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SECURITY ANALYSIS & PORTFOLIO
MANAGEMENT



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Block 1 Unit 1

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1.1 Introduction

When the current income of an individual exceeds the current consumption, it is a general human tendency to save the excess amount for future requirements. For the purpose of savings, there are multiple avenues available. One can simply keep the excess amount idle and get back the same amount whenever required. But keeping the money idle is not an ideal option as time value factor will reduce the actual value of the money in the long run. Hence, it is important to make the money work for you so that it can grow and give you the expected return over the time.

The best way to make your excess money work for you is to invest them in suitable investment avenues. Investment is considered as an asset that yields return which may vary depending on the type of investment and the risk involved. The basic purpose of any investor is to earn the maximum possible return from his/her investment with minimum risk. In this unit, we shall learn about the fundamental concepts related to investment before entering into the technicalities of the investment world.

1.2 Objectives

After going through the unit, you should be able to answer the following:

- What is an Investment?
- Why is it important to make investment?
- What are the various features of investment?
- What are the various types of investment?

1.3 Concept of Investment

An investment is an asset which is purchased with the expectation of getting return in future. Investment is considered as a sacrifice of current consumption for receiving future benefits. It is a commitment of money with the hope of getting additional return in future.

Simply earning money is not sufficient to live a comfortable life. In addition to earning money, if we can make the money work for us, it helps in creating wealth. Anybody can make his/her money work for him/her and generate return by efficiently investing them in various investment avenues available in the market. For example, investing saved money in banks in the form of various deposits, investing additional funds in securities, mutual funds, etc.

According to Fischer and Jordan, "Investment is a commitment of funds made in the expectations of some positive rate of return. If the investment is positively undertaken, the return will be commensurate with the risk the investor assumes."

Warren Buffett has defined Investing as "the transfer to others of purchasing power now with the reasoned expectation of receiving more purchasing power after taxes have been paid on nominal gains in the future."

However, investment always involves two inter-related phenomena –Risk and Return. The basic purpose of any investor is to minimise the risk and maximise the return which forms the subject matter of study for the whole world of investment.

1.3.1 Characteristics of investment:

Investment is a unique term in the world of finance and economics. It possesses some salient features which are discussed below-

- a) **Risk:** All investments involve some amount of risk. The basic purpose of any investor is to minimise the risk and maximise the return. Higher the expected return, higher is the risk and vice versa. However, some investments like Bank deposits, PPF, NSC, Government Securities are considered as risk-free investment avenues as the risk involved in these instruments are very negligible.
- b) **Return:** As discussed earlier, an investor's main objective is to earn some amount of return from his/her investment. This return may be in the form of capital gain or yield or both. Capital gain occurs when the value of the instrument increases over the time and it can be sold or realised in the market at a higher price than the purchasing price. On the other hand, yield from an investment refers to the interest, dividend, etc. that can be earned during the period of holding the instrument.
- c) **Safety:** When an amount is invested in any kind of investment, its safety is always a major concern for the investor. Safety here means certainty of return of the amount invested without any loss of money or time. Higher the risk involved, less is the safety of the investment. Thus, if the investor wants to assure safety of the investment, it is advisable to invest in risk-less investment avenues.
- d) **Liquidity:** If an investment is easily marketable or realisable or saleable without the risk of loss of money or capital value, it is considered as a liquid investment. Liquidity is an important factor for the investors as it ensures that the invested amount can be easily converted into cash. However, investments with high liquidity may result into low return as compared to an illiquid investment.
- e) **Marketability:** The terms 'marketability' and 'liquidity' are used synonymously in case of investment. However, the term 'marketability' is mostly applicable in

case of security form of investment as there is involvement of an open market for buying and selling of shares, debentures, etc. Marketability means the availability of a ready market for the securities where they can be easily bought or sold. The securities of those companies which are listed in the recognised stock exchanges are more easily marketable as compared to the non-listed one.

- f) **Protection against inflation:** An investment is made with the objective of safety and with an expectation of good return. Hence it is important that investment provides protection against the prevailing inflation in the economy. If the inflation rate is higher than the expected rate of return from the investment then the actual value of the investment will go down and the investor will suffer loss. The investors have to ensure that the return on investment is always higher than the prevailing inflation rate so that they are protected from the inflation hit.
- g) **Tax minimisation:** Investment also helps the taxpayers, especially the salaried people, in reducing the tax liability. In order to promote investment habits among the public, Government provides various deductions and exemptions from tax in terms of the amount invested in selected investment avenues. For example, under sec 80C of the Income Tax Act, any amount invested in PPF, NSC, some specific Mutual funds, ELSS, etc are eligible for deduction while calculating taxable income of an individual taxpayer.

1.3.2 Savings vs Investment

Most of the times the terms ‘savings’ and ‘investment’ are considered as synonymous by the laymen. But as a commerce learner, it is important to know the key differences between both the terms. Savings is putting aside the excess amount of money safely for the purpose of future requirements with no or negligible amount of risk. But investment is always made with the expectation of growth and regular return over the period of time which obviously involves risk. Let us discuss a few points of distinction between both the terms-

Basis	Savings	Investment
Objective	To safely meet short term future requirements.	To create wealth by earning high return and capital appreciation.
Risk	It involves zero or negligible amount of risk.	It involves high or moderate amount of risk.
Return	It helps in earning a fixed and steady return.	It has the capability to earn much higher return.
Liquidity	It has very high liquidity.	Usually it has medium or very low liquidity.
Difficulty	It is very easy to choose a saving instrument.	It requires special knowledge or skill to choose an appropriate instrument for investment

		as per requirements.
Products or instruments	Cash, Bank Deposits, Post Office Deposits, etc.	Stock, bonds, mutual funds, real estate, etc.

Check your progress:

- 1) Keeping money idle is actually a loss because of _____ factor.
- 2) Investment always involves _____ and _____.
- 3) Savings are highly _____ as compared to investment.

1.4 Objectives of Investment:

The investors invest their money in various investment avenues keeping in mind their future goals and requirements. But the general objective of each and every investor is to earn high rate of return and gain capital appreciation over the period of time involving minimum amount of risk. Although safety of the investment is a priority for the investors but in reality, there is no such thing as safe and secure investment. When there is expectation of growth and return, it necessarily involves some amount of risk along with it. It is up to the investor how much risk he is willing to take as per his expectation of return and growth. Any rational investor is very well aware about the time value of money and he/she will definitely try to earn a higher rate of return on his/her investment than the rate of inflation prevailing.

Apart from the primary objective of safety of the investment, earning higher rate of return than the inflation rate, capital appreciation; investors may have certain secondary objectives. Such secondary objectives include liquidity and tax reduction. Liquidity, as discussed earlier, is the ability of the investment to be converted into cash with ease in the market without the risk of loss. Most of the investors prefer their investment to be liquid so that they can be used at the time of emergencies without much difficulty. But all the investment tools are not equally liquid. Therefore, it is important for an investor to invest in suitable avenues as per their liquidity requirements. Sometimes, an investment is also made with an additional objective of reducing the tax liability. Since some of the selected investment avenues are eligible for tax deduction, they are preferred by the investors solely for the purpose of getting tax benefits. However, in order to avail such tax benefits, it is very important for the investor to research and find out the most suitable investment avenue.

1.5 Types of Investment:

All the investment avenues available for an investor can be broadly classified as **Security form of Investment** and **Non-security form of investment**. Security form of investments are those investment avenues which are freely transferable and saleable as per the investor's will. For example, shares, bonds, mutual funds, etc. On the other hand, non-security form of investments includes those investment alternatives which are non-marketable and the

ownership of such investments cannot be transferred to others. For example, bank deposits, post-office deposits, insurance policies, etc. When an investor makes an investment, he/she gets a wide range of alternatives to invest in. A brief description about various types of Investment Avenues is provided below:

- a) **Deposits:** The most popular investment avenue preferred by the low risk tolerant Indian investors is Deposits. They are non-marketable i.e. they cannot be sold in the market to collect the invested money prior to the maturity date. For example, bank deposits, post office deposits, company deposits, provident fund deposits, etc. They are the safest form of investment as there is no risk of loss involved. Since there is no risk, the rate of return is also low. Normally the rate of return in deposits are just sufficient enough to meet the inflation rate. However, if the economic situation of the country degrades due to any uncertain event, there may arise such situation where the interest provided by the financial institutions on savings account will not be capable of bearing the hit of inflation in the economy. In such cases the investment in these deposits cannot be considered as a safe form of investment.
- b) **Equity Shares:** Equity shares are the representative form of ownership capital of a company. By investing in equities of a company, an investor become an equity shareholder which make them the owner of that company. However, it also involves undertaking risks associated with that company because of the ownership stake. Hence, they also provide the investors with the opportunity to earn higher return as compared to other investment avenues. (A detailed description about equity share is provided in the next section of this unit).
- c) **Property:** It involves investing funds in real property or tangible personal property such as land, building, gold, antiques, etc. They are not easily marketable investment as these are not easy to buy or sell and hence considered as illiquid type of investment.
- d) **Bonds or debentures:** They represent long term debt instrument issued by a corporate or Government organisation. Investment in bonds are secured by a specific physical asset but the debentures are secured only by the issuer's promise to pay the interest and principal amount on time.
- e) **Indirect Investment:** These are the investment avenues which are managed and operated by professional investment experts having specified set of skills and experience in the field of investment. The actual investors are only concerned with providing the fund. The responsibility of utilising the funds so provided in an efficient manner to make the maximum out of it lies on the hands of the experts. These experts or fund managers, however, charge an amount of commission for the services provided. For example, mutual fund schemes, Systematic Investment Plans (SIPs), etc.
- f) **Money Market Securities:** These are short term debt instruments with a maturity of less than one year. They are mainly dealt in money market and are very liquid in nature. For example, Treasury Bills (T-Bills), Commercial Papers, Certificate of Deposits (CoD), etc.
- g) **Life Insurance Policies:** Although not much profitable in terms of return, Life Insurance Policies are also considered as important investment avenue. Investors uses

such avenue mainly with the purpose of tackling uncertainty in future and the tax benefits it provides to the policyholders.

- h) **Derivatives Securities:** These are financial instruments the value of which is derived from the value of an underlying asset. Some frequently used derivative instruments are Options, Futures and Swaps. (A detailed discussion regarding the derivatives has been made in the Block 6 of this book.)
- i) **Digital Assets:** With the tremendous growth in the technology, a new form of investment avenue has evolved over the past few years. Investors, especially, the young investors are very much attracted to this investment avenue which is called digital assets or virtual digital assets. They are basically assets without any physical form but available only in digital form. They are any information or number or token that is generated through cryptographic means. For example, Non-fungible Tokens (NFT), cryptocurrencies, etc.

Equity Shares:

From the previous discussion we have come to know that an investor willing to invest his/her surplus fund gets an ample number of investment avenues to choose. However, in the world of investment management, the Equity investment holds a special place and hence devotion of a separate section for this topic is very much important for the learners having interest in the field of investment.

Generally, when a company starts, it gets its first source of equity capital from the owners or promoters of that company. Equity capital is the main source of finance for any company providing investors with rights to vote, share of profits and claim on assets. After a certain level of growth, the company requires more capital for further growth and expansion. The promoters of the company then collect the required amount of funds from their friends, relatives, venture capitalists, mutual funds, or any such small group of investors and issue fresh equity shares to these investors. But there comes a point where the company reaches a high level of growth and requires huge capital investment for further growth and expansion. In such situation the company approaches the general public by means of an Initial Public Offering (IPO) to become equity investors in the company. Equity shares are long-term sources of finance because legally they are irredeemable in nature. For the equity investors, these shares are certificate of ownership in the company by virtue of which they are entitled to share the net profits and have a residual claim over the assets of the company in the event of liquidation. Investors have voting rights in the company and their liability to the company is limited to the amount of issue price of the equity stock.

Classification of Equity shares: The equity capital of a company can be classified into the following groups-

- **Authorised Share Capital:** It is the maximum amount of capital which a company is authorised to issue. The companies can increase it from time to time for which they need to comply with some legal formalities and also have to pay some fees to the legal bodies.
- **Issued Share Capital:** It is that part of authorized capital which the company offers to the investors.

- **Subscribed Share Capital:** It is that part of issued capital which the investors have subscribed for.
- **Paid Up Capital:** It is the part of the subscribed capital, for which the investors have actually made the payment for.

Apart from the above classifications, equity shares can also be classified as follows:

- **Rights Shares:** These are those shares which a company issues to its existing shareholders prior to issuing them to the public. The company issues such kind of shares in order to protect the ownership rights of the existing investors.
- **Bonus Shares:** When the company issues shares to its shareholders instead of paying them dividend, such shares are called bonus shares. It helps the company to maintain the liquidity position intact.
- **Sweat Equity Share:** These are shares issued by the company at a discount to its employees and directors as a consideration for their services and hard work towards the company. The employees become owners in the company and participate in profit

Check your progress:

- 4) To issue equity shares to the public in the market for the first time, companies use _____ .
- 5) Equity shareholders enjoy _____ in the company.

sharing.

Various terms associated with Equity Shares:

- **Par or Face Value:** Par or face value is the value of shares which is mentioned in the memorandum.
- **Issue Price:** This is the price at which a company offers the investors to purchase the price.
- **Share Premium:** When the issue price is higher than the face value of the share, the difference is termed as share premium. However, if the shares are issued at a price lower than the face value then the share are said to be issued at discount.
- **Book Value:** The book value of a share can be calculated with the help of the following formula -

$$\frac{\text{Paid up equity capital} + \text{Reserves and surplus} - \text{any loss}}{\text{The total number of equity shares of the company}}$$
- **Market Value:** When the shares of a company are listed in stock exchange, the market value of the share is the price at which the shares are traded in the market. This value is volatile in nature and changes according to the market demand and supply of such shares.

Classification of Equity Shares in Stock Market: The equity shares are sub-classified in the stock market as follows-

- a) **Blue-chip shares:** These are the shares of large, financially strong, well-established companies with a sound operational track record. They are not only the premium corporates but also the dominant leaders of the respective industry.
- b) **Growth shares:** These are the shares in companies which are anticipated to grow at a rate significantly higher than the average growth rate in the market. They are also profitable in nature.
- c) **Income shares:** This is the class of shares of companies which have fairly strong hold in the market and thus shareholders are paid high amount of dividend. But the scope of growth in case of income shares are lesser than the growth shares.
- d) **Cyclical shares:** These are the shares the performance of which in the stock market are affected by the cyclical fluctuations in economic cycle.
- e) **Defensive shares:** These shares are not affected by the ups and downs of economic cycle in the market. They provide constant dividend and stable earning irrespective of the overall market condition.
- f) **Speculative shares:** These are the shares used by traders in stock market to involve in speculative trading. Speculation means conducting a financial transaction with the expectation of significant gain but with a substantial risk of losing.

1.6 Key Terms

Time value factor: Also known as time value of money, it is based on the fact that with passage of time, the value of money reduces. In other words, a sum of money at present is of more value than the same amount of money in future.

Liquidity: It refers to the ability of an asset or security to be converted into cash without reducing its market value.

Inflation: Inflation refers to the increase in prices of goods and services in the economy. Such increase in price happens due to reduction of purchasing power of a particular currency over time.

Venture capitalists: A venture capitalist is a private equity investor who provides funds to companies with high growth potential as capital in an exchange for equity stake in the company.

1.7 Summing Up

- An investment is an asset which is purchased with the expectation of getting return in future.
- Investment always involves two inter-related phenomenon –Risk and Return.
- The general objective of each and every investor is to earn high rate of return and gain capital appreciation over the period of time involving minimum amount of risk.
- All the investment avenues available for an investor can be broadly classified as Security form of Investment and Non-security form of investment.

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1.9 Model Questions

- 1) Define investment and explain its salient features.
- 2) What are the motives behind making any investment by an investor?
- 3) Briefly explain various kinds of security and non-security form of investments.
- 4) 'Equity shares have been classified distinctly in share market.' – elaborate the statement.

1.10 Answers to 'Check your progress'

- 1) Time value of money
- 2) Risk and return
- 3) Liquid
- 4) IPO or Initial public offerings.
- 5) Voting rights

BLOCK 1 UNIT 2

- 2.1 Introduction
- 2.2 Objectives
- 2.3 Concept of Portfolio Management
- 2.4 Objectives of Portfolio Management
- 2.5 Phases of Portfolio Management
- 2.6 Key Terms
- 2.7 Summing Up
- 2.8 References and Suggested readings
- 2.9 Model Questions
- 2.10 Answers to ‘Check your progress’

2.1 Introduction

In order to earn profit or gain growth by investing in stock market it is not sufficient to invest in a particular company's security. The investor needs to invest his fund in a diversified manner by selecting securities of multiple companies. Besides, in order to curb the risk involved in corporate securities, some investors may be interested to include debentures, bonds or Government securities in his investment target. A collection of all financial assets such as shares, debentures, bonds, debt instruments, mutual funds, etc. where an investor puts his money, together is called his investment portfolio. It is very important for an investor to be aware about managing his portfolio efficiently. In this unit, we shall learn about how an investor can manage his portfolio in an efficient manner to get higher return with minimum risk involved. We shall also learn about the various objectives along with the process of portfolio management in this unit.

2.2 Objectives

After going through the unit, you will be able to:

- explain the concept of portfolio management.
- Understand why portfolio management is important
- Discuss the various phases involved in portfolio management.

2.3 Concept of Portfolio Management

Portfolio: A collection of all financial assets such as shares, debentures, bonds, debt instruments, mutual funds, etc. where an investor puts his money, together is called his investment portfolio. It is an appropriate collection of various investments which may be

held by an individual investor or an institutional investor. Building a diversified Portfolio helps the investors in reducing risks without sacrificing the returns.

Portfolio Management: The basic goal of any investor is to earn maximum possible return for minimum possible risk. But it is not possible for an investor to meet that goal by randomly investing in securities. Construction of an efficient portfolio to get the desired result is a critical process which requires professional skill and knowledge. Portfolio management is the process of selecting the right financial assets for maximising the returns by minimizing the risks involved. It is a professionally managed process including various activities to make optimum utilisation of the invested funds so as to meet the specified investment goals of the investor. Basically, it involves proper decision making regarding buying and selling of securities included in the portfolio. In other words, it is a SWOT analysis of alternative investment opportunities after considering the investors' objective and risk appetite. There may be infinite number of alternatives available at a particular point of time in terms of securities to be bought or sold. But an investor needs not only to plan the portfolio as per his return expectancy, but also needs to manage the portfolio by analysing the risk-return pattern of the securities so as to earn the maximum possible return for the lowest possible risk. Portfolio management is a dynamic concept and it requires continuous and systematic analysis, judgement and actions for achieving the desired goals.

Portfolio management involves the following activities-

- a) Collection of Investor's database.
- b) Construction of a portfolio.
- c) Formulation and implementation of an investment strategy.
- d) Review and monitoring of portfolio performance.
- e) Portfolio evaluation.

2.4 Objectives of Portfolio Management

Portfolio management is a widely practised process in India. With tremendous technical advancement, portfolio management has become quite easy as the data tracking, data analysis and finding the required result can be done with an automated process through computers having high processing capacity. While the process has become easier, the basic objective of portfolio management has been the same for every investor i.e. to earn maximum return for minimum risk. However, an efficient portfolio management fulfils various other objectives for the investors as well. Following are some of the main objectives of portfolio management-

- a) **Safety of Invested funds:** Ensuring safety of the principal amount invested in the portfolio is the very first objective of portfolio management. Before thinking about return or growth, it is always necessary to ensure safety of the investment to the investor. In search of high return or high growth, the safety of the investment must not be compromised and it is the duty of the portfolio manager to ensure that the

investment is absolutely safe.

- b) Stability of return:** Return here refers to current income by means of interest or dividends but not capital gains. After ensuring safety of the investment, it is the objective of portfolio management to earn a stable return by investing in various suitable financial assets. Such return, however, should be at least equal to the opportunity cost of the invested funds. If the return yielded does not compensate for the opportunity cost then it is advisable to alter the financial assets mix in the portfolio.

- c) Capital appreciation:** Earning a stable return does not suffice the purpose of portfolio management. It is always important to ensure appreciation in the capital value of the funds invested so as to avoid erosion in purchasing power resulting from inflation and related economic factors. If the investment does not appreciate in value over the time, there is no point of investing because the current earnings from such investment will be offset by the loss in purchasing power of funds so invested. Portfolio management assures capital growth by investing in growth securities available in the market after analysing the risks involved therein.

- d) Liquidity:** The economic and financial environment keeps on changing on a minute to minute basis. The wise investors are always in search of market opportunities to increase their wealth and they always need ready liquidity position for that. Healthy liquidity position can be ensured by managing one's portfolio in such a manner that there are funds available at short notice so that whenever there is a market opportunity, the investor can make the best out of it.

- e) Marketability:** Marketability of the financial assets, especially shares, included in a portfolio is an important aspect for any investor. If the portfolio consists of such investments which cannot be marketed and traded in the market easily, it may lead to difficulty when there arises a market opportunity or when there is a need to switch from one investment to another. A portfolio management ensures that the portfolio consists of ready financial assets which can be marketed and traded without much obstacles.

- f) Risk Diversification:** It is a well known fact in the world of finance that higher the risk, higher is the return and vice versa. An efficient portfolio consists of financial assets with diversified risk potential i.e. it contains securities having high, medium as well as low risk potential. By diversifying the risk, portfolio management ensures reduced risk of loss, both capital as well as revenue nature.

- g) Tax planning:** Whenever there is a source of income, it involves the taxation aspect of such income. Income from investment is no exception and any kind of income being interest, dividend or capital gain resulting from investment is chargeable to tax as per their respective taxation rules. It is an important objective of portfolio management to

minimise the tax burden by providing favourable tax shelter to the investor. An evaluation of the whole portfolio should be made after carefully considering the income tax, capital gain tax along with any other taxes that is chargeable on the investment made by the investor.

Check your progress:

- 1) It is better to invest in single security than in a basket of securities. (State true or false)
- 2) Portfolio management is a one-time process. (State true or false)
- 3) Portfolio management helps in reducing risk as well as tax burden of the investor. (State true or false)

2.5 Phases of Portfolio Management

As stated earlier, portfolio management is a dynamic concept and it requires continuous and systematic analysis, judgement and actions for achieving the desired goals. The whole process of portfolio management can be subdivided into five phases each of which is an integral part of the whole process. The process starts with security analysis and continues upto portfolio evaluation. The efficiency in implementing these phases are crucial for the success of the portfolio management as a whole. These phases are described below-

- a) **Security analysis:** When it comes to investing in securities, an investor gets many options including equity shares, preference shares, debentures, bonds, depository receipts, etc. That is why the portfolio management process starts with choosing the best options for the investment portfolio as per the investor's requirements. Security analysis involves evaluation and analysis of risk-return characteristics of each individual security so as to find out the 'mispriced' securities. The strategy adopted here is to buy the under-priced securities and sell the over-priced securities to earn a satisfactory return. There are two approaches to security analysis – Fundamental analysis and Technical analysis. While fundamental analysis concentrates on fundamental aspect of a company such as EPS, dividend pay-out ratio, market competition, management quality, etc; technical analysis is more concentrated towards analysing the movement in the security prices to predict future price trends and patterns. Both these approaches have been discussed in details under the Block-3 of thisbook.
- b) **Portfolio analysis:** A portfolio is a combination of financial and physical assets held together as an investment. After security analysis the investor can finalise the securities in which investment need to be made so as to decide on the components of the portfolio. However, there can be multiple portfolios that can be constructed by combining different sets of securities and also by changing the proportion of investment weightage in each security. Portfolio analysis helps in constructing the suitable portfolio for the investor by identifying the range of probable portfolios that

can be constructed from a particular set of securities and by calculating their risk-return pattern for further analysis. It enables the investor to spread the risk by creating a diversified portfolio. Continuous portfolio analysis helps the investor in making necessary changes in the portfolio from time to time according to the changing market condition.

- c) **Portfolio selection:** Investors always try to build a portfolio with highest return at a given level of risk. On the basis of input received from portfolio analysis, the efficient portfolios are formed out of all the possible portfolios. Efficient portfolio here refers to the portfolio which offers the highest return at a given level of risk. Out of all the efficient portfolios, the investor then selects the optimal portfolio for making the final investment. **Harry Markowitz** developed a conceptual theoretical framework for determining an optimal portfolio in a disciplined and objective manner. However, it is upto the investor to make the final decision regarding which portfolio is the most suitable one for the investment to be made.
- d) **Portfolio revision:** In order to maintain the optimality of the selected portfolio over time, it is important to constantly monitor its components. As the market never remains same, the securities included in the portfolio may not possess the same risk-return characteristics for its whole life. Dynamic economic and financial situation may result into new securities with better return at lower risk. In such situation, the investors need to revise their portfolio in a scientific and objective manner. Such portfolio revision may include selling of old securities and purchase of new securities. Revision may also be made by altering the combination of securities or their proportion in the portfolio. The portfolio revision is an important phase of portfolio management and it is as significant as portfolio analysis and portfolio selection.
- e) **Portfolio evaluation:** It is important to ensure that the portfolio is performing as per the expectations of the investor or at least there is not much variance in its actual performance with the expected one. Portfolio evaluation is the process of assessing the risk-return performance of the portfolio over a particular period of time. It is a feedback mechanism which helps in improving the entire portfolio management process. The quantification of return realised and the risk born by the portfolio discloses the relative merits and demerits of the portfolio. Such crucial information may be used by the investor to eliminate the deficiencies in the portfolio and design a better portfolio next time.

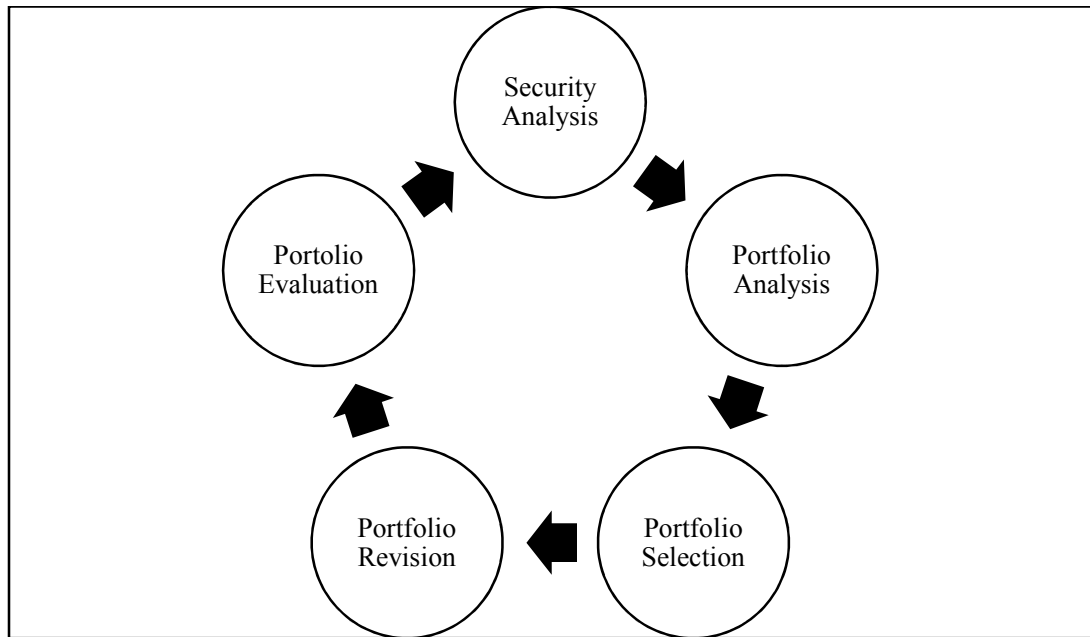


Fig.2.1 Phases of Portfolio Management

2.6

Check your progress:

- 4) In case of mispriced securities, the strategy adopted should be to buy the _____ securities and sell the _____ securities to gain profit.
- 5) An optimal portfolio can be selected by using _____ Model.
- 6) Portfolio _____ provides a feedback mechanism to improve the whole portfolio management process.

s

:

Institutional investor: Some financial institutions also invest funds on behalf of their clients or members in the securities market. Such investors are known as institutional investor.

SWOT analysis: Strength, Weakness, Opportunities and Threats analysis.

Risk appetite: It is the risk-taking capacity of an investor.

Opportunity cost: It is the potential loss as a result of selecting one alternative over others.

Tax shelter: These are the means and ways through which the taxpayers try to reduce their tax liability.

Mispriced securities: When there is a difference between the market price and the intrinsic value or fundamental value of a security, the security is considered as

mispriced security.

2.7 Summing Up

- Portfolio is a collection of all financial assets such as shares, debentures, bonds, debt instruments, mutual funds, etc. where an investor puts his money.
- Portfolio management is a SWOT analysis of alternative investment opportunities to build a strong portfolio to meet the investors' objective and risk appetite.
- Portfolio management is a continuous process involving five distinct steps-security analysis, portfolio analysis, portfolio selection, portfolio revision and portfolio evaluation.

2.8 References and Suggested readings

- Avadhani, V. A. (2011). *Investment Analysis and Securities Markets in India* (9th Ed.). Mumbai: Himalaya Publishing House.
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- Pathak, B. (2014). *Indian Financial System* (4th Ed.). Delhi and Chennai: Pearson.
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2.9 Model Questions:

- 1) What do you understand by a portfolio? Why portfolio management is important for an investor?
- 2) Describe the different phases involved in portfolio management.
- 3) "Portfolio evaluation provides a feedback mechanism for improving the entire portfolio management process." Elucidate the statement.

2.10 Answers to 'Check your progress'

- 1) False
- 2) False
- 3) True
- 4) Under-priced, over-priced
- 5) Markowitz

6) evaluation

BLOCK 1 UNIT 3

- 3.1 Introduction**
- 3.2 Objectives**
- 3.3 Risk and Return**
- 3.4 Types of Risk**
- 3.5 Measurement of Risk**
- 3.6 Key Terms**
- 3.7 Summing Up**
- 3.8 References and Suggested readings**
- 3.9 Model Questions**
- 3.10 Answers to ‘Check your progress’**

3.1 Introduction

As we have already learnt in the 1st Unit of the 1st Block, investment always involves two inter-related phenomena –Risk and Return. The basic purpose of any investor is to minimise the risk and maximise the return which forms the subject matter of study for the whole world of investment. Only after careful analysis of the Risk-Return characteristics of a security, an investor may choose to include the security in the portfolio. The difference between expected return and actual return from an investment is termed as risk in investment. In this unit, we will learn about various aspects of risk-return characteristics of investment. We will discuss about the classification of risks as well as various measurement tools applicable in risk calculation.

3.2 Objectives

After going through the unit, you will be able to:

- Explain the relationship between risk and return of a security
- Understand the various types of risk involved in investment.
- Identify and measure the risk involved in investment.

3.3 Risk and Return

Risk, in terms of investment, is the possibility of getting less return from the investment made as compared to the expected return. Due to uncertainty of future and volatility in the market, sometimes the investor might not be able to get as much return as expected. This uncertainty of future return is called risk. In other words, when there is possibility of variability in returns, there arises risk. All investors are concerned with the risk factor that their actual return from investment will be less than the expected return. The higher the gap between expected and actual return, the higher is the risk and vice versa.

Return, on the other hand, is the reward for undertaking risk. It is the primary motivating factor that encourages an investor to make investment. This return may be in the form of capital gain or yield or both. Capital gain occurs when the value of the instrument, where investment has been made, increases over the time and it can be sold or realised in the market at a higher price than the purchasing price. On the other hand, yield from an investment refers to the interest, dividend, etc. that can be earned during the period of holding the instrument.

3.4 Types of Risk

Risk means the possibility of loss or possibility of not getting the expected return from an investment. It is the potentiality of variability in returns. The difference between expected return and actual return from an investment is termed as risk in investment. Broadly, investment risk can be classified into two groups-**Systematic Risk** and **Unsystematic Risk**. Below, a detailed discussion has been made about these two groups of risks along with their sub-classification-

a) Systematic risk: Systematic risks are the risks related to the economic trends in the market which affects the entire market. From time to time, you must have noticed news headlines such as 'Market has crashed' or 'Market is down'. These are phenomena which are created by systematic risk. The risk which is caused by factors that are external to a particular company as well as uncontrollable to the company, are known as systematic risk. The systematic risk does not affect a single company but affects the market as a whole. These risks cannot be avoided as they occur due to the response to economic, social and political changes. For example, changes in economic policy may cause an adverse effect on the prices of all industrial and corporate securities. Systematic risk can be again classified into 3 types- **Interest rate risk, market risk** and **Purchasing power risk**. These are discussed below-

(i) Interest rate risk: Interest rate risk is particularly related to the debt securities in the market. In general, the prices of the debt securities tend to move inversely to the interest rate changes in the market. That means, when market interest rate increases, there is a decrease in the debt securities and vice versa. Interest rate risk is the variation in the single period rates of return caused by the fluctuations in the market interest rate. Most commonly the interest rate risk affects the debt securities like bonds and debentures.

We shall discuss with an example to understand how the interest rate risk can affect the prices of a debt security. Let us assume that a bond with a face value of Rs. 100 is being issued with a coupon rate of 10%. If the prevailing market interest rate is also 10% then the bond will also have a market value of Rs. 100. But, if due to any policy changes the market interest rate goes up to 12.5%, then there will be fall in the demand for the bond in the market. This is because the investors will not be interested to buy the bonds as they have the option to earn 12.5% interest in the market as compared to 10% interest offered by the bond. As a result, the issuer of the bond will be compelled to reduce the price of the bond so that the investor will be able to earn a return of at least equal to the market rate. In this case, the issuer has to reduce the price to at least Rs. 80 so that investors in the bond can earn a return of Rs. 10 on an investment of Rs.80 which is equivalent to the market rate of return of

$(\frac{10}{80} \times 100)$ or 12.5%. That is why the market price of debt securities is inversely related to the prevailing market interest rates. This variation in the prices of debt securities in relation to the market interest risk is termed as Interest rate risk.

Changes in the market interest rate also have an impact on the stock prices of corporate bodies. Most of the stock traders are involved in margin trading i.e. purchasing stocks on margin by using borrowed funds. When there is an increase in the market interest risk, the margin for the traders reduces and as a result they become less interested in buying stocks which reduces the demand and eventually reduced the stock price.

(ii) Market risk: Stock market is volatile in nature. The ups and downs of stock market leads to variation in security returns. Such variation in return caused by stock market volatility is referred to as market risk. Share prices fluctuate over a period of time in a continuous manner. When there is upward trend of the share prices in the market for a significant period of time, it is called **bullish trend** and when the prices tend to fall over a significant period of time, it is called a **bearish trend**. Such bullish trend or bearish trend can be created both by tangible as well as intangible events. Tangible events may include various social, economic or political events such as changes in monetary policy, war between countries, changes in Government, etc. These events change the demand-supply equation in the market and eventually creates bullish and bearish trends in the market. Intangible events, on the other hand, include psychological and emotional factors of the investors. Generally, changes in investors' expectations is due to the real or tangible events. But reaction to such fluctuations is often intensified by intangible factors such as psychology and emotion of the investor leading to an overreaction and irrational decision by the investor.

Thus, any tangible or intangible factor may create volatility in the stock market which eventually results in variations in security returns. Such variation in return caused by stock market volatility is referred to as market risk.

(iii) Purchasing power risk: Variation in the return from investment caused by inflation in the economy is known as purchasing power risk. Inflation in the economy may be **cost-push** inflation or **demand-pull** inflation. Cost-push inflation is caused by increase in the cost of production and such incremented cost is passed to the customers through the rise in the prices of goods. On the other hand, demand-pull inflation is caused by the excess demand over the supply, resulting in an increase in the prices of the goods in order to eliminate the excess demand. When there is fall in the purchasing power of the money due to inflation, the prices of the goods and services would increase and the investor would face a loss in the purchasing power of his investment along with the return on such investment. Such variation in return from investment is termed as purchasing power risk.

b) Unsystematic risk: Opposite to the systematic risk, these are the risk caused by factors that are specific, unique and related to a particular industry or company. A security may have variable return because of certain specific factors affecting only the company issuing such securities. For example, frequent labour strike in a company may hamper the profitability of

the company, changes in consumer preferences may affect the sales of a particular company, technological changes may make some company absolutely irrelevant in the market, etc. These factors need careful analysis for calculating the total variability of return of a particular company or industry. There are two types of unsystematic risks- **Business Risk** and **Financial Risk**. These are explained below-

(i) Business risk: Business risk may result from both internal as well as external factors. Every company operates within a particular operating environment which includes both internal environment within the firm and external environment outside the firm. Internal factors are associated with the efficiency with which a company operates within its broader environment. For example, unavailability of raw materials, improper product mix, lack of competency, absence of strategic management, etc. External factors are associated with the changes in operating conditions due to the factors which are beyond the company's controls. For example, changes in business law, ups and downs in international markets, technological changes, etc. In simple words, business risk is the variability in operating income caused by the operating conditions of the company.

(ii) Financial risk: Financial risk in a company is associated with the capital structure of the company. It arises because of involvement of debt capital in the total capital structure of a company. Use of debt capital in the capital structure, also known as financial leverage, enables the companies to bring capital at a lower cost. However, Financial leverage is beneficial for the company only when the earnings of a company are higher than the cost of borrowing. If the earnings of the company are low, then it will lead to lower earnings per share for the equity shareholders. Financial risk refers to the variability of the income to the equity shareholders due to the use of debt capital in the total capital structure. The involvement of debt in the capital structure compulsorily creates fixed payments in the form of interest which creates more variability in the earning per share available to equity shareholders. This variability of return is called financial risk and it is a type of unsystematic risk.

Check your progress:

- 1) When there is high risk involved in a security, there is also scope for _____ return from that security.
- 2) Systematic risk affects only an individual security. (State true or false)
- 3) Financial risk arises from using _____ in the capital structure.

3.5 Measurement of Risk

As we have already learnt that risk is nothing but deviation of actual return from expected return, the calculation of such deviation is very much important to make proper investment decision. Most investors are concerned with the fact that the actual return will be less than the expected return and such concern gives rise to the significance of Risk Measurement. The

higher the variability in return, the higher will be the risk. Such variability can be measured with the help of two statistical measures of dispersion:

- a) **Variance:** It is a measure of potential deviation of the possible return from the expected rate of return. Variance is denoted by σ^2 and can be calculated with the help of the following formula:

$$\sigma^2 = \sum_{i=1}^n \{p(x_i)(x_i - \bar{x})^2\}$$

Where, $p(x_i)$ = Probability of possible return

x_i = Possible Return

\bar{x} = Expected Return

- b) **Standard Deviation:** It is an absolute measure of Risk and is simply the square root of the variance that has been discussed above. That is why it is represented as σ and is calculated as follows:

$$\sigma = \sqrt{\sum_{i=1}^n \{p(x_i)(x_i - \bar{x})^2\}}$$

Apart from variance and standard deviation, several other measures such as range, semi-variance, absolute mean deviation, etc. have been used to measure risk. But out of all the measures, standard deviation has been the most widely accepted measure of risk calculation.

Illustration 1: From the following data, calculate the expected return and Standard Deviation of return of a stock-

<u>Possible Return (%)</u>	<u>Probability</u>
28	0.25
40	0.34
39	0.08
52	0.23
67	0.10

Solution:

Calculation of expected Return:

Possible Return (%)	Probability	
x_i	$p(x_i)$	$x_i p(x_i)$
28	0.25	7
40	0.34	13.6
39	0.08	3.12
52	0.23	11.96
67	0.10	6.7
$\sum x_i p(x_i) = 42.38$		

- Expected Return, $\bar{x} = 42.38\%$

Calculation of Standard Deviation (SD):

Possible Return (%) x_i	Probability $p(x_i)$	Deviation $x_i - \bar{x}$	Deviation ² $(x_i - \bar{x})^2$	$p(x_i)(x_i - \bar{x})^2$
28	0.25	-14.38	206.78	51.70
40	0.34	-2.38	5.66	1.92
39	0.08	-3.38	11.42	0.91
52	0.23	9.62	92.54	21.28
67	0.10	24.62	606.14	60.61
$\sum \{p(x_i)(x_i - \bar{x})^2\} = 136.42$				

- Variance, $\sigma^2 = 136.42\%$
- Standard Deviation (SD), $\sigma = \sqrt{136.42}\% = 11.68\%$

Illustration 2: Below a list of possible selling prices of a stock and their respective probabilities is provided. If the stock costs Rs.250 but pays no dividend, then calculate the expected return and the Standard Deviation of return of the stock.

<u>Possible selling prices (Rs)</u>	<u>Probability</u>
185	0.30
270	0.22
250	0.15
215	0.10
285	0.15
265	0.08

Solution:

In this question, the possible return (in %) is not directly given. Hence, we need to calculate it by using the following formula:

$$\text{Possible return (in \%), } x_i = \frac{\text{Dividend} + (\text{Selling Price} - \text{Cost Price})}{\text{Cost price}} \times 100$$

Calculation of Possible Return (in %):

Possible Selling Prices (Rs.)	Selling Price – Cost price	Possible Return (in %)
185	-65	-26
270	20	8
250	0	0
215	-35	-14
285	35	14
265	15	6

Calculation of expected return:

Possible Return (%)	Probability	
x_i	$p(x_i)$	$x_i p(x_i)$
-26	0.30	7.80
8	0.22	1.76
0	0.15	0
-14	0.10	-1.4
14	0.15	2.1
6	0.08	0.48
$\sum x_i p(x_i) = 10.74$		

• Expected Return, $\bar{x} = 42.38\%$

Calculation of Standard Deviation (SD):

Possible Return (%) x_i	Probability $p(x_i)$	Deviation $x_i - \bar{x}$	Deviation ² $(x_i - \bar{x})^2$	$p(x_i)(x_i - \bar{x})^2$
-26	0.30	-36.74	1349.82	404.95
8	0.22	-2.74	7.51	1.65
0	0.15	-10.74	115.35	17.30
-14	0.10	-24.74	612.10	61.21
14	0.15	3.26	10.63	1.60
6	0.08	-4.74	22.50	1.80
$\sum \{p(x_i)(x_i - \bar{x})^2\} = 488.51$				

- Variance, $\sigma^2 = 488.51\%$
- Standard Deviation (SD), $\sigma = \sqrt{488.51\%} = 22.10\%$

Beta Calculation:

The systematic risk of a security is required to be measured for the purpose of analysing the variations in returns of the security in terms of market volatility. Such systematic risk of a security can be measured by comparing the security's variability in return with the variability in the stock market index. Beta coefficient (β) is used as a relative measure of the systematic risk of an individual security relative to the market portfolio. For calculating beta of an individual security, historical data relating to the return of the individual security is required along with the returns of the stocks included in the market portfolio. There are two statistical methods that are used for calculating beta coefficient – **correlation method** and **regression method**.

Under **correlation method**, beta (β) of an individual security can be calculated by using the following formula-

$$\beta_i = \frac{r_{im}\sigma_i\sigma_m}{\sigma_m^2}$$

Here,

r_{im} = correlation coefficient between returns of individual stock 'i' and the returns of market portfolio.

σ_i = Standard deviation of returns of individual stock 'i'

σ_m = Standard deviation of returns of the market index

σ_m^2 = Variance of the market returns.

Under **regression method**, beta (β) of an individual security can be calculated by using the following regression equation-

$$R_i = \alpha + \beta R_m$$

Here,

R_i = Return of an individual security 'i'

α = Estimated return of the security

β = Change in the return of a security in relation to unit change in the return of the market index i.e. the systematic risk of the security

R_m = Return of the market portfolio.

The resultant Beta coefficient calculated via both the methods may have positive, negative or zero value. If beta is found to be 1.0, it is an indication that the security has an average risk. It means that for every 1% change in the market return, the security's return also changes on an average of 1%. Similarly, If the beta is found to be more than 1.0, it indicates security with above average risk. For example, if the beta is found to be 1.5, on an average security returns are 1.5 times as volatile as market returns, both up and down. Such security is considered as an aggressive security due to its high volatility. On the other hand, securities with beta less than 1.0 is considered as conservative security as its variability in return would be less than the market variability. If the beta value is found to be negative, it implies that the return of the individual stock moves in an opposite direction to the market return. In simple words, stocks with high betas are considered as high-risk securities and vice versa.

Check your progress:

- 4) Systematic risk can be measured by _____ coefficient.
- 5) _____ is the most widely used statistical tool to measure risks.
- 6) If the security X and Security Y is having beta coefficient of 1.83 and 1.23 respectively, as an investor having high growth expectancy and high risk appetite, which security should be selected for investment and why?

3.6 Key Terms

Debt securities: These are financial assets bearing fixed interest earning capacity for the owners.

Market interest rate: This is the interest rate prevailing in the market that is offered on cash deposits.

Coupon rate: It is the rate at which an investor in bond can expect to earn annually by holding a bond.

Bullish trend: 'Bullish Trend' is an upward trend in the prices of stocks of an industry or overall rise in the market indices. The term has been coined as per the nature of the animal 'Bull' as it attacks by thrusting its horn into air.

Bearish trend: 'Bearish Trend' is opposite to the bullish trend. It is a downward trend in the prices of stocks of an industry or overall downfall in the market indices. The term has been coined as per the nature of the animal 'bear' as it attacks by swiping its paws downwards.

3.7 Summing Up

- Risk and return are two inter-related phenomena in terms of investment. Higher the risk, higher is the return and vice versa.
- There are two broad categories of risks- Systematic and unsystematic. While systematic risk affects the market as a whole, unsystematic risk affects the stock of a particular company or industry.
- Interest rate risk, a systematic risk, is the variation in the single period rates of return caused by the fluctuations in the market interest rate.
- Variation in return caused by stock market volatility is referred to as market risk.
- Variation in the return from investment caused by inflation in the economy is known as purchasing power risk.
- Variability in operating income caused by the operating conditions of the company is known as business risk.
- Financial risk refers to the variability of the income to the equity shareholders due to the use of debt capital in the total capital structure.
- Risk can be measured with the help of variance as well as standard deviation. However, in order to calculate the amount of systematic risks involved in a security, measures of beta coefficient can be used.

3.8 References and Suggested readings

- Avadhani, V. A. (2011). *Investment Analysis and Securities Markets in India* (9th Ed.). Mumbai: Himalaya Publishing House.
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- Smart, S. B., Gitman, L. J., & Joehnk, M. D. (2017). *Fundamentals of Investing* (13th Ed.). Harlow, England: Pearson.

3.9 Model Questions

- 1) What is meant by risk? Explain the concept of systematic and unsystematic risk.
- 2) Briefly explain the various types of systematic and unsystematic risk involved in security market.
- 3) “Financial risk is a function of financial leverage” – elucidate the statement.

- 4) How to measure systematic risk of a security? Also explain how to interpret such measurement of systematic risk.

3.10 Answers to 'Check your progress'

- 1) High
- 2) False
- 3) Debt capital
- 4) Beta
- 5) Standard deviation
- 6) The investor should invest in security X as it will yield more return as compared to security Y. Since security X is having a high beta coefficient, it is more risky than security Y and with high risk there is also scope for high return. As the investor is willing to take high risk and expecting a high return, he should invest his funds in Security X.

BLOCK 2 UNIT 2

2.1 Introduction

2.2 Objectives

2.3 Stock Market in India

2.3.1 The structure of the securities market in India

2.3.2 Trading of Securities in Indian Stock Market

2.4 Security Market Indices

2.4.1 Indian Stock Market Indices

2.5 Key Terms

2.6 Summing Up

2.7 References and Suggested readings

2.8 Model Questions

2.9 Answers to ‘Check your progress’

2.1 Introduction

Each and every commodity that can be bought or sold require a physical or virtual market. Securities are the financial commodity that is issued to raise funds and these commodities are bought and sold through a market commonly known as Stock Market or Stock Exchanges. In International scenario, the history of Stock Market can be traced back to 1611 when the Amsterdam Stock Exchange was created. But in India, issue of securities by corporate units is as old as the introduction of joint stock company by the British Government. In this unit we shall learn about the history of the Stock market in India along with the various indices used in the stock market.

2.2 Objectives

After going through the unit, you will be able to:

- Discuss about Indian Stock Market.
- Understand the mechanism of Stock Market Indices.
- Discuss about the Indian Stock Market indices.

2.3 Stock Market in India

Securities are financial instruments used to raise funds. It enables flow of capital from investors to borrowers. Initially the securities are issued by the companies in the primary market or new-issue market. Securities market or stock exchanges are called secondary markets where securities already issued by the companies are purchased by the investors and subsequently traded among themselves. In order to finance their investment and current expenditures; business organisations, corporate units and the Government may issue

securities in the market. These securities, after being purchased by the investors, are the source of funds for the issuers. The history of securities market in India is as old as the introduction of joint stock company by the British Government. In the 18th and 19th century, with the emergence of cotton and jute textiles, tea and plantation industry; many joint stock companies were set up and many businessmen from major cities started trading in securities market where liability was limited by shares. However, Government securities were traded in the late 19th century when Government started issuing treasury bills and Government securities in rupees which led to the emergence of Government securities market in India.

It is hard to believe but true that the initiation of the very first Stock exchange of India was made under a banyan tree opposite the Town Hall in Mumbai. Mumbai being a busy trading port, a few brokers would informally gather around under the banyan tree to trade in cotton, which was the beginning of the concept of securities market in India. These brokers started the first share trading association of India – ‘**Native Stock and Share Brokers Association**’ in the year 1875. This association later came to be known as the **Bombay Stock Exchange (BSE)** which is also the oldest stock exchange of Asia. Following is a chronological list of various important events in the history of Indian Stock Market scenario-

Year	Event
1875	Establishment of ‘Native Stock and Share Brokers Association’, later came to be known as the Bombay Stock Exchange (BSE)
1894	The Ahmedabad Stock Exchange was established to deal in the shares of textile mills in the city
1908	The Calcutta Stock Exchange was established to facilitate a market for shares of plantations and jute mills.
1920	Establishment of Madras Stock Exchange.
1957	BSE was recognised by the Government of India under the Securities Contract Regulation Act.
1988	Establishment of Securities and Exchange Board of India (SEBI) for the purpose of monitoring and regulating the securities market.
1992	SEBI was given Statutory Powers through SEBI Act, 1992.
1992	Establishment of the first demutualised electronic stock exchange – the National Stock Exchange (NSE).
1995	Transformation of BSE to electronic exchange system from floor trading system.

Table 2.1

Check your progress:

- 1) What was the original name of BSE?
- 2) Already issued securities are traded in _____ market.

Being the oldest and robust in the whole Asian region, the Indian Stock market is very renowned. BSE and NSE are the two most popular among all the stock exchanges in India. Although there were multiple stock exchanges operating in India, 20 of them got closed in

recent time due to various reasons. According to the list available in SEBI website (www.sebi.gov.in) currently there are 9 stock exchanges active in India-

- 1) Bombay Stock Exchange Limited (BSE)
- 2) National Stock Exchange of India (NSE)
- 3) Calcutta Stock Exchange Limited (CSE)
- 4) India International Exchange (INDIA INX)
- 5) Multi Commodity Exchange of India (MCX)
- 6) National Commodity and Derivates Exchange (NCDEX)
- 7) Indian Commodity Exchange Limited (ICEX)
- 8) Metropolitan Stock Exchange of India Limited (MSE)
- 9) National Stock Exchange IFSC Limited

2.3.1 The structure of the securities market in India

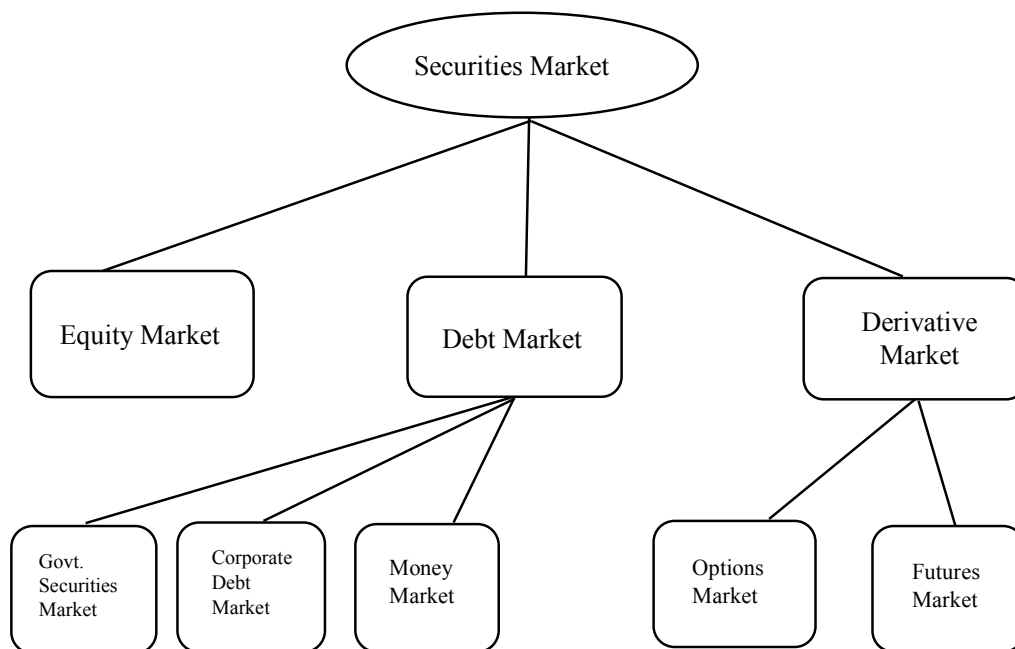


Fig 2.1 Securities Market in India

2.3.2 Trading of Securities in Indian Stock Market

Securities are traded through the platform of stock exchanges. Securities which are listed and permitted to be traded in the stock exchanges are bought and sold with the help of the registered members of stock exchanges i.e. the brokers. Investors who are willing to buy or sell the securities should first place their orders with their brokers and the brokers will accordingly execute the orders for their clients (investors). After executing the orders, there will be exchange of securities and cash between the traders where the clearing house and the depositories play an important role.

In India, the **floor trading** system, traditionally known as **open outcry** system, was prevailing for many years. In this system, the buyers and sellers of securities used verbal signals to communicate with each other on the trading floor of the stock exchange during the official trading hours. The investor willing to buy or sell securities used to place orders through a broker. The bids by buyers and offers by sellers were matched and final trading prices were being fixed by bargaining in the market through face to face communication. After deciding the prices, the brokers acting on behalf of their clients would finally exchange the share certificates and money with each other.

At present, in this digital era, the trading system in stock exchanges has adopted the information and communication tools to trade in securities. This system is known as **screen-based trading system (SBTS)**. Under this system, the trading floor has been switched to the digital screens and due to which participants from remote areas can also trade with each other very easily and comfortably with the help of computer or mobile networks. There is no need of the traders to be present in the trading floor to communicate with each other. The geographical boundaries have disappeared and the traders can transact at a very high speed by installing trading terminals at any place. They have been able to get a full view of the market which have increased their confidence in the market. There are two sub-systems involved in dealing with securities under Screen-Based Trading System:

a) Quote Driven system: Under quote driven or price driven system, the market only displays the bid price (buying price) and the offer price (selling price) for a security from a designated market maker (dealer in a particular security). The market participants willing to buy or sell securities place their orders taking into consideration the bid-offer quotes. These are then matched by the automated mechanism installed in the system. For example, let the market maker of XY Stock posts its bid price and offer price say Rs.100 and Rs.120 respectively. It indicates that an investor can buy a share of XY stock at Rs.120 and anyone willing to sell the share may sell it at Rs.100. This much will only be displayed in the market and the market maker will fulfil the order on its own or will match the order with another order. The investors, however, have the option to negotiate for better prices in the market. Quote driven system ensures more liquidity and a guarantee of order fulfilment as the market makers need to meet their quoted bid and ask prices.

b) Order driven system: Under this system, all the orders of both buyers and sellers are displayed along with the prices at which they are willing to buy or sell securities as well as their quantity. The buy or sell orders are then automatically matched by the system according to the preinstalled rules. The order driven system ensures transparency in the market but it cannot guarantee fulfilment of orders as they simply display the prices investors or traders desire to pay.

Check your progress:

- 3) Floor trading system has been replaced by _____ in Indian Stock market.
- 4) Which system is suitable under screen based trading system to maintain transparency in the market?

Market Indices

In order to be a successful security market investor, it is very important to decide in which securities the funds should be invested. This decision-making process must be assisted by some indicators of the market trend which will enable the investors to identify the general pattern of the market. It is not possible for the investors to check the prices of every stock to determine whether the market is upward or downward. Stock market indexes or indices measure the general behaviour of stock prices over time. They act as barometer of the stock market and give a broad outline of the market movement. Indices measure the current price behaviour of a representative group of stocks in relation to a base value set at an earlier point in time. The major stock market indices constructed in India are BSE SENSEX, NSE NIFTY, RBI Share Price Index, BSE National Index, BSE-200, BSE-500, Dollex-200, etc.

A stock market index is useful for the investors because of the following reasons:

- (i) It helps in picking up stock to invest in.
- (ii) It helps in recognising the broad trends in the market.
- (iii) Investor's portfolio can be evaluated keeping the indices as benchmark.
- (iv) It represents the general economic condition of the country.
- (v) It reflects the investors' sentiments which affects the demand for a stock which in turn impacts the overall price of the stocks.

To understand how a stock market index is prepared, let us go through the following hypothetical example:

Let us assume that there are 5 different listed companies in a stock market the stock prices of which are as follows-

Company	Stock prices for the year 2015	Stock prices for the year 2019
P Ltd.	60	90
Q Ltd.	80	95
R Ltd.	55	85
S Ltd.	75	65
T Ltd.	80	100
Total	350	435

If we keep the year 2015 as base year for calculating the index then we set the total stock price of year 2015 i.e Rs.350 equal to 100 and measure any future periods against that total. If we need the index for the year 2019 keeping the 2015 as base year, the calculated index will be 124.28 (as 435 is 24.28% higher than 350).

This is an example of price weighted index i.e higher the stock prices, higher will be the market index. In practice, the stock market indices can be classified into 3 broad categories:

- a) **Price Weighted Index:** It reflects the **sum of the prices** of the sample stocks on a certain date in relation to a base date.

- b) **Equal weighted index:** It reflects the **simple arithmetic average** of the price relative to the sample stocks on a certain date in relation to a base date.
- c) **Value weighted index:** It reflects the **aggregate market capitalisation** of the sample stocks on a certain date in relation to a base date.

2.4.1 Indian Stock Market Indices

Indian stock market consists of a number of Stock market indices viz. Sensex, S&P CNX Nifty Index, RBI Share Price Index, S&P BSE Smallcap, BSE Midcap, S&P BSE BANKEX, BSE-100 Natex, BSE-500, S&P CNX Nifty Junior, and so on. However, Sensex and S&P CNX Nifty Index or simply Nifty is considered as the benchmark indices for the Indian stock market.

- a) **SENSEX:** The Bombay Stock Exchange Sensitive Index or SENSEX is the most widely followed index in India. It was introduced by BSE on 1st January, 1986. SENSEX reflects the movement of 30 sensitive shares of top 30 companies representing a sample of big, well-established and financially sound companies from around 20 different industries. The base year of BSE SENSEX is 1978-79 and the base value is 100.
- b) **S&P CNX Nifty Index:** The NSE NIFTY is the most rigorously constructed stock market index in Indian Capital Market which composes of 50 leading stocks from different sectors of the listed companies in NSE. NIFTY was introduced on April 22, 1996 and is built by India Index Services and Product Limited (IISL) which has a strategic alliance with Standards and Poor Rating Services for co-branding the index for which the index is also named as S&P CNX NIFTY.

2.5 Key Terms

Virtual market: It is a marketplace based on the internet technology where multiple companies execute various economic transactions electronically.

Liability limited by share: It means the liability of the shareholders to the creditors of the company is limited only up to the amount originally invested.

Treasury Bills: Treasury Bills or T-Bills are short term debt instruments issued by the Government of India.

Listed securities: These are the securities issued and traded only through a stock exchange.

Market indicators: These are tools used by security traders to interpret financial data in order to forecast stock market movements.

2.6 Summing Up

- History of stock market in India is as old as the introduction of joint stock company by the British Government.
- A security market has 3 segments – equity, debt and derivatives.
- Floor trading system has been replaced by screen based trading system in Indian stock market.

- Screen based trading system has 2 sub-systems under it – Quote driven system and order driven system.
- Most practised stock index in India are – price weighted index, equal weighted index and value weighted index.
- Sensex and Nifty are the two most popular stock indices in India.

2.7 References and Suggested readings

- Avadhani, V. A. (2011). *Investment Analysis and Securities Markets in India* (9th Ed.). Mumbai: Himalaya Publishing House.
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2.8 Model Questions

- 1) Define stock exchange.
- 2) Discuss the evolution of stock market in India.
- 3) Briefly explain the stock market trading mechanism prevailing in Indian stock market scenario.
- 4) Explain briefly how a stock market index is created and explain any two indexes prevailing in Indian Stock market.
- 5) “Stock Exchanges act as barometers of the health of the economy.”- Discuss.

2.9 Answers to ‘Check your progress’

- 1) Native Stock and Share Brokers Association
- 2) Secondary Market or Stock exchanges
- 3) Screen based trading system
- 4) Order driven system

BLOCK 2 UNIT 3

- 3.1 Introduction
- 3.2 Objectives
- 3.3 Purpose of security market indices
- 3.4 Factors influencing construction of security market index
- 3.5 Methods of constructing index
- 3.6 Key Terms
- 3.7 Summing Up
- 3.8 References and Suggested readings
- 3.9 Model Questions
- 3.10 Answers to 'Check your progress'

3.1 Introduction

We have already learnt about Market Index in the last unit. These indexes help the stakeholders in making various decisions related to stock market. Apart from this basic purpose of Stock market index, there are various other needs that it fulfils. In this unit we shall learn about various purposes of Stock market index along with the factors that influence the construction of market index. Besides, it is also important to get a basic idea regarding the construction process of Market index. Hence, we shall also discuss about the important methods which are popularly followed while constructing these indexes.

3.2 Objectives

After going through this unit, you will be able to –

- Describe why security market indices are required.
- Discuss the various factors that influence the construction of market index
- Elaborate the various methods of constructing market index.

3.3 Purpose of security market indices

The basic purpose of Security Market Indices is to reflect the stock market behavior. They represent the upward and downward trend of the market and thus help the investors in decision making. The stock market indices are useful for various reasons. Some of them are –

- a) **Represent Market Trends:** A stock market index is constructed by selecting a set of stocks that are representative of the whole market or a particular sector or segment of the market. It provides a quick outlook of the market or sector performance without

analyzing the prices of each and every listed stock. Thus, it helps the investors in judging the state of a particular sector or the whole industry and invest accordingly.

- b) **Acts as a Benchmark:** It is important for an investor to analyse the portfolio performance on a regular basis. Index acts as a benchmark for comparison of the portfolio performance. If the portfolio return is higher than the index, then the portfolio is said to have outperformed the index. On the other hand, the portfolio is said to have underperformed, if its return is less than that of the index.
- c) **Reflects Market Sentiment:** The prices of stock fluctuate as per the demand and supply in the market. Demand and supply are again affected by the market sentiments. Hence, it is important to understand and analyse the market sentiment before making any investment decision and the stock market indices are of great help to understand it. An upward index indicates a positive sentiment in the market and a downward index indicates otherwise.
- d) **Acts as a forecasting tool:** It is almost impossible to accurately predict the stock market movement in future. However, with the help of past movements in stock market index, one can forecast about the future trends in the market with some amount of accuracy. Such forecast will enable the investor to determine whether it is suitable to invest in the market at present or it is better to wait for market correction.
- e) **Supports Passive Investment:** Passive investment means replicating the market index portfolio for investing in personal portfolio. Investors, especially the new investors in the market, tend to follow the passive investment policy to cut down on the cost of research and stock selection. The return on such passive investment portfolio will resemble the return on index portfolio.

3.4 Factors influencing construction of security market index

A stock market index is constructed by selecting a group of stocks which are representative of the whole market or a particular segment of the market. After selecting the group of stocks, there are various methods to calculate the final index. These methods are discussed in the next section of this unit. However, the calculation or construction of a market index is influenced by many other factors. Some significant of them are discussed below-

- a) **Size of the sample stock:** Selection of a representative sample stock is a prerequisite for construction of an index. The sample size should be statistically significant fraction of the target population to be representative of the population. If the sample size of the stock is too small, it will not fulfill the actual purpose of the market index as it will not be reflecting the actual market trend.
- b) **Proper Weightage:** It is necessary to provide proper weightage to different stocks as per their importance in the economy. If proper weightage is not provided based on its market capitalization or price, then also it will influence the market index construction and the index so created will result in a misleading value.
- c) **Base period:** The changes in the prices of representative stocks are measured with reference to a base period in order to construct the market index. If the base period is

not properly selected or if it is not altered from time to time, the construction of the market index will not yield satisfactory result.

- d) Accuracy of prices:** Trading in securities take place on a continuous basis and the prices of stocks also tend to fluctuate even on a single day. Generally, four types of prices can be identified on a single day- Opening, closing, highest and lowest price of the day. In order to accurately construct the market index, the prices of the sample stock should be accurate enough to avoid any kind of calculation error.

Check your progress:

- 1) _____ acts as a benchmark for comparison of the portfolio performance.
- 2) By analyzing the _____ trends in the stock market, _____ trends can be predicted.
- 3) _____ means duplicating the market index portfolio in one's own portfolio.
- 4) A security may have 4 types of prices on a single day- _____, _____, _____ and _____.

3.5 Methods of constructing Index

Index portfolio is a hypothetical portfolio, the value of which is derived from the values of the securities included in the portfolio. In order to determine the index value, there are multiple methods available. Every index uses its own methodology to determine the index value. The individual values of the underlying securities are adjusted by assigning individual weights to determine the final index value. Such weights may be based on market price, floating rate price or market capitalization. Following are three commonly used methodology to construct a market index-

- a) Price-weighted index method
- b) Equal-weighted index method
- c) Capitalisation-weighted index method

a) Price-weighted index method: Under this method, each security included in the index is weighted according to its current market price. Securities with a high market price have a greater weight as compared to those with lower price. As a result, the index value is highly influenced by the price movements of securities with the higher market price.

A price weighted index is constructed by adding up the current market prices of each security included in the index portfolio and dividing it by the sum of market prices of the securities at the base period and multiplied by the base index value.

$$\text{Price weighted index} = \frac{\text{Sum of Current market price of securities}}{\text{Sum of base period market price of securities}} \times \text{Base Index}$$

b) Equal-weighted index method:As the name suggests, Equal-weighted index is constructed by assigning equal weight of each stock covered under the index portfolio. Thus, each stock’s performance carries equal importance in constructing the total value of the index. This index is calculated by summing up the proportionate changes in the prices of all the stocks covered under the index portfolio, dividing it by total number of stocks in the portfolio and multiplying the same by base index value.

$$\text{Equal-weighted index} = \frac{\sum \frac{\text{Current market price of security}}{\text{Base period market price of security}}}{\text{Total number of stocks in the portfolio}} \times \text{base index}$$

c) Capitalisation-weighted index method:This method of index construction is the most widely used method among all the available methods at present. Under this method, each security covered under the index portfolio is weighted as per its relative total market capitalization. Market capitalization refers to the product of total number of outstanding shares and share price at a particular point of time. When market capitalization is considered for weighing the securities, companies with larger market capitalization have greater influence on the index construction as compared to a company with smaller market capitalization. Mathematically, Capitalisation-weighted index is calculated as below-

$$\text{Capitalisation-weighted index} = \frac{\text{Current market capitalisation}}{\text{Base market capitalisation}} \times \text{Base index}$$

Here,

current market capitalization =

$$\sum (\text{Number of outstanding shares} \times \text{current market price}) \text{ of all stock in the index.}$$

Base market Capitalisation =

$$\sum (\text{Number of outstanding shares} \times \text{base market price}) \text{ of all stock in the index.}$$

Illustration 3.1: From the following share price details of 6 companies, calculate the index value as per –

- i) Price-weighted index method
- ii) Equal-weighted index method

Name of the company	Share price as on 2012 (Rs.)	Share price as on 2022 (Rs.)
AB Ltd.	235.46	370.50
CD Ltd	315.25	295.47
EF Ltd.	748.90	1082.65
GH Ltd	514.53	655.25
OP Ltd.	129.30	247.85

XY Ltd.	450.63	345.28
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Sol: i) Price-weighted index method:

Name of the company	Share price as on 2012 (Rs.)	Share price as on 2022 (Rs.)
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GH Ltd	514.53	655.25
OP Ltd.	129.30	247.85
XY Ltd.	450.63	345.28
Total	2394.07	2997

Assuming base index as 1000, price weighted index consisting of 6 stocks can be calculated

$$\begin{aligned} \text{as - } & \frac{\text{Sum of Current market price of securities}}{\text{Sum of base period market price of securities}} \times \text{Base Index} \\ & = \frac{2997}{2394.07} \times 1000 \\ & = 125.18 \end{aligned}$$

ii) Equal-weighted index method:

Assuming base index as 1000, equal-weighted index consisting of 6 stocks can be calculated

$$\begin{aligned} \text{as - } & \frac{\sum \frac{\text{Current market price of security}}{\text{Base period market price of security}}}{\text{Total number of stocks in the portfolio}} \times \text{base index} \\ & = \frac{\frac{370.50}{235.46} + \frac{295.47}{315.25} + \frac{1082.65}{748.90} + \frac{655.25}{514.53} + \frac{247.85}{129.30} + \frac{345.28}{450.63}}{6} \times 1000 \\ & = \frac{7.91299}{6} \times 1000 \\ & = 1318.83 \end{aligned}$$

3.6 Key Terms

Market Correction: Market correction refers to an indication of a potential reset to the value of a market index or the price of an individual asset.

Market price: It is the amount of money for which an asset can be bought or sold in the market.

Floating rate: Floating rate implies that the rate of interest is not fixed and it changes as per the changes in the market rate or a benchmark rate or an index.

Market capitalisation: It refers to the total value of all the shares of a company in the market.

3.7 Summing Up

- A market index tracks the performance of the stocks considered for constructing the market index portfolio.
- Market Index also acts as a benchmark for comparison of the portfolio performance.
- Construction of a market Index is influenced by many factors such as stock sample size, proper weightage, base period, price accuracy, etc.
- Index construction can be done through various methods, but three commonly used methods are – price-weighted index method, value weighted index method and market capitalisation weighted method.

3.8 References and Suggested readings

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3.9 Model Questions

- 1) What is security market index? What is its significance for the stock market traders?
- 2) Briefly elaborate the factors that influences the construction of a stock market index.
- 3) Explain the weighting methods of constructing indexes with suitable examples.

3.10 Answers to ‘Check your progress’

- 1) Index
- 2) Past, future
- 3) Passive investment
- 4) Opening, closing, highest, lowest.

BLOCK 3 : Analysis of equity investment

Unit 3: INDUSTRY ANALYSIS

Contents:

- 1.1 Introduction
- 1.2 Objectives
- 1.3 Fundamental Analysis
- 1.4 Industry analysis
- 1.5 Meaning and Classification
- 1.6 Key Factors
- 1.7 Industry Lifecycle
- 1.8 Summing up
- 1.9 References and Suggested Readings
- 1.10 Answers to check your progress

1.1 INTRODUCTION

Investing in securities is risky because the returns from such investments are not definite but it depends upon many dynamic factors. In other words one cannot say with much surety how much return will they get by investing in securities or if they will get any return or not because the return depends on prices of the securities and this price in turn fluctuates depending upon many factors. This unit deals with Industry Analysis which is a part of fundamental analysis. Fundamental Analysis is a technique to analyse which securities should an investor invest upon to gain higher profits. Fundamental analysis focuses on three factors which are Economic Analysis, Industry Analysis and Company Analysis. To understand industrial analysis which is a part of fundamental analysis we will first discuss Fundamental Analysis in brief. Industrial Analysis is the second stage which comes after Economic Analysis.

1.2 OBJECTIVES

This unit is an attempt to brief on Industry Analysis. Since industry analysis is a part of fundamental analysis therefore focus is made on fundamental analysis too. After going through this unit you will be able to

- Discuss Economic Analysis, Industry Analysis and company analysis under Fundamental Analysis.
- Explain industry analysis and the classification of industry depending upon various basis.

- Discuss factors to be considered under Industry Analysis that facilitates in selecting that industry that is beneficial for an investor to invest on.
- Explain the various stages in Industry Life Cycle that includes pioneering stage, expansion stage, stagnation stage and decay.

1.3 Fundamental Analysis

Fundamental analysis is a method to find out the true value of securities so that the investors can decide whether or not to buy a security at the current market price. Thus **analyzing the various factors that determine the fair value of a security is called fundamental analysis**. It is important to find out the true value of the securities as the securities may be underpriced or overpriced. True value shall give a true picture of the returns that can be expected by investing in a security. Fundamental analysis uses two types of approaches-

1. **Top-Down-Approach** – In the top-down approach first the overall economy and securities market is analysed, then the industry is analysed and lastly the company is analysed.
2. **Bottom-Up-Approach**- In this approach the analyst does the reverse of top down approach. First the company prospect is analysed, then the industry prospect is estimated and lastly the economy.

Thus from the above two approaches we can say that fundamental analysis comprises of three factors- Economic Analysis, Industrial Analysis and Company Analysis. It is also called the **EIC (Economic-Industry-Company) Approach**. Fundamental analysis covers how the price of securities is affected by economic, industrial and company factors.

Economic Analysis- Economic Analysis focuses on the factors operating in the overall economy. Every activity that contributes towards the economy is focused in Economic Analysis. It plays an important role in the investment decision making because the economic activities and economic conditions affect a firm's profit and in turn the price of the security. Analysing the economy if the analyst is of the opinion that the economy is vibrant it is a signal to invest in such an economy. In contrast a sagging economy is not what an analyst would suggest to invest in. These factors speak in volume of where and how much to invest upon since the economic condition of a country is an indication of growth of the industry.

Industry Analysis- After analyzing the economic conditions the investor then analyses the industrial condition. When the investor analyses the economic condition and finds that the economic condition is vibrant to invest on he then analyses the industry to invest upon. Industry analysis is important because the growth rate varies across industries. One industry may react differently to the same economic conditions.

Company Analysis- The main aim of Company analysis is to figure out the specific share or companies where money can be invested on. It basically analyses the intrinsic value of a share and the expected earnings of a company. The intrinsic value majorly depends on the earning capacity of the firm i.e on sales, profit, tax rate, asset utilization etc. On the other hand, forecasting the expected earnings of a company is done by firstly looking at the balance sheet, income statement, cash flow statement etc . Secondly it estimates future dividends and earnings by analyzing these financial statements.

Out of this we shall discuss INDUSTRY ANALYSIS in details.

STOP TO CONSIDER

- How fundamental analysis is useful to a prospective investor?
- Why Economic analysis and company analysis is important?

1.4 Industry Analysis

The second stage in the Fundamental Analysis of investments is Industry Analysis. After an investor analyses the economic condition and finds it attractive to invest, before deciding in which industry to invest, an analysis of the industry is important. **It is important from the point of view that every industry reacts differently in the capital market.** The same factor effecting two industries might have different reaction from both. To understand this better let us take an example. Say suppose an industry dealing with consumer goods will show higher growth in comparison to heavy industries under good economic prospect . The industry analyst before dropping to conclusions focuses on-

- a. The key Sectors and
- b. The relative strength and weakness of a particular sector

The objective of industry analysis is to pick that industry to invest upon that has high growth opportunity. In other words the purpose of industrial analysis is to select industries to invest upon that grows faster than the real rate of GNP.

SELF ASKING QUESTIONS (SAQ)

QUESTION 1. What is GNP? Why is it important?

1.5 Meaning and Classification

Meaning of Industry : An industry is a homogeneous group of firms. It means industry comprises of smaller units called firms and these firms deals with similar product, goods and services. In broader terms Industry covers all the economic activities contributing towards growth.

Industry can be classified based on various bases such as-

- a. Product line : Automobile, Textiles etc
- b. Sector Wise- Agricultural, manufacturing, IT etc
- c. Industry Life Cycle : Pioneering stage, Expansion Stage, Declining Stage, Decay

Under Standard Industrial Classification Industries are categorized into-

1. Growth Industries- These industries are identified by the growth rate in terms of earnings which is in general abnormally high. Industries that fall under this are those that bring innovation or major changes in the technology like cellular phones.
2. Cyclical Industries- Industries that performs based on whether the economy is vibrant or a sagging economy. An industry that has increase earning during economic prosperity and suffer the most in term of earnings during economic recession falls under Cyclical Industries. Industries dealing in durable goods i.e. goods that has a short life span falls under this category.
3. Defensive Industries- These industries are least affected at time of economic recession . Industries that falls under defensive category are those that deals in essentials such as food, non durable goods etc. these industries gives lucrative investment opportunities.
4. Cyclical-Growth Industries- As the name signifies these industries are a combination of Cyclical industries and Growth Industries.

In India industries are broadly classified as per the stock exchange list which is as follows-

1. Engineering
2. Electricity Generation
3. Textiles
4. Cement
5. Steel Mills and alloys
6. Cable and electrical
7. Plantation
8. Chemicals and pharmaceuticals
9. Paper

10. Sugar
11. Rubber
12. Automobiles, cycle and accessories
13. Miscellaneous

Every industry is not equally sensitive towards the same economic condition or business cycle prevailing. Some industries are independent towards economic conditions or business cycle while some industries are very sensitive to the economic condition. To say for example a food industry is virtually independent of business cycle in contrast to a luxury product. How sensitive is a industry towards the business cycle depends on-

- a. Sensitivity of Sales – The industries dealing with necessities such as medical services, food , drugs etc have low sensitivity. On the other hand industries dealing with luxury products are highly sensitive.
- b. Operating Leverage – Operating leverage means the degree of change in operating profits as a result of change in sales. Higher the fixed cost greater is the degree of operating leverage. Industries which has less fixed cost (i.e higher variable cost) are less sensitive to business cycles.
- c. Financial Leverage – The financial leverage depends on the percentage of capital raised by the firm through debts. Debts are basically borrowed funds and thus, higher the percentage of borrowed funds greater is the degree of financial leverage. Interest on debt is a compulsory payment that has to be made irrespective of the level of sales. Thus the profits made by the firms which has high outside borrowings are more sensitive to business cycles than the firms having less borrowings.

An investor should always opt to invest in the industry that is less sensitive to business cycles. Since investments in industries that are highly sensitive to business cycles will be in more risk.

1.6 Key Factors

To identify the industries in which investments should be done according to industry analysis certain key points or characteristics should be considered. Some of these key factors are-

1. **Past performance** - In order to understand or predict the future earnings of an industry, its past earnings and past sales should be studied for few years. Though the past performance may not rightfully or exactly define the future performance however it is important to know how the firm behaved in the past to the market scenario. This will help an investor judge the stability of the industry in terms of sales and earning.

2. **Permanence of the product and technology in the industry-** If it is so observed that the demand for the product of the industry one wants to invest in will soon vanish no investment should be made in such industry. In the era of rapid obsolescence in technology the degree of permanence is an important factor.
3. **Governments Attitude-** An investor should note the probable attitude of the government to understand if it will restrain the industries growth or it will provide financial and other support. For example after the permission of import of a few electrical items whose import was earlier restricted severally affected the Indian Manufacturers. An insight into the various governments schemes and policies related to the industry one wants to invest upon is important.
4. **Labour Conditions** – Whether the industry is labour intensive or capital intensive is a matter of analysis. If the industry for its functioning depends mostly on labour and it is located in a area that faces lot of lock outs, bandhs, hartals etc the functioning of the industry will be then affected as it may halt the production process that shall in turn affect the profit of the industry.
5. **Competition faced-** An industry that has high pressure of competition are often not good to invest upon as the profit is less since most of the earnings are spent to win a market position. Spending for industries facing high competition includes- advertising, marketing etc. If an industry has advantage over product differentiation (the products are noticeably different than that of others), cost advantage or has an advantage for producing in large scales has an added benefit and are looked as favorable industries for investments.
6. **Industry Share Price-** A share that is under priced is the best to bet on. If the share price of the industry is overpriced due to manipulation such industries should be avoided.
7. **Industry Characteristics-** Before investing it is essential to note if the industry has a possibility to grow in the future. It depends on if the industry is cyclical, fluctuating or stable. For instance woolen industries which is seasonal has limited scope of growth. The possibility of growth depends on raw materials, easy availability of factors such as man power , inputs etc.
8. **Demand** – The product the industry deals in should have higher demand too. If the demand is controlled by the government the prospect of selling more and in turn the earnings of that industry will also be limited. Industry that has exports too are looked upon for investment purpose.

CHECK YOUR PROGRESS

QUESTION 1. What are the various classifications of Industries?

QUESTION 2. How sensitive is an industry towards the business cycle depends on which factors?

QUESTION 3. In industry analysis which key points should be considered before investing?

1.7 INDUSTRY LIFE CYCLE

Industry Life Cycle- There is a firm believe that every product has a particular life cycle. The product comes into existence, grows in demand , faces decline and ultimately vanishes. Similar is the case for industries. The life cycle for industries comprises of pioneering stage, expansion stage, stagnation stage and decline stage. There is no investments made in the last two stages i.e in the stagnation and decline stage.

A study of the industry life cycle is important to forecast the future of the industry. The industry life cycle is shown in the figure.

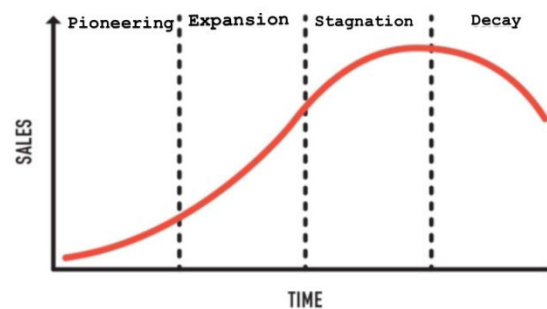


Figure1.7 Industry Life Cycle

The various stages of industry life cycle are explained below-

1. **Pioneering Stage** – This stage is characterized by increased production, expanding demand and high profits. Hence new companies enter the market increasing the competition resulting in the exit of the less efficient firms.
2. **Expansion Stage** – This is the second stage of the Industry Life Cycle. This phase is characterized by continuous growth , stability in price and production and lesser firms in comparison to pioneering stage. This is the stage of security and safety thus attracting more investible funds.
3. **Stagnation Stage** – In the third stage of the industry life cycle i.e the stagnation stage the growth of the firms begin to moderate. There is no scope of innovation and the possibility of survival is also at stake.

4. **Decay-** In this stage there is no growth. The output of the firms also declines and hence sees no new investments.

SELF ASKING QUESTIONS (SAQ)

What are the reasons for decline of an industry ?

1.8 Summing up

One of the technique for security analysis is Fundamental Analysis. It is important to know in detail about Fundamental analysis because an investor invests in securities to be benefitted in terms of capital profit and dividend. Since these returns are not definite but depend on factors existing in the market. Understanding the bases of such fluctuations or uncertainty in return one must closely analyse the three phases- Economic analysis, Industry analysis and company analysis before making investments decisions. This unit focused on why analysing an industry closely before making investments decision is important.

1.9 References and Suggested Readings

2. Security Analysis and Portfolio Management , Shashi K. Gupta and Rosy Joshi, Kalyani Publishers, ISBN 978-93-272-2695-9.
3. Investment Management Theory and Practice, R.P Rustagi, Sultan Chand & Sons Publications, ISBN 978-93-5161-041-0.
4. Investment Management: Security Analysis and Portfolio Management, V.K Bhalla, S. Chand Publisher, ISBN-13: 978-8121912488.

MODEL QUESTIONS

- I. Objective type questions-
 - a. The purpose of fundamental analysis is to find out the intrinsic value of a security.
 - b. In EIC Approach E stands for earnings of the company.
 - c. In fundamental analysis the focal point is the future earnings capacity of the firm.
 - d. Every industry is equally sensitive towards the economic conditions.
 - e. There is no investments made in the stagnation and decline stage.

Answer to Objective type Questions-

- a. True b. False c. True d. False e. True

- II. Long Questions-

Q1. Explain the EIC Approach.

Q2. What is industrial analysis? What are the key characteristics?

Q3. What is industry life cycle? What is its relevance to security analyst?

1.10 Answers to 'check your progress'

ANSWER 1. . Industry can be classified based on various bases such as-

- a. Product line : Automobile, Textiles etc
- b. Sector Wise- Agricultural, manufacturing, IT etc
- c. Industry Life Cycle

(For the answer in detail students can check Section 1.5)

ANSWER 2. How sensitive is an industry towards the business cycle depends on -

- a. Sensitivity of Sales
- b. Operating Leverage
- c. Financial Leverage

(For the answer in detail students can check Section 1.5)

ANSWER 3. To identify the industries in which investments should be done according to industry analysis certain key points or characteristics should be considered. Some of these key factors are-

1. **Past performance** - In order to understand or predict the future earnings of an industry, its past earnings and past sales should be studied for few years. It is important to know how the firm behaved in the past to the market scenario. This will help an investor judge the stability of the industry in terms of sales and earning.
2. **Permanence of the product and technology in the industry**- If it is so observed that the demand for the product of the industry one wants to invest in will soon vanish no investment should be made in such industry.
3. **Governments Attitude**- An investor should note the probable attitude of the government to understand if it will restrain the industries growth or it will provide financial and other support.
4. **Labour Conditions** –If the industry for its functioning depends mostly on labour and it is located in a area that faces lot of lock outs, bandhs, hartals etc the functioning of the industry will be then affected as it may halt the production process that shall in turn affect the profit of the industry.

5. **Competition faced-** An industry that has high pressure of competition are often not good to invest upon as the profit is less since most of the earnings are spent to win a market position. If an industry has advantage over product differentiation, cost advantage or has an advantage for producing in large scales has an added benefit and are looked as favorable industries for investments.
6. **Industry Share Price-** A share that is under priced is the best to bet on. If the share price of the industry is overpriced due to manipulation such industries should be avoided.
7. **Industry Characteristics-** Before investing it is essential to note if the industry has a possibility to grow in the future. It depends on if the industry is cyclical, fluctuating or stable. For instance woolen industries which is seasonal has limited scope of growth.
8. **Demand** – The product the industry deals in should have higher demand too. If the demand is controlled by the government the prospect of selling more and in turn the earnings of that industry will also be limited. Industry that has exports too are looked upon for investment purpose.

(For the answer in detail students can check Section 1.6)

BLOCK 3 : Analysis of equity investment

Unit 4: TECHNICAL ANALYSIS

Contents:

- 1.1 Introduction
- 1.2 Objectives
- 1.3 Technical Analysis
- 1.4 Charting
- 1.5 Theories of technical analysis
 - 1.5.1 Dow Theory
 - 1.5.2 Elliott Wave Theory
- 1.6 More common Charting
 - 1.6.1 Bar Chart
 - 1.6.2 Line Chart
 - 1.6.3 Point and Figure Chart
 - 1.6.4 Candlestick Chart
- 1.7 Price Patterns
 - 1.7.1 Trend
 - 1.7.2 Head and Shoulders
 - 1.7.3 Double tops and bottoms
 - 1.7.4 Triangles
 - 1.7.5 Flags
- 1.8 Support and Resistance Level
- 1.9 Indicator analysis
 - 1.9.1 Moving Averages
- 1.10 Disadvantages of Technical Analysis
- 1.11 Summing up
- 1.12 References and Suggested Readings
- 1.13 Answers to check your progress

1.1 Introduction

A decision to invest is not always based on speculation. It is important for an investor to behave rationally. Thus they opt for an in-depth analysis provided in Technical Analysis to predict future price behavior based on past data. The past data reveals information based on equity prices and stock market as a whole. Though there are shortcomings to technical analysis it is assumed that it shall go a long way for the in-depth information it provides. This unit focuses on Technical analysis to analyse changes or fluctuation in share price.

1.2 Objectives

This unit is an attempt to brief on Technical Analysis. After going through this unit you will be able to

- Explain the Theories formed under Technical Analysis.
- Discuss various charting techniques used by technical analysts .
- Explain price pattern in Technical Analysis.
- Discuss Indicator Analysis and the related disadvantage of Technical Analysis.

1.3. Technical Analysis

Technical Analysis is an approach to examine the **price behavior** of the securities. Technical analysis revolves around the proposition that the **prices of the securities and volume in the past is an indication of their future price behavior**. In other words whether prices in future will move high or low can be analysed by looking at the past pattern in prices. Technical analysis is based on the concept that what the future holds can be understood by the past information in prices and volume. Thus the prices of the securities and any related changes can be predicted by studying the market data. According to the premises of technical analysis a capital market moves in trends. A particular trend is believed to continue unless there is some definite information leading to change.

Technical analysis may also be called the **market analysis** because it uses the record and information of the market to predict the future price and volume. It is based on the principle that let the market narrate its own story.

Technical Analysis doesn't measure a shares intrinsic value. It looks at graphs and charts for patterns and other indicators to forecast the price behavior. The market price is believed to reflect all information that affects demand and supply of the securities.

Basic Principles of Technical Analysis

1. Market price of a security depends on demand and supply operating in the stock market.
2. The prices of the stock tend to move in trends with minor fluctuation for a long period.
3. Reversal or shift in trend in prices may occur because of change in demand and supply factors.
4. The change in the factors of demand and supply can be identified with the help of charts and graphs.
5. Price pattern tends to repeat and hence can be used to predict future trend.

A broad classification of various tools and techniques used by technical analysts are –

1. CHARTING

2. SELECT MARKET INDICATORS

These are discussed hereunder.

STOP TO CONSIDER

- WHAT IS A CAPITAL MARKET?
- WHAT IS A MARKET PRICE?
- DIFFERENCE BETWEEN FUNDAMENTAL ANALYSIS AND TECHNICAL ANALYSIS

1.4 CHARTING: THE BASIC TOOL OF TECHNICAL ANALYSIS

The key activity in Technical Analysis is Charting. As already discussed in Technical analysis the basic motive is to identify the price trend on the basis of historical data. Which in turn is used to predict future price behavior. In Technical Analysis the bases used are **price and volume** data of the securities and **charts and graphs** are the basic tools used to predict the trends in prices.

The various price information shown in a chart or graph comprises of

- ▶ Opening Price- It is the rate at which the **first transaction** for the day has taken place.
- ▶ High Price – It is the **highest rate** at which transactions took place for the day.
- ▶ Low Price – It is the **lowest rate** at which transactions took place for the day.
- ▶ Closing Price - It is the rate at which the **last transaction** for the day has taken place.

Importance of the Closing Price-

1. The stock indices for the day is calculated on the basis of closing price
2. The trend in price can be known by comparing the closing price with the opening price for that day or the closing price of the previous day.
3. In charting generally the closing prices are shown where the X axis shows the time and Y axis shows the prices.

CHECK YOUR PROGRESS

QUESTION 1. WHAT ARE THE BASIC PRINCIPLES OF TECHNICAL ANALYSIS?

QUESTION 2. WHAT ARE THE VARIOUS PRICE INFORMATION SHOWN IN A CHART OR GRAPH?

1.5 Theories OF TECHNICAL ANALYSIS:

1.5.1 DOW THEORY:

The DOW THEORY proposed by **Charles Dow** is the first theory of technical analysis. It is taken as a basis for all other techniques used by technical analysis. Dow theory focuses on three specific trends –

Primary Trend – It is the trend in price that exist for a long period of time. It is on this trend that whether the market is bullish (Moving up) or bearish (Moving down) in nature can be identified.

Secondary Trend : It is a trend that exist for a comparatively shorter duration and exist within a primary trend. The restraining force on the primary trend is given by the secondary trend.

Minor Trend- As the name suggest it is a trend in prices for a very short duration like for a day or few days.



Figure 1.1 – Different types of Trends as per Dow Theory

Figure 1.1 shows Primary trend (increase in Price) , secondary (prices falling for a short period) and Minor trend. In Dow Theory the upward primary trend is called the **bull market** and if the primary trend is downward it is called the **bear market**. Figure 1.1 shows a bull market. In this figure the primary trend is upward moving despite three secondary movements that are downward. The secondary trend is also known as **technical correction**. After a secondary correction in bull market there will always be an upward movement and it penetrates previous heights and vice versa. The minor trend is also called **ripples**.

Points to be noted:

1. Primary trend cannot be manipulated. No individual investor can affect the basic trend in the market.

2. Dow theory fails to tell when a primary trend shall end or will be reversed.

1.5.2 **Elliott Wave Theory**- The stock prices according to this theory is described as a set of wave. The wave comprises of five waves.

In case of **bull market** the five waves comprises of-

The first wave is upward, the second is downward, the third is upward, the fourth is downward and the fifth wave is upward.

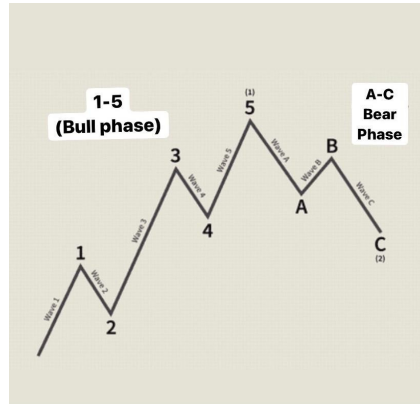


Figure 1.2 Elliott Wave Theory: 1-5 (Bull market) and A-C (Bear Market)

In **bear market** it is vice versa i.e downward, upward, downward, upward and downward. Figure 1.2 shows three waves for bear market i.e A,B AND C.

Both Dow theory and Elliott theory shows the trends for long period with short deviations. Over the years many other patterns and charts have been developed that are used by technical analysts. Few of which that are common are discussed below.

SELF ASKING QUESTIONS (SAQ)

Is there any difference between the two theories? If Yes, What are the differences?

1.6 Common Charts used by Technical analysts

1.6.1 BAR CHART – This is a popular technique that shows price and volume on a particular day and then a comparative presentation for a longer period say 1 month or half year. Each days price behavior are shown in bar. The closing and opening price are shown as horizontal ticks. The volume of the transaction is shown as vertical bars in the lower portion of the chart.

Each price bar shows Open, High, Low, Close and hence it is also called the **OHLC bar** .

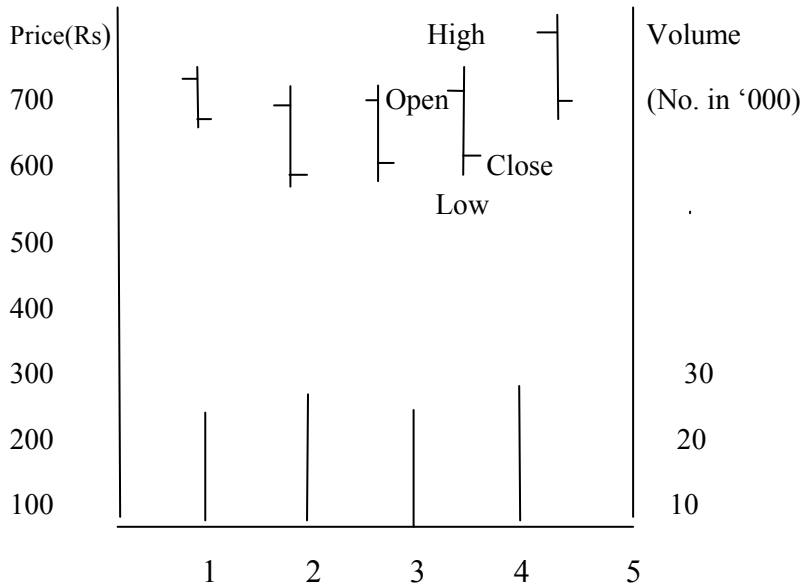


Figure – 1.3 Bar Chart showing elements of price bar along with price and volume data. In figure 1.3 price and volume bar chart is shown for a particular security for 5 days. On day 1 as shown in the graph the highest price is Rs. 610 and the lowest price is Rs. 510. Bar charts are popular as they have a lot of visual presentation for even lay man to understand.

1.6.2 Line Chart – It is one of the simplest presentation. The horizontal axis in a line chart shows time and the variable is shown in vertical axis. The variables can be price of the securities, volume, Index Number etc. A line chart has a lot of visual power as even a layman can make an idea of what it depicts. When we consider securities prices to draw a line chart closing prices of the securities is taken into consideration. The closing prices are then joined by a line which is called the variable line. To make a comparative chart more than one line can be drawn taking different variables.

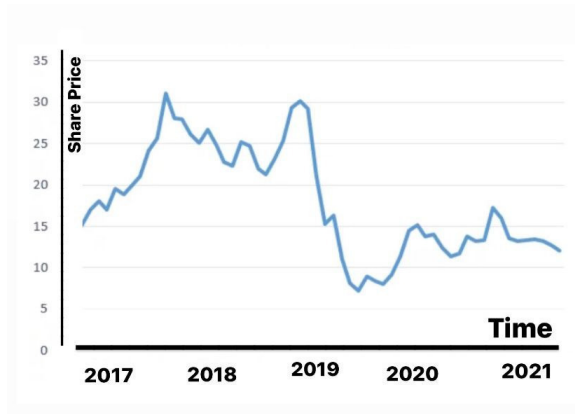


Figure- 1.4 Line Chart for a share

1.6.3 Point and Figure Chart – In this chart only the prices in the past is taken into consideration to predict the future price trend. Significant price changes and reversals is shown in the chart to predict future price behavior. While making this chart one has to judge right as to which change in price or price reversal is significant. For example – A share whose price is 100 a change of Rs. May be considered significant while for a share whose price is 1000 a change of Rs. 20 may be considered significant.

In the Figure ‘X’ represents price increase and O represents price decrease. Lets say a price change (whether increase or decrease) of Rs. 2 shall be considered to plot in the chart. Suppose the initial price is Rs 30 which is shows a ‘X’ in the first column, the price then increases to Rs 32 which is a increase by 2 from 30 therefore it will be shown by adding another ‘X’ in the first column. Thus now there are two ‘X’ in the first column that implies that price has increased from 30 to 32. Since we have considered a change by 2 as significant change so the first column will continue to have two ‘X’ until the price changes to 34 and so on. In case the price reduces i.e a reversal trend shall be shown as ‘O’ and shall be market in the next column. For example if the price moves down to 29, 27 and 25. The share is now in the downward cycle. There shall be three ‘O’ in the next column. If the prices again rises it shall be marked as ‘X’ in the next column and so on. Thus, alternative reversals of price trend is shown by successive ‘X’ and ‘O’ columns. It should be noted that **in a Point and figure chart one column cannot have both ‘X’ and ‘O’** it can only have either ‘X’ in one column or ‘O’.

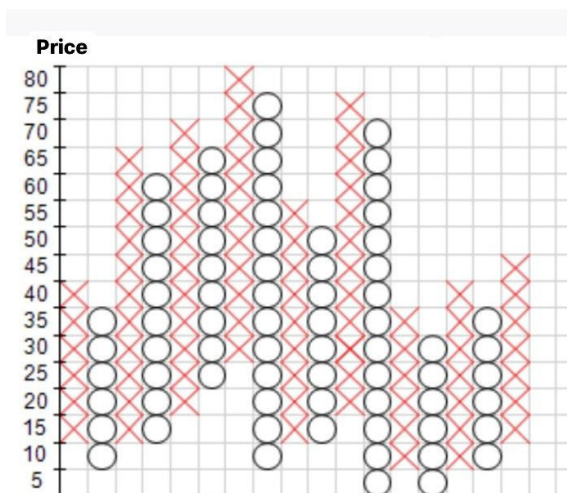


Figure 1.5 Point – and – Figure Chart

Figure 1.5 shows that in the initial period price increases which is shown as X later when the price decreases it is shown as O .

1.6.4 Japanese Candlestick Chart – It is an extension of the bar chart. **Along with price data even price trend for the day is shown in Candlestick Chart technique.** The price data for a day is represented by a vertical candle and a vertical line passing through it. If the **candle is clear it implies an increase in price** during the day (i.e the closing price is higher than the opening price for the day) and if the **candle is shaded it represents a decrease in price** (i.e the closing price is lower than the opening price for the day). The top and bottom points of the line passing through the candle signifies the high and low prices respectively. The information depicted by candlestick chart are-

2. Opening and closing prices for the day
3. Highest and Lowest prices for the day
4. Increasing or decreasing trend in price during the day

One candlestick may represent data for a week or for a month.

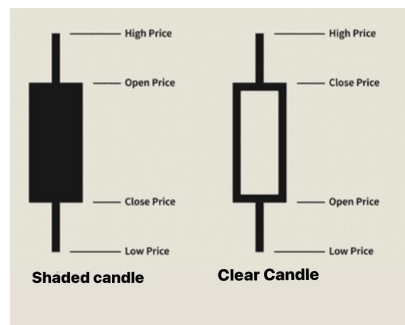


Figure 1.6 Candlestick

Figure 1.6 shows detailed price information (high price, low price, open price and close price) in both the candlesticks. The candlestick that is shaded represents that the closing price is lower than opening price. On the other hand when the candlestick is clear it means that the opening price is lower than the closing price.

Check your Progress

Question 1. What are the three specific trends in Down Theory?

Question 2. In Elliott Wave theory the stock prices are explained as ?

Question 3. In point and figure chart how is price increase and decrease shown ?

Question 4. What are the implications of a clear and shaded candle?

1.7 ANALYSIS OF PRICE – VOLUME CHARTS

Price – volume charts have a high degree of visual communication. There are two ways in which these charts can be studied and analysed.

1. Pattern Analysis

2. Indicator Analysis

1.7.1 PATTERN ANALYSIS- Some common price patterns are

1.7.1 Trend – As the name signifies depicts the price pattern over a long period of time say for a year or three. If it moves upward it implies increasing trend and if it moves downward it implies decreasing trend as shown in figure.

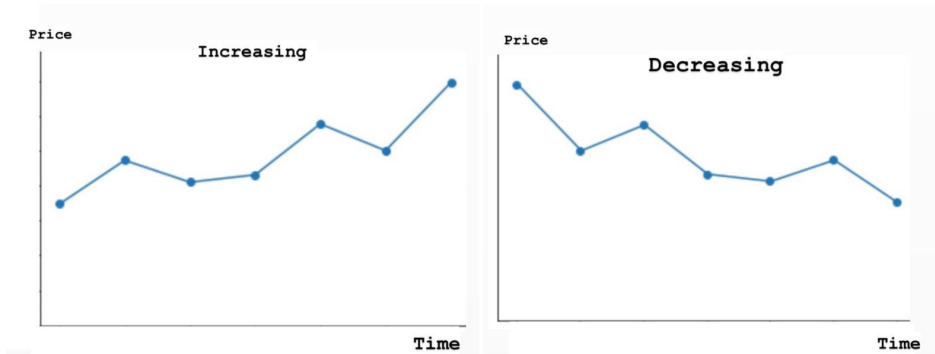


Figure 1.7 Trend

1.7.2 Head and Shoulders- At the end of a trend a reversal may show up. This reversal is shown by a head and shoulder formation. The set of three humps (middle one being higher than the other two) as shown in the figure appears. To mark the base a neck line may be drawn. When the prices fall below the neck line a downward trend is expected to occur. The three humps shows a short term rallies in prices.

Inverted Head and Shoulders – This pattern is just the opposite of Head and Shoulders method. It occurs at the end of a downward trend. Here also there are three inverted humps formed (middle one being deeper than the other two). To mark the base a neck line may be drawn by joining the tops of the inverted humps. When the prices breach the neck line rising trend is expected to occur.

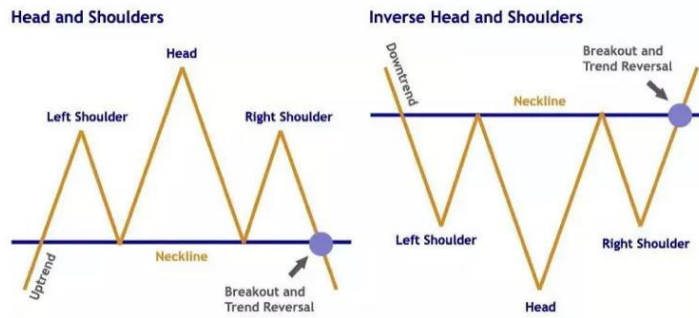


Figure 1.8 : Head and Shoulders and Inverted Head and Shoulders

1.7.3 Double tops and Bottoms- When a share hits a high and then comes lower, it hits back high again but cannot reach the previous high double tops appear. If the price comes below the lower level earlier set a downward trend starts. On the other hand a double bottom appears at the end of the bearish trend , indicating a start to bull phase.

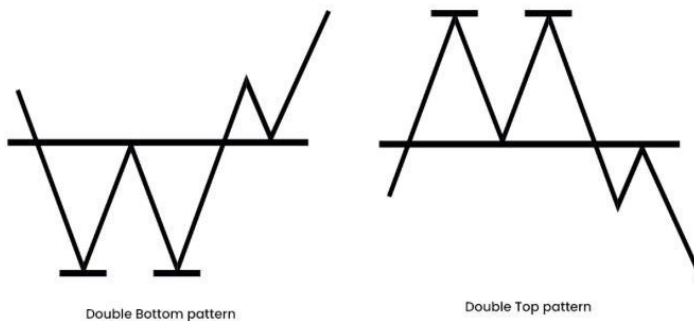


Figure 1.9 : Double tops and Bottoms

1.7.4 Triangles- a triangle is formed when the succeeding peaks are lower than the previous peaks and the succeeding bottom is higher than the previous bottom. These tops and bottoms are joined by a line which meets converges and looks like a triangle. The triangle may be formed either in case of a bear or bull phase. The different types of triangles formed may be called ascending, descending, symmetrical or expanding. The upper line of the triangle is called the resistance line meaning the price does not go beyond it. The lower line of the triangle is called the support line meaning the price does not go below it. In general there are three upper points and three lower points that makes a triangle. The time limit that marks the end of the triangle pattern is when the two lines meets to make a triangle. Before the end of the triangle or immediately after the end the price should breakout of the triangle in the earlier trend.

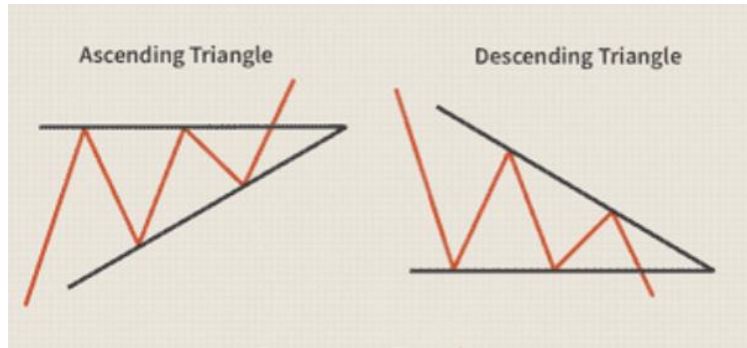


Figure 1.10 Triangle

1.7.5 Flags – When a bull phase or bear phase is interrupted by a consolidation pattern, flag formation appears. The pattern formed is called a flag as it appears like a rectangle or parallelogram. The consolidation pattern appears for a short while. The flag formation indicates a pause in the continuation of the earlier trend. Thus the price moves in the same direction as before.

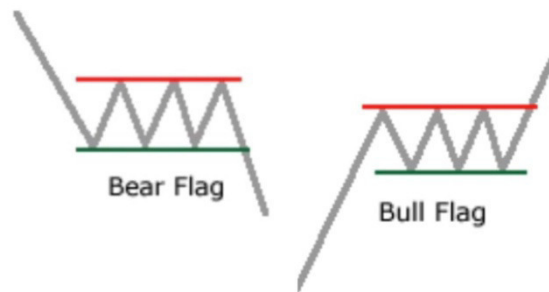


Figure 1.11 Flags

STOP TO CONSIDER

- A STUDY ON THE OTHER PRICE PATTERN?
- A GRAPHICAL REPRESENTATION OF THE PRICE PATTERNS LEARNED

1.8 SUPPORT AND RESISTANCE LEVELS

Support and Resistance levels are the price levels at which a trend (rising or declining) takes a turn and moves in the opposite direction. Depending on the past data these levels are determined that determines the level below which or above which the price will not fall or rise.

A SUPPORT LEVEL is the level below which the price level is not expected to fall. On the other hand **A RESISTANCE LEVEL** is the level above which the price level is not expected to rise. However if the price increases above the resistance level it is considered as a **bull signal**. Whereas if the price moves below the support level it is considered a **bear signal**. For example – If the market price of a share for ABC Company moves between Rs.150 and Rs.350 . when price reaches Rs.150 it begins to rise and when it reaches Rs.350 it begins to fall. 150 is the support level while Rs.350 is the resistance level. The reason behind this is that when the price of a share reaches Rs.350 the investors believes that price will not rise further and hence they start selling the shares they have at Rs.350 for the which the price of shares then falls. Similarly when the price reaches Rs.150 the investors believes that the price of the shares will not fall further and therefore they start buying shares of ABC Company at Rs. 150 and therefore the price of shares then rises. A breach to the support level and the resistance level gives rise to the bear and bull trend.

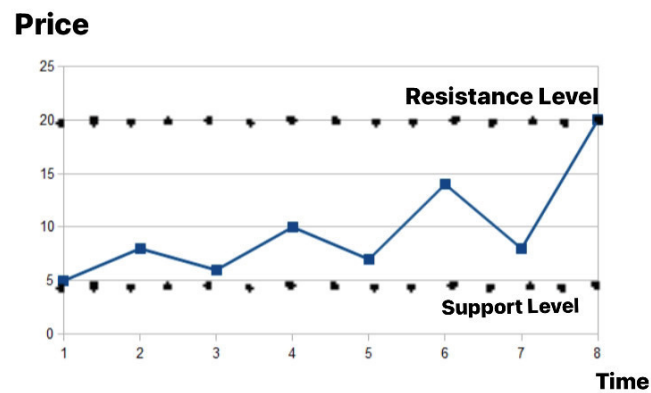


Figure 1.12 Support and Resistance level.

This chart helps us identify the support and resistance zone. A support zone occurs when the supply-demand balance is in favour of demand and the price is expected to increase. If the price of the share falls below this support zone it indicates a bearish trend owing to the farther fall in prices. On the other hand if the supply demand balance is in favour of supply meaning which the price of shares shall fall it gives rise to a resistance zone. If the price of shares moves above the resistance level in indicates a rise in price i.e an uptrend in prices.

CHECK YOUR PROGRESS

Question 1. When the Head and shoulder pattern is formed?

Question 2 What does a bull and bear flag indicate?

Question 3. How is a support and Resistance level formed?

REVERSAL PATTERNS AND CONTINUATION PATTERNS

The price patterns discussed above can be classified as Reversal patterns and Continuation patterns. The Reversal pattern as the name signifies indicates the reversal of the existing trend. The Continuation pattern signifies that there is only a pause in the market and the old trend will continue again. The Reversal pattern can be further classified into Bullish and Bearish Patterns. Table shows the difference between Bullish Pattern and Bearish Pattern.

Table 1 : Classification of Price Pattern

Reversal patterns		Continuation Pattern
Bullish Pattern	Bearish Pattern	
<ol style="list-style-type: none"> 1. Up trend 2. Inverted head and shoulders 3. Double Bottoms 4. Triple Bottoms 5. Support Level 	<ol style="list-style-type: none"> 1. Down Trend 2. Head and Shoulders 3. Double Tops 4. Triple Tops 5. Resistance Level 	<ol style="list-style-type: none"> 1. Triangles 2. Flag

1.9 INDICATOR ANALYSIS

Indicator Analysis is another method apart from charting to interpret price volume charts. This examination is math oriented and uses a series of calculations. The main aim of Indicator Analysis is to predict where and in which direction will price move in the future. In other words we can state that Indicator Analysis establishes a mathematical relationship of current price to past prices. The various indicators under Indicator Analysis comprises of Trend Following (e.g Moving Averages) or Oscillators (e.g Relative Strength Index). Trend following indicators makes the predictions slow as it examines the past data closely to forecast the future. On the other hand Oscillators reacts rather quickly to the short term changes in prices.

1.9.1 Moving Averages – This is a popular indicator to study price charts. Average here means the averages of **closing prices**. When a sequence of averages is calculated by finding the averages on daily basis. This sequence sets the moving average.

To calculate moving average, a period has to be selected say a period of 5 weeks, 200 days, a year etc. Let us take an example for moving average period of 5 weeks. Each week the moving average will be calculated by dropping the oldest week and adding the latest week to make it an average of 5 weeks. This is explained in the below table-

Table 1.1 shows weekly sensex level for 10 weeks.

WEEK	SENSEX	5-WEEK MOVING AVERAGE
1	25300	-
2	25350	-
3	25320	-
4	25400	-
5	25410	25356
6	25460	25388
7	25500	25418
8	25440	25442
9	25400	25442
10	25480	25456

The table shows that when the sensex is rising the moving average is lower than the sensex. When the moving average is higher than sensex it mean prices are falling that is an indication to “sell” for the investors. When the prices are rising it is an indication ton “buy”

SELF ASKING QUESTIONS

- Why can we not classify continuation patter as bullish or bearish?
- A technical analyst explains that a stock market acts like a barometer rather than like a thermometer. comment

1.10 Disadvantages of Technical Analysis

Technical analysis helps predict the future price behavior by looking at past data. Though very helpful there are few shortcomings of this analysis-

1. Identification – Identifying a trend in Technical analysis needs a lot of expertise as movements for a short duration cannot be taken to be trends. Thus to identify a pattern and to interpret price movements needs to be done more carefully. A technical analyst should be able to find out the real pattern and should be bale to differentiate between short and long term patterns.
2. Biasness – There is a possibility of biasness in Technical Analysis from the end of the analyst. Say for example the analyst is optimistic which may show up in his interpretations and predictions of going bullish.

3. Quick Judgments- The analyst must be quick in identifying the beginning of a trend to make the maximum benefit of it. A delay in identification will result in a sustainable portion of the move already taking place in the market which in turn will take away the opportunities of earning profit.

STOP TO CONSIDER

- The various advantages of Technical Analysis.
- What are the major sources of information used in Technical analysis?
- What is the relevance of technical analysis for an individual investor?

1.11 Summing Up

One of the technique for security analysis is Technical Analysis. It is important to know in detail about technical analysis for reasons such as- AN investor opts to invest in equity shares with the expectation of two returns-

- Capital profit by selling the equity when the market price is high
- To earn Dividend

Thus Dividend and fluctuation in price of equity are the two factors that makes return from equity a worthy investment. The return from equity is not fixed which is in contrast to fixed income securities where the return is definite and fixed. The reason for uncertainty in case of return from Equity is because the dividend is distributed from residual income and the price fluctuations are never definite. Thus understanding the bases of such fluctuations or being able to predict has been discussed in detail in this chapter Technical Analysis.

1.12 References and suggested Readings

2. Security Analysis and Portfolio Management , Shashi K. Gupta and Rosy Joshi, Kalyani Publishers, ISBN 978-93-272-2695-9.
3. Investment Management Theory and Practice, R.P Rustagi, Sultan Chand & Sons Publications, ISBN 978-93-5161-041-0.
4. Investment Management: Security Analysis and Portfolio Management, V.K Bhalla, S. Chand Publisher, ISBN-13: 978-8121912488.

MODEL QUESTIONS

- I. Objective type questions-
 - a. Technical analysis gives us the actual price information that will appear in the future.
 - b. In Technical analysis the historical price of securities is studied.
 - c. Dow theory classifies the price behavior in long term and short term trends.

- d. Elliott Wave Theory helps in preparing the charts.
- e. The downward primary trend is known as bear market.
- f. Resistance level is the minimum level below which share price will not fall.
Support level is given by stock exchange authorities.
- g. Candlestick Chart shows the volume of transactions.
- h. Fundamental and Technical analysis are alternative to each other.

II. Long Questions-

Q1. Write notes on

- i. Point and figure chart
- ii. Support and Resistance Level

Q2. Explain the technical analysis. How is it different from fundamental analysis?

Q3. Explain the Dow Theory and Elliott Wave theory with the help of a diagram.

Q4. Explain the different types of charts used by technical analysts to predict future trend in price.

Q5. Critically examine- “ Technical analysis relies largely on past data to predict future price behavior”.

Q6. Differentiate between

- i. Bar Chart and Candlestick Chart
- ii. Primary Trend and Secondary Trend

Answer to Objective type Questions-

- a. False b. True c. False d. False e. True
- f. False g. False h. False

1.13 Answers to check your progress

Answers to CHECK YOUR PROGRESS under section 1.4

Answer 1. Basic Principles of Technical Analysis

1. Market price of a security depends on demand and supply operating in the stock market.
2. The prices of the stock tend to move in trends with minor fluctuation for a long period.

3. Reversal or shift in trend in prices may occur because of change in demand and supply factors.
4. The change in the factors of demand and supply can be identified with the help of charts and graphs.
5. Price pattern tends to repeat and hence can be used to predict future trend.

(For the answer in detail students can check Section 1.3)

Answer 2. The various price information shown in a chart or graph comprises of

Opening Price- It is the rate at which the first transaction for the day has taken place.

High Price – It is the highest rate at which transactions took place for the day.

Low Price – It is the lowest rate at which transactions took place for the day.

Closing Price - It is the rate at which the last transaction for the day has taken place.

(For the answer in detail students can check Section 1.4)

Answers to CHECK YOUR PROGRESS under section 1.6

Answer 1. Dow theory focuses on three specific trends –

Primary Trend – It is the trend in price that exist for a long period of time. It is on this trend that whether the market is bullish (Moving up) or bearish (Moving down) in nature can be identified.

Secondary Trend : It is a trend that exist for a comparatively shorter duration and exist within a primary trend. The restraining force on the primary trend is given by the secondary trend.

Minor Trend- As the name suggest it is a trend in prices for a very short duration like for a day or few days.

(For the answer in detail students can check Section 1.5.1)

Answer 2. The stock prices according to this theory is described as a set of wave. The wave comprises of five waves.

In case of bull market the five waves comprises of-

The first wave is upward, the second is downward, the third is upward, the fourth is downward and the fifth wave is upward.

In bear market it is vice versa i.e downward, upward, downward, upward and downward.

(For the answer in detail students can check Section 1.5.2)

Answer 3. In point and figure chart how is price increase and decrease shown ?

In point and figure chart 'X' represents price increase and O represents price decrease. The alternative reversals of price trend is shown by successive 'X' and 'O' columns. In a Point and figure chart one column cannot have both 'X' and 'O' it can only have either 'X' in one column or 'O'.

(For the answer in detail students can check Section 1.6.3)

Answer 4. What are the implications of a clear and shaded candle?

In Japanese Candlestick Chart a clear candle implies an increase in price during the day (i.e the closing price is higher than the opening price for the day) and if the candle is shaded it represents a decrease in price (i.e the closing price is lower than the opening price for the day).

(For the answer in detail students can check Section 1.6.4)

Answers to CHECK YOUR PROGRESS under section 1.8

Answer 1. Head and shoulder pattern is formed at the end of a trend a reversal

(For the answer in detail students can check Section 1.7.2)

Answer 2. When a bull phase or bear phase is interrupted by a consolidation pattern, flag formation appears. The pattern formed is called a flag as it appears like a rectangle or parallelogram. The consolidation pattern appears for a short while . The flag formation indicates a pause in the continuation of the earlier trend. Thus the price moves in the same direction as before.

The bear flag indicates that while the prices were initially falling, for a short duration there is a pauses in this trend and the prices begins to fluctuate but ultimately at the end of the short span it continues to fall i.e. price moves in the same direction as before

The bull flag indicates that while the prices were initially rising, for a short duration there is a pause in this trend and the prices begin to fluctuate but ultimately at the end of the short span it continues to rise i.e. price moves in the same direction as before.

(For the answer in detail students can check Section 1.7.5)

Answer 3. Support and Resistance levels are the price levels at which a trend (rising or declining) takes a turn and moves in the opposite direction. Depending on the past data these levels are determined that determines the level below which or above which the price will not fall or rise.

A SUPPORT LEVEL is the level below which the price level is not expected to fall. On the other hand A RESISTANCE LEVEL is the level above which the price level is not expected to rise.

(For the answer in detail students can check Section 1.8)

BLOCK 3: ANALYSIS OF EQUITY INVESTMENT

UNIT-5

EFFICIENT MARKET HYPOTHESIS

Contents:

- 5.1 Introduction
- 5.2 Objectives
- 5.3 Random Walk Theory
- 5.4 Efficient Market Hypothesis
- 5.5 Forms of Market Efficiency
- 5.6 Implications of EMH
- 5.7 Empirical Tests of Market Efficiency
- 5.8 Summing Up
- 5.9 References and Suggested Readings
- 5.10 Model Questions
- 5.11 Answer to check your progress/Possible Answers to SAQ

5.1 INTRODUCTION

There are three approaches to study the behaviour of stock prices viz. Fundamental analysis, Technical analysis and Efficient Market Hypothesis (EMH). Fundamental analysis is the analysis of the economy, industry and company to evaluate the intrinsic value of securities for investment purposes. In the other words, it is the detailed analysis of the fundamental factors affecting the performance of the company. Technical analysis is the study of past behaviour of stock price and volume movements so as to predict the future stock price movement. Technical analysis assumes that stock prices move in trends or waves which may be upward or downward. In the other words, stock price movement is quite orderly and not random. This assumption of technical analysis on behaviour of stock price has been questioned by the advocates of a new theory on stock price behaviour. According to the advocates of the new theory, stock price movements are random because changes in stock prices are independent of each other and cannot be predicted. Changes in stock prices are dependent on the new pieces of information. The new theory is known as Random Walk Theory which is based on Efficient Market Hypothesis (EMH). This hypothesis states that an efficient stock market is one in which stock prices are always equal to their intrinsic values.

5.2 OBJECTIVES

After going through this unit, you will be able to:

- Explain the concept of Efficient Market Hypothesis

- Explain Random Walk Theory
- Understand various forms of Market efficiency
- Specify the implications of efficient market hypothesis
- Understand various empirical tests of market efficiency

5.3 RANDOM WALK THEORY

Random Walk Theory is based on the premise that stock price movements are random i.e. the successive price changes are independent or unrelated of each other. The successive price changes are unpredictable. Hence, one cannot predict future prices on the basis of today's price or past prices. A change in stock prices occurs only as a result of new pieces of information which are not available earlier. Thus, the current stock price fully reflects all available information on the stock. Therefore, the price of each day is independent. The movement in stock prices i.e. higher or lower or unchanged from the previous price depends on new pieces of information being received each day.

According to Random Walk Theory, present and past prices cannot be used to predict future prices as prices have no memory. This theory contradicts the technical analysis which believes that past prices can be used to predict future prices. According to technical analysis, present prices are based on past trends and the history of trends repeats itself. A change in stock prices occurs only as a result of new pieces of information which are not available earlier. The adjustment to new pieces of information is so fast that it is impossible to earn profit from it. Therefore, fundamental analysis is also a useless exercise to predict future prices.

The random walk theory presupposes that the stock markets are efficient. An efficient stock market is one in which stock prices reflect all available information and adjust rapidly to the inflow of new information. This is because of a good communication system through which information spread anywhere instantaneously.

In nutshell, Random Walk Theory assumes that stock price changes are independent of each other. The present price is randomly determined and only new pieces of information which are not available earlier influence prices. Since information is independent and free, the resulting price changes are also independent and free. Stock prices discount all information quickly. This theory also assumes that the market is supreme and no individual investor or group can influence it.

Check Your Progress

1. Explain briefly Random Walk Theory?

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5.4 EFFICIENT MARKET HYPOTHESIS (EMH)

The Efficient Market Hypothesis is based on the assumption that the security market is efficient in processing information. An efficient security market is one in which the security prices reflect all available information and adjust rapidly to the inflow of new pieces of information. Hence security prices will change only in case of new information. Since the inflow of new information is unpredictable, security price changes cannot be predicted. If new information happens to be good, then security prices will adjust upward immediately and if the new information happens to be bad then the security prices will adjust downward instantaneously. Hence, market efficiency is concerned with the speed of adjustment of security prices to new information. It is concerned with the speed at which information is incorporated into security prices.

Technical analysts believe that past trends of prices contain information about future price movements as they believe that security prices incorporate information slowly. This gives technical analysts an opportunity to earn excess returns by studying the past movements of security prices and trading accordingly.

According to fundamentalists, it may take several days or weeks to incorporate new information into security prices. As a result, the price may be volatile for a number of days before it adjusts to new information. This provides an opportunity for the analyst to earn excess returns because they possess superior analytical skills.

The notion that stock prices fully reflect all available information is referred to as the efficient market hypothesis. In an efficient market, new information is processed so fast as it arrives and is incorporated into the prices. Consequently, no investor can outperform the market by undertaking technical analysis or fundamental analysis.

STOP TO CONSIDER

The notion that stock prices fully reflect all available information is referred to as the efficient market hypothesis. An efficient security market is one in which the security prices reflect all available information and adjust rapidly to the inflow of new pieces of information.

5.5 FORMS OF MARKET EFFICIENCY

There are three forms of the efficient market hypothesis viz. weak form, semi-strong form. This classification is based on the type of information absorbed by the market.

5.5.1 Weak Form

According to the weak form of market efficiency, current prices of security fully reflect all past or historical information. Therefore, past prices cannot be used to predict future prices. It is based on the premise that “stock prices have no memory”. It implies that successive price changes are independent of past price changes. Hence, one cannot predict future prices on the basis of past prices. The weak form is the opposite of the technical analysis, which states that prices move in trends or waves i.e. in a predictable manner and historical movement can help to

predict future price trends. Technical analysis is of no use in a weak form efficient market. The short-term trader in this form of the market is in a similar position as another investor who adopts the approach of 'buy' and 'hold' strategy.

5.5.2 Semi-strong Form

The semi-strong form is the second form of market efficiency. According to this form of market efficiency, security prices reflect past or historical prices as well as publicly available information. One cannot outperform the market by using historical as well as publically available information as security prices. It implies that not only technical analysis but also fundamental analysis becomes a useless exercise in a semi-strong efficient market. Only those investors or traders can beat the market and earn superior returns who have access to private or inside information.

5.5.3 Strong Form

The Strong form is the highest level of market efficiency. According to the strong form, security prices reflect all available information both public and private (i.e. inside information). In this form prices also reflect the information that is available to insiders apart from information available publicly. It implies that no one, even investors or traders with insider information beat the market or earn superior returns as all information about the security is already discounted and reflected in its price. It is only the new pieces of information that can change security prices.

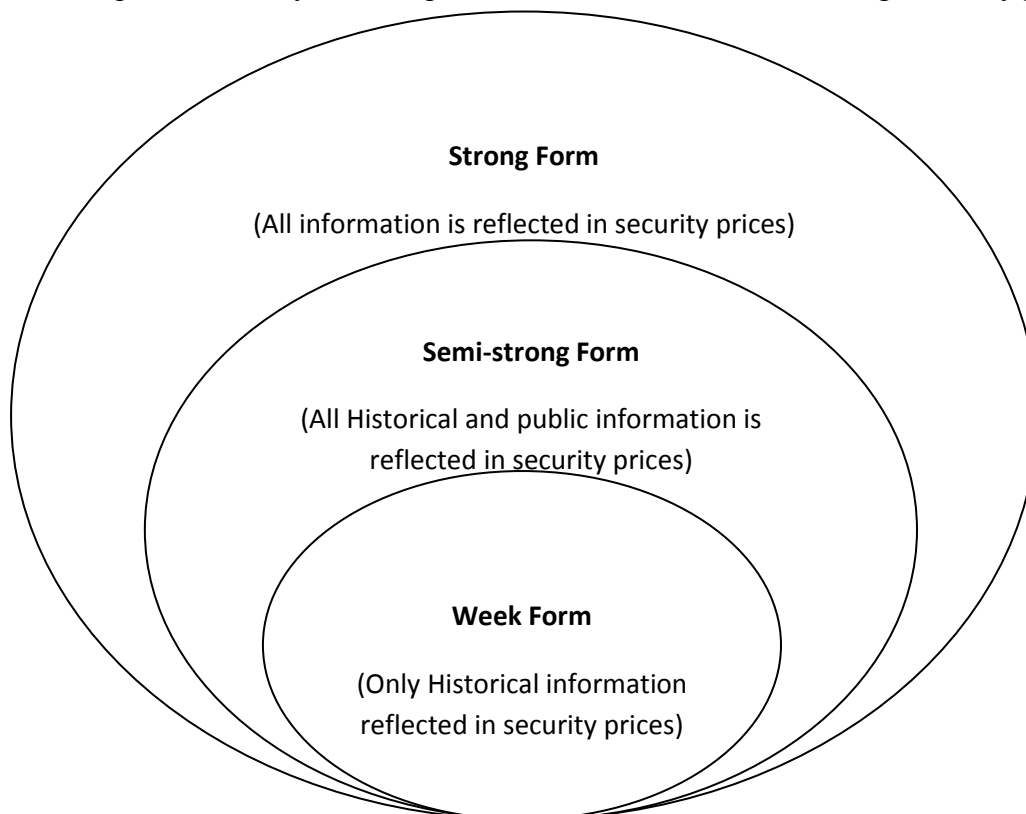


Fig. 5.1 Forms of Market Efficiency

Self Asking Questions I

1. Describe the differences in various forms of Market efficiency.

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5.6 IMPLICATIONS OF EMH

One of the significant implications of efficient market hypothesis is that no one can beat the market consistently as security prices reflect their true intrinsic value. Security price movements are random in nature. In the other words, it implies that changes in stock prices are independent or unrelated of each other. Hence one cannot predict future prices on the basis of today's price or past prices. A change in stock prices occurs only as a result of new pieces of information which are not available earlier. Therefore, one cannot earn superior returns with the help of trend analysis (or technical analysis) or fundamental analysis. It implies that not only technical analysis but also fundamental analysis becomes a useless exercise. As per EMH, anytime is a good time to buy or sell as security prices fully reflect all available information. Thus, 'Passive Investment Strategy' is the best strategy in an efficient market rather than 'Active Investment Strategy'. Passive management means investment in an index fund or market portfolio. Passive management does not require analysis of individual securities for selection in portfolio. Here, investors can earn market return at market risk by investing in the market index. Active management requires analysis of individual securities for selection in portfolio, revision of portfolio, tracking the performance of an investment portfolio and making buy, hold, and sell decisions about the assets in it. The goal is to outperform the market. This is impossible to earn superior profit in an efficient market.

Passive management strategy does not mean that all investors earn same return i.e. market return by assuming same amount of risk. To meet their risk-return preferences, investors might combine a passive portfolio, i.e. a market portfolio, with a risk-free asset.

STOP TO CONSIDER

One of the significant implications of efficient market hypothesis is that no one can beat the market consistently as security prices reflect their true intrinsic value. Security price movements are random in nature.

5.7 EMPIRICAL TESTS OF MARKET EFFICIENCY

There are three forms of market efficiency viz., weak form, semi-strong form and strong form. Tests of market efficiency depend upon the form of market efficiency one to test for. Various empirical tests have been devised to test the different forms of market efficiency. Some of the tests used are discussed below:

5.7.1 Tests of Weak Form of Market Efficiency

Weak form of market efficiency implies that the security prices follow a random walk i.e. successive price changes are independent and unrelated. A number of statistical tests are being used by the researchers to test the market is weak form efficiency or not. Some of the tests used are discussed below:

(i) Serial correlation Test (or Autocorrelation Test)

Serial correlation is used in statistics to describe the relationship between observations of the same variable over specific periods. If a variable's serial correlation is measured as zero, there is no correlation, and each of the observations is independent of one another. Conversely, if a variable's serial correlation skews toward one, the observations are serially correlated, and future observations are affected by past values. Essentially a variable that is serially correlated has a pattern and is not random. In this test, randomness in changes in stock price can be tested by conducting a correlation analysis between price changes in one period and changes for the same in another period. If the correlation coefficient is zero or close to zero, the price changes are said to be serially independent.

(ii) Run Test

The run test is another test used to test the randomness in changes in stock price. In this test, the absolute values of changes in price are ignored rather it considers the direction of changes in price. The direction of changes in price is represented by '+' or '-' sign. An increase in price as compared to the preceding price is represented by + sign and decrease in price as compared to the preceding price is represented by - sign. Zero is used to indicate no change in prices. A run is a consecutive sequence of the same sign. A new run begins when the sign of change differs. A change of sign is considered as a new run. There are five runs in the sequence + + + - - 0 + + - - - ; a sequence of three + is a run, followed by another run of two -'s, another run of one 0, a fourth of three - and the fifth run of three -'s. In this test, the actual number of runs in a series of stock price changes is compared with a number of runs in a purely random series of the size. If no significant differences are observed, then the stock price movements are considered to be random in nature.

(iii) Filter Rules Test

Successful mechanical trading systems are very difficult to develop when the stock price movements are random in nature. Filter Rules have been developed to examine the validity and usefulness of specific mechanical strategies. A filter rule is a trading strategy of actions (buy or sell) to be taken when the price of a stock increases or decreases by a certain percentage from prior prices. Let us take an example that a 10% filter has been set. In this case, if a share price starts increasing and when it ceases to decline and increases 10% above its low point, it is a buy signal. Similarly, if the price starts increasing and then begins to decline, once the price has declined 10% from its previous peak, it is a sell signal. The returns earned by applying the filter rule are compared to returns earned by an investor/trader by following the buy and hold strategy. If returns earned by applying filters are superior returns that would suggest that price movements are not random and it negates the weak form EMH.

5.7.2 Tests of Semi-Strong Form of Market Efficiency

According to the semi-strong form of market efficiency, security prices reflect past or historical prices as well as publicly available information. Tests of the semi-strong form of market efficiency are based on event study and portfolio study.

(i) Event Study

Event studies can be used to understand the effects of a particular event or announcement about earnings, dividends, mergers, stock splits, new laws, etc on a company's stock prices and returns. The date of a particular event or announcement is considered as the 'event day' and price changes are examined over a period prior to and post the 'event day'. Generally, a test window of ± 30 is applied. If significant abnormal returns are generated over the period surrounding the event date, the market is said to be semi-strong form efficient.

(ii) Portfolio Study

A portfolio is a collection of financial assets which is made by an investor by selecting certain securities on some basis such as performing companies in a different sector, companies having good P/E ratios, etc. In this study, portfolios are observed to see whether it earns superior risk adjusted returns. The excess of actual return over expected return i.e. excess return is calculated. If excess return across two or more than two portfolios in the study are not the same then the market is not semi-strong efficient. In the other words, If excess return across two or more than two portfolios in the study are same then the market is semi-strong efficient.

5.7.3 Tests of Strong Form of Market Efficiency

The strong form is the most extreme form of the efficient market hypothesis. According to this form of market efficiency, the current stock prices reflect all information both publicly available information and private or inside information which implies that no information, whether public or private, can be used to earn superior returns on a consistent basis over the long term. It has been seen that the top level management, mutual funds and other professional analysts have such inside or private information which are not available to the general public. One of the ways to test whether the market is strong form efficiency or not is to find out whether those who have access to inside information able to earn excess returns by utilizing such inside information. If

these sets of people are able to earn higher returns than the market or general investors, it can be concluded that the market is not strong form efficient.

Self Asking Questions II

1. How are week and semi-strong forms of market efficiency tested?

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5.8 SUMMING UP

- Random Walk Theory is based on the premise that stock price movements are random i.e. the successive price changes are independent or unrelated of each other. The successive price changes are unpredictable. This theory is based on Efficient Market Hypothesis.
- The notion that stock prices fully reflect all available information is referred to as the efficient market hypothesis. In efficient market, security prices reflect fully all available information and adjust instantaneously to the inflow of new information.
- There are three forms of market efficiency viz. week form, semi-strong form and strong form.
- In week form of market efficiency security prices fully reflect all past or historical information. Technical analysis is of no use in a week form efficient market.
- In semi form of market efficiency security prices reflect past or historical prices as well as publicly available information. Both technical analysis and fundamental analysis becomes useless exercise in semi-strong efficient market
- In strong form of market efficiency security prices reflect all available information both public and private (i.e. inside information).
- In an efficient market, no one can beat the market consistently as security prices reflect their true intrinsic value.
- Tests for week form of market efficiency include serial correlation, filter rules .test ad run test
- Tests for semi-strong form of market efficiency include event study and portfolio study.

- One of the ways to test whether the market is strong form efficiency or not is to find out whether those who have access to inside information able to earn excess returns by utilizing such inside information.

5.9 REFERENCES AND SUGGESTED READINGS

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5.10 MODEL QUESTIONS

1. What do you mean by Efficient Market Hypothesis? Describe the various forms of market efficiency?
2. What is Random Walk Theory? Explain.
3. What is weak form of market efficiency? Describe the different tests of weak form of market efficiency.
4. Explain semi-strong form of market efficiency? What are the tests available for testing semi-strong form of market efficiency?
5. Explain strong form of market efficiency. How can it be tested?
6. What are the implications of EMH to fundamental and technical analysis?
7. Write short notes on:
 - (a) Serial Correlation Test
 - (b) Run Test
 - (c) Filter Rules Test

5.11 ANSWER TO CHECK YOUR PROGRESS/POSSIBLE ANSWERS TO SAQ

Check Your Progress

1. Refer to 5.3

SAQ I

1. Refer to 5.5

SAQ II

1. Refer to 5.7.1 & 5.7.2

BLOCK 4
UNIT: 1
PORTFOLIO ANALYSIS

CONTENTS

- 4.1 Introduction
- 4.3 Traditional and Modern Portfolio Analysis
- 4.3 Advantages of Portfolio Analysis
- 4.4 Process of Portfolio Analysis
- 4.5 Portfolio Risk and Return
- 4.6 Expected Return of a Portfolio
- 4.7 Risk of a Portfolio
- 4.8 Optimal Portfolio
- 4.9 Efficient Portfolio
- 4.10 Markowitz Model
- 4.11 Assumptions of Markowitz Model
- 4.12 Efficient Frontier
- 4.13 Limitations of Markowitz Model

After completion of this unit you will be able to understand:

- Meaning and Advantages of Portfolio Analysis
- Expected return and risk associated with Portfolio Analysis
- Concept of Optimal & Efficient Portfolio
- Efficient Frontier and its significance
- Markowitz Model, Assumptions and its Limitations

4.1 INTRODUCTION

Portfolio means a collection or combination of securities such as shares, debentures and government securities. In general terms a ‘portfolio’ may be defined as a bundle of securities or collection of assets, which can even include physical assets like gold, silver, real estate, etc. What is to be borne in mind is that, in the portfolio context, assets are held for ‘investment’ purposes and not for ‘consumption’ purposes.

Most investors tend to invest in a group of securities rather than a single security. Such a group of security held together as an investment is what is known as portfolio. The process of creating such a portfolio is called diversification. It is an attempt to spread and minimise the risk in investment. This is sought to be achieved by holding different types of securities across different industry groups. From a given set of securities, any number of portfolios can be created. A rational investor attempts to find the most efficient of these portfolios. The efficiency of each portfolio can be evaluated only in terms of expected return and risk of portfolio as such. Thus, determining the expected return and risk of different portfolios is a primary step in portfolio management. This step is designated as ‘portfolio analysis’.

Portfolio Analysis is the process of assessing or reviewing the elements of the entire portfolio of securities. The review is done for careful analysis of risk and return. Portfolio analysis conducted at regular intervals helps the investor to make changes in the portfolio allocation and change them according to the changing market and different circumstances. The analysis also helps in proper asset allocation to different elements in the portfolio. In short; portfolio analysis is a quantitative method for selecting an optimal portfolio that can strike a balance between maximizing the return and minimizing the risk in various uncertain environments.

4.2 TRADITIONAL AND MODERN PORTFOLIO ANALYSIS

Traditional portfolio analysis has been of a very subjective nature for each individual investor. The investors made the analysis of each security through the evaluation of risk and return conditions in that security. The normal method of finding the return on an individual security was by finding out the amounts of dividends that have been given by the company, the price earnings ratios, the common holding period and by an estimation of the market value of the shares. The traditional theory assumes that selection of securities should be based on lower risk as measured by its standard deviation from the mean of expected returns. The greater the variability of returns the greater is the risk. Thus, the investor chooses assets with the lowest variability of returns. Though subjective in nature the theory has provided success to some investors who have made their investments by making analysis of individual securities through evaluation of return and risk conditions. The focal point of modern portfolio theory is in the maximization of return through a combination of securities. The modern portfolio theory considers the relationship between different securities and then

draws inter-relationships of risks between them. It is not necessary to achieve success, only by trying to get all securities of minimum risk. The theory states that by combining a security of low risk with another security of high risk, success can be achieved by an investor in making a choice of investment outlets.

The modern portfolio theory is of the view that by diversification, risk can be reduced to a great extent. Diversification is important but the modern theory states that there cannot be only diversification to achieve the maximum return. The securities have to be evaluated and thus diversified to some limited extent within which the maximum achievement can be sought by the investor. Modern portfolio theory, as brought out by Markowitz and Sharpe, is the combination of the securities to get the most efficient portfolio. Combination of securities can be made in numerous ways. Markowitz developed the theory of diversification through scientific reasoning and method. He is of the view that a portfolio should be analysed depending upon:

- (a) The attitude of the investor towards risk and return; and
- (b) The quantification of risk.

Thus, traditional theory and modern theory are both framed under the constraints of risk and return, the former analysing individual securities and the latter believing in the perspective of combination of securities.

4.3 ADVANTAGES OF PORTFOLIO ANALYSIS

The following are the advantages of Portfolio Analysis:

1. Portfolio analysis facilitates the investors to assess the performance periodically and make changes to their Investment strategies if such analysis suggests.
2. It helps in comparing the portfolio against a benchmark for return perspective and understanding the risk undertaken to earn such return, enabling investors to derive the risk-adjusted return.
3. It helps realign the investment strategies with the changing investment objective of the investor.

4. Through portfolio analysis, the investor can separate the underperforming investments from the good ones. This will help to replace the underperforming ones with outperforming investments.

4.4 PROCESS OF PORTFOLIO ANALYSIS

Portfolio analysis is one of the areas of investment management that enables market participants to analyze and assess the performance of a portfolio. The following is the process of portfolio analysis:

1. Assessing the requirements

The portfolio manager needs to understand the values, mindset, requirements and priorities of the investors for developing the appropriate strategy. Planning for investments requires a thorough analysis of the current scenario of the investor. Knowledge of current asset, cash flow, debt, etc of the investor is helpful to form future strategies and to accomplish the stated goal.

2. Establish Investment Objectives

This process involves identifying the risk-return profile of investors. Determining how much risk the investor can take for the required returns for the formulation of the Investment strategy. Secondly, it involves establishing a benchmark to compare the actual portfolio performance and make adjustments a long way.

3. Determine Asset Allocation

It is important to diversify the portfolio and allocate the assets in such a way that it minimize the risk and maximize the returns. The investor needs to explore various avenues of asset allocation like cash, stock, bonds, and alternative investments concerning the risk-return profile.

4. Selecting Investment Options

The portfolio can be managed in bilateral ways that are active and passive. Active management of portfolio refers to outperforming the market in comparison to a specific benchmark through more frequent trades whereas passive management of portfolio depicts

the investment holdings of a particular index and requires low shuffling. It is completely on the investors to decide what kind of investment management strategy they want.

5. Monitor, Measure, and Restructure

The portfolio managers monitor the investments on the basis of its returns generated and risk associated, compare them with a specific benchmark, and in case of any differences, restructure the portfolio by selling the non-performing stocks and buying the stocks with higher potential.

4.5 PORTFOLIO RISK AND RETURN

Risk and expected return are the two key determinants of an investment decision. Risk, in simple terms, is associated with the variability of the rates of return from an investment; how much do individual outcomes deviate from the expected value? Statistically, risk is measured by any one of the measures of dispersion such as co-efficient of range, variance, standard deviation etc.

The risk involved in investment depends on various factors such as:

- i. The length of the maturity period - longer maturity periods impart greater risk to investments.
- ii. The credit-worthiness of the issuer of securities - the ability of the borrower to make periodical interest payments and pay back the principal amount will impart safety to the investment and this reduces risk.
- iii. The nature of the instrument or security also determines the risk. Generally, government securities and fixed deposits with banks tend to be riskless or least risky; corporate debt instruments like debentures tend to be riskier than government bonds and ownership instruments like equity shares tend to be the riskiest. The relative ranking of instruments by risk is once again connected to the safety of the investment.
- iv. Equity shares are considered to be the most risky investment on account of the variability of the rates of returns and also because the residual risk of bankruptcy has to be borne by the equity holders.
- v. The liquidity of an investment also determines the risk involved in that investment. Liquidity of an asset refers to its quick saleability without a loss or with a minimum of loss.

- vi. In addition to the aforesaid factors, there are also various others such as the economic, industry and firm specific factors that affect the risk an investment.
- vii. Another major factor determining the investment decision is the rate of return expected by the investor. The rate of return expected by the investor consists of the yield and capital appreciation.

Stop to Consider

Q1. What is Portfolio Analysis? Highlight its advantages.

Q2. Discuss the process of Portfolio Analysis.

Q3. Explain the significance of portfolio analysis in portfolio management.

4.6 EXPECTED RETURN OF A PORTFOLIO

In the first step of portfolio analysis, an investor needs to specify the list of securities is eligible for selection or inclusion in the portfolio. Next he has to generate the risk return expectations for the securities. These are typically expressed as the expected rate of return (mean) and the variance or standard deviation of the return.

The expected return of the portfolio of assets is simply the weighted average of the return of the individual securities held in the portfolio. The weight applied to each return is the fraction of the portfolio invested in that asset/ security. The formula for the calculation of expected portfolio return may be expressed as shown below:

$$r_p = \sum_{i=1}^n x_i r_i$$

where,

r_p = Expected return of the portfolio;

x_i = Proportion of the portfolio's initial fund invested in asset i;

r_i = Expected return of asset i; and

n = Number of assets in the portfolio;

Let us consider a portfolio of two equity shares X and Y. The expected return on X is, say, 15% and that on Y is 20%. Further, assume that the investor have invested 40% of the fund in share X and the remaining 60% in share Y. Then, the expected portfolio return will be:

$$(0.40 \times 15) + (0.60 \times 20) = 18 \text{ percent.}$$

4.7 RISK OF A PORTFOLIO

Portfolio risk is a term used to describe the potential loss of value or decline in the performance of an investment portfolio due to various factors, including market volatility, credit defaults, interest rate changes and currency fluctuations. The variance of return and standard deviation of return are alternative statistical measures that are used for measuring risk in investment. These statistics measure the extent to which returns are expected to vary around an average over time. The calculation of variance of a portfolio is a little more difficult than determining its expected return. The variance or standard deviation of an individual security measures the riskiness of a security in absolute sense. For calculating the risk of a portfolio of securities, the riskiness of each security within the context of overall portfolio has to be considered. This depends on their interactive risk i.e. how the returns of the security move with the returns of other securities in the portfolio and contribute to the overall risk of the portfolio. Covariance is this statistical major that indicates the interactive risk of a security relative to others in a portfolio of securities. In other words, the way security returns vary with each other affects the overall risk of the portfolio.

The covariance between two securities A and B may be calculated using the following formula:

$$Cov_{xy} = \frac{\sum_{i=1}^N [R_x - \bar{R}_x][R_y - \bar{R}_y]}{N}$$

where,

Cov_{xy} = Covariance between x and y

R_x = Return of security x

R_y = Return of security y.

\bar{R}_x = Expected or mean return of security x

\bar{R}_y = Expected or mean return of security y

N = Number of observations.

4.8 OPTIMAL PORTFOLIO

An optimal portfolio is one that occupies the 'efficient' parts of the risk-return premium spectrum. It satisfies the requirement that no other collection exists with a higher expected return at the same standard deviation of the return (risk measure). Different combinations of assets produce different levels of return. The optimal portfolio concept represents the best of these combinations, those that provide the maximum possible expected return for a given level of acceptable risk. The process of finding the optimal portfolio is described as **portfolio selection**.

The optimal portfolio concept falls under the **modern portfolio theory**. The conceptual framework and analytical tools for determining the optimal portfolio in a discipline and objective manner have been provided by Harry Markowitz in his pioneering work on portfolio analysis described in his 1952 *Journal of Finance* article. His method of portfolio selection has come to be known as the **Markowitz model**.

4.9 EFFICIENT PORTFOLIO

An Efficient portfolio is the one which yields maximum return at minimum risk at a given level of return. The Dominance Principle is used as a base to identify the efficient portfolio. A portfolio having maximum return for a specific level of risk is preferred over other portfolios having similar risk. Investors maximize their terminal wealth by going for high yielding securities at a given risk level. Only efficient portfolios are feasible in the long run which fulfils this need of the investors. The expected returns and risk measured by standard deviation of portfolio returns can be estimated as done in the table below:

Portfolio Number	Expected Return (%)	Standard Deviation (%)
1	5	4.5
2	7	5.6
3	9	7.8
4	11	7.8
5	13	11.3
6	13	12.8
7	15	13.1
8	17	14.5
9	18	16.4
10	20	17.2
11	22	18.9
12	25	19.1

By comparing the portfolios at the given risk and return, if we compare portfolio No. 5 and 6 with the same return at 13%, an investor would select Portfolio No. 5 since the risk is low at 11.3 as compared to portfolio No. 6. Similarly, if we compare portfolio No. 3 and 4, having similar risk depicted by standard deviation of 7.8 an investor would choose portfolio No. 4 since it yield at higher return at 11% compared to portfolio No. 3.

Thus, we can lay down general criteria for portfolio selection as -

1. Between two portfolios having the same risk, an investor would choose the one with higher expected return.
2. Between two portfolios having the same return, an investor would choose the one with lower risk.

This is because of the rational natures of the investors who is risk averse and want maximum returns.

Stop to Consider

Q1. How is the risk calculated in a security?

Q2. Illustrate the calculation of expected risk of a portfolio.

Q3. Define briefly the concept of optimal portfolio.

4.10 MARKOWITZ MODEL

Harry Markowitz is regarded as the father of modern portfolio theory. According to him, investors are mainly concerned with two properties of an asset: risk and return, but by diversification of portfolio it is possible to trade-off between them. The essence of his theory is that risk of an individual asset hardly matters to an investor. What really counts is the contribution it makes to the investor's total risk. By turning his principle into a useful technique for selecting the right portfolio from a range of different assets, he developed 'Mean Variance Analysis' in 1952. The thrust has been on balancing safety, liquidity and return depending on the taste of different investors. The portfolio selection problem can be divided into two stages, first finding the mean-variance efficient portfolios and secondly selecting one such portfolio. Investors do not like risk and the greater the riskiness of returns on an investment, the greater will be the returns expected by investors. There is a trade-off between risk and return, which must be reflected in the required rates of return on investment opportunities. The standard deviation (or variance) of return measures the total risk of an investment. It is not necessary for an investor to accept the total risk of an individual security. Investors can and do diversify to reduce risk. As number of holdings approach larger, a good deal of total risk is removed by diversification.

4.11 ASSUMPTIONS OF MARKOWITZ MODEL

This model has taken into account of risks associated with investments – using variance or standard deviation of the return. This model is based on the following assumptions:

1. The return on an investment adequately summarises the outcome of the investment.

2. All investors are risk-averse. For a given expected return he prefers to take minimum risk, obviously for a given level of risk the investor prefers to get maximum expected return.
3. Investors are assumed to be rational in so far as they would prefer greater returns to lesser ones given equal or smaller risk and risk averse. Risk aversion in this context means merely that, as between two investments with equal expected returns, the investment with the smaller risk would be preferred.

4.12 EFFICIENT FRONTIER

Markowitz has formulised the risk return relationship and developed the concept of efficient frontier. For selection of a portfolio, comparison between a combination of portfolios is essential. As a rule, a portfolio is not efficient if there is another portfolio with:

- a higher expected value of return and a lower standard deviation (risk)
- a higher expected value of return and the same standard deviations (risk)
- the same expected value but a lower standard deviation (risk).

Markowitz has defined the diversification as the process of combining assets that are less than perfectly positively correlated in order to reduce portfolio risk without sacrificing any portfolio returns. If an investor's portfolio is not efficient he may:

- increase the expected value of return without increasing the risk.
- decrease the risk without decreasing the expected value of return, or
- obtain some combination of increase of expected return and decreased risk.

This is possible by switching to a portfolio on the efficient frontier.

If all the investments are plotted on the risk-return sphere, individual securities would be dominated by portfolios, and the efficient frontier would take shape, indicating investments which yield maximum return given the level of risk bearable, or which minimises risk given the expected level of return. The figure depicts the boundary of possible investments in securities A, B, C, D, E and F; and B, C, D are lying on the efficient frontier.

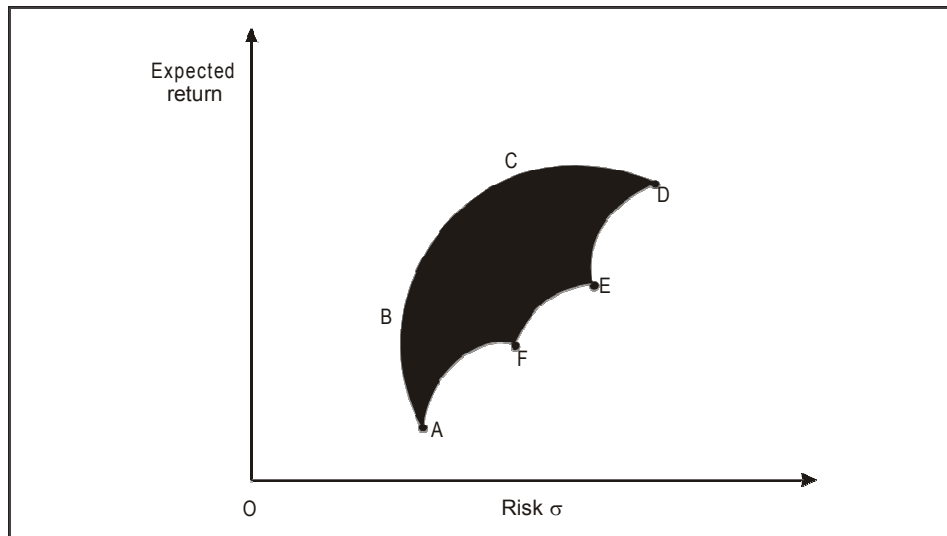


Figure 4.1: Markowitz Efficient Frontier

The best combination of expected value of return and risk (standard deviation) depends upon the investors' utility function. The individual investor will want to hold that portfolio of securities that places him on the highest indifference curves, choosing from the set of available portfolios. The dark line at the top of the set is the line of efficient combinations, or the efficient frontier. It depicts the trade-off between risk and expected value of return. The optimal investment achieved at a point where the indifference curve is at a tangent to the efficient frontier. This point reflects the risk level acceptable to the investor in order to achieve a desired return and provide maximum return for the bearable level of risk. The concept of efficient frontier and the optimal point location is explained with help of next figure. A, B, C, D, E and F define the boundary of all possible investments out of which investments in B, C and D are the efficient proposals lying on the efficient frontier. The attractiveness of the investment proposals lying on the efficient frontier depends on the investors' attitude to risk. At point B, the level of risk and return is at optimum level. The returns are the highest at point D, but simultaneously it carries higher risk than any other investment.

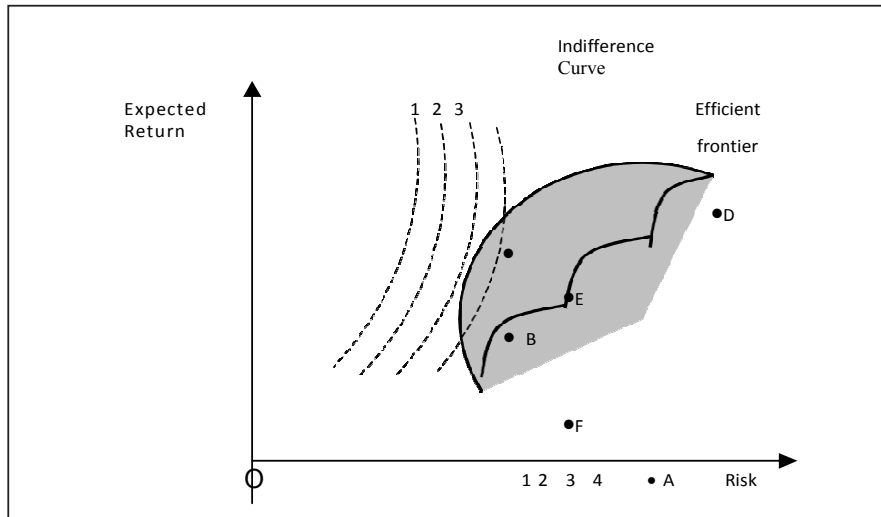


Figure 4.2: Optimal Portfolio

The shaded area represents all attainable portfolios, that is all the combinations of risk and expected return that may be achieved with the available securities. The efficient frontier denotes all possible efficient portfolios and any point on the frontier dominates any point to the right of it.

Markowitz used the technique of quadratic programming to identify the efficient portfolios. Using the expected return and risk of each security under consideration and the covariance estimates for each pair of securities, he calculated risk and return for all possible portfolios. Then, for any specific value of expected portfolio return, he determined the least risk portfolio using quadratic programming. With another value of expected portfolio return a similar procedure again gives the minimum risk portfolio. The process is repeated with different values of expected return, the resulting minimum risk portfolios constitute the set of efficient portfolios.

4.13 LIMITATIONS OF MARKOWITZ MODEL

One of the main problems with the Markowitz model is the large number of input data required for calculations. An investor must obtain estimates of return and variance of returns for all securities as also co variances of returns for each pair of securities included in the portfolio. If there are N securities in the portfolio, he would need N return estimates and N variance estimates and $N(N-1)/2$ covariance estimates, resulting in a total of $2N + [N(N-1)/2]$ estimates. For example, analysing asset of 200 securities would require 200 return estimates, 200 variance estimates and 19,900 covariance estimates, adding upto a total of

20,300 estimates. For a set of 500 securities, the estimates required would be 1,25,750. It may be noted that the number of estimates required becomes large because coverage between each pair of securities have to be estimated. The second difficult to with the Markowitz model is the complexity of computations required. The computations required are numerous and complex in nature. With a given set of securities infinite number of portfolios can be constructed. The expected returns and variances of returns for each possible portfolio have to be computed. The identification and efficient portfolios requires the use of quadratic programming which is a complex procedure. Because of the difficulties associated with Markowitz model, it has found little use in practical applications of portfolio analysis. Much simplification is needed before theory can be used for practical applications. Simplification is needed in the amount and type of input data required to perform portfolio analysis; simplification is also needed in the computational procedure used to select optimal portfolios.

The simplification is achieved through index models. There are essentially two types of index models: single index model and multi index model. The single index model is the simplest and the most widely used simplification and may be regarded as being at one extreme point of the continuum, with the Markowitz model at the other extreme point. Multi index models may be placed at the mid region of this continuum of portfolio analysis techniques.

4.14 SUMMARY

Portfolio analysis involves assessing your investments. It is a very important part of investing journey. By monitoring the portfolio regularly, one can achieve stated financial goals. Portfolio analysis conducted at regular intervals helps the investor to make changes in the portfolio allocation and change them according to the changing market and different circumstances. Risk and expected return are the two key determinants of an investment decision with the help of which one can create an optimal/ efficient portfolio. An Efficient portfolio is the one which yields maximum return at minimum risk at a given level of return. Harry Markowitz has developed the modern portfolio theory which helps to minimise risk and maximise return of a portfolio using quadratic programming.

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ANSWER TO SELF CHECK EXERCISES

Q1. Explain briefly Portfolio Analysis. Discuss its advantages.

Q2. Analyse the concept of expected return and risk of a portfolio.

Q3. What will happen to portfolio risk if we go on adding more and more stocks to a portfolio?

Q4. What is meant by efficient frontier? How is it identified?

Q5. Discuss the Markowitz Model. List the Limitations of the Model.

BLOCK 4: PORTFOLIO ANALYSIS
UNIT-2
SINGLE INDEX MODEL, SHARPE INDEX MODEL, PORTFOLIO DATA

Contents:

- 2.1 Introduction
- 2.2 Objectives
- 2.3 Single Index Model or Sharpe Index Model
- 2.4 Measuring return and risk of an individual security under Single Index Model
- 2.5 Measuring return and risk of a portfolio under Single Index Model
- 2.6 Summing Up
- 2.7 References and Suggested Readings
- 2.8 Model Questions
- 2.9 Answer to check your progress/Possible Answers to SAQ

2.1 INTRODUCTION

The Markowitz model of diversification of portfolios was theoretically very elegant and conceptually very sound. However, the Markowitz model requires a large number of inputs for portfolio analysis. If there are n securities, the Markowitz model requires n return estimates, n variance estimates, and $n(n-1)/2$ covariance estimates. For example, if an analyst is considering 100 securities, the Markowitz model requires 100 return estimates, 100 variance estimates, and 4950 covariance estimates. For analyzing a set of 200 securities would require 200 return estimates, 200 variance estimates, and 19,900 covariance estimates. It has been seen that the number of estimates required becomes large with the number of securities increase because covariances between each pair of securities have to be estimated. Another difficulty with the Markowitz model is the complexity of calculations needed. The calculations needed are numerous and complex in nature. Because of the difficulties associated with this model, its application remained severely limited until William F. Sharpe published a model simplifying the mathematical calculations required by the Markowitz model. This simplification of the Markowitz model has come to be known as the Single Index Model or Sharpe Index Model.

2.2 OBJECTIVES

After going through this unit, you will be able to:

- Understand the Sharpe's Single Index Model
- Measure the return and risk of an individual security under Single Index Model
- Measure the risk and return of a portfolio under Single Index Model

2.3 SINGLE INDEX MODEL OR SHARPE INDEX MODEL

The Single Index Model was developed by William F. Sharpe. The basic idea underlying with this model is that all stocks are affected by movements in the stock market as measured by any one of the widely used stock market indices. Casual observation of the stock prices reveals that most of the stock prices move with the market index. When the market index moves up, stock prices also tend to increase. When the market index goes down, stock prices also tend to decline. This indicates that co-movement between stocks is due to movement or change in the market index. This relationship of co-movement of stocks with a market index can be studied with the help of a simple linear regression analysis by taking the returns on an individual security as the dependent variable (R_i) and the returns on the market index (R_m) as the independent variable. The return of an individual security may be expressed as:

$$R_i = \alpha_i + \beta_i R_m + e_i$$

Where,

R_i = Expected return on security i

α_i = Component of security i 's return that is independent of the market's performance.

β_i = Constant that measures the expected change in R_i given a change in R_m

R_m = Rate of return on the market index

e_i = Error term representing the random or residual return

This equation divides the return on a stock into two components, the return due to the market and the return independent of the market. β_i in the equation indicates sensitiveness of the stock return to the changes in the market return. For example, if the β_i of a security is 1.5, then the return of the security is expected to increase by 1.5% when the market return increases by 1% and vice-versa. Likewise, if the β_i of a security is 0.5, then the return of the security is expected to increase by 0.5% when there is a change of 1% in the market return. β_i of 1 indicates that the return of a security and the market return are moving in tandem. β_i of greater than one would suggest greater responsiveness of the stock return to the changes in the market return and vice-versa.

The alpha parameter in the equation indicates what the security's return would be when market return is zero. For a security with an alpha of +2% would earn 2% return when market return is zero and a security with an alpha of -2% would lose 2% when market return is zero. Thus, the positive alpha indicates a sort of additional return associated with the security at all levels of market return, whereas a negative alpha indicates a penalty to the investor which is an undesirable aspect of a security. The positive alpha would be a highly desirable aspect of a security.

The final term e_i in the equation represents the random or residual return. The random or residual return is the unexpected return resulting from influences not identified by the model. It can have any value, but it will average out to zero over a large number of observations.

William Sharpe has developed a simplified variant of the Markowitz model that reduces the data inputs in a substantive manner. He provided a satisfactory simplification by abandoning the covariance of each covariance of each security with each other security and suggested to substituting in its place the relationship of each security with a market index as measured by the single index model or Sharpe index mode.

The Markowitz model requires $n(n-1)/2$ covariances whereas Sharpe index model requires only n measures of beta coefficient.

STOP TO CONSIDER

The Single Index Model was developed by William F. Sharpe. The basic idea underlying with this model is that all stocks are affected by movements in the stock market as measured by any one of the widely used stock market indices

Self Asking Questions

1. What are the limitations of the Markowitz Model? How are they addressed by the Single Index Model?

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2.4 MEASURING RETURN AND RISK OF AN INDIVIDUAL SECURITY UNDER SINGLE INDEX MODEL

The expected return of an individual security under Single Index Model may be expressed as:

$$\bar{R}_i = \alpha_i + \beta_i \bar{R}_m$$

The return of the security is the sum of two components. One component is specific return represented by the alpha of the security. Other component is market related return

represented by the term $\beta_i \bar{R}_m$. The residual return disappears from the expression because its average value is expected to be zero.

Likewise, the risk of a security σ^2 is the sum of two components. One component is market related risk and other component is specific risk to the security. This has been expressed as:

$$\begin{aligned} \text{Total risk} &= \text{Market related risk} + \text{Specific risk} \\ \sigma^2_i &= \beta_i^2 \sigma^2_m + \sigma^2_{ei} \end{aligned}$$

Where,

σ^2_i = Variance of individual security

σ^2_m = Variance of market index

σ^2_{ei} = Variance of residual returns of individual security

β_i = Beta coefficient of individual security.

The market related risk is referred to as systematic risk as it affects all securities whereas the specific risk is referred to as unsystematic or unique risk which can be reduced through diversification. The unsystematic risk is also called diversifiable risk.

From regression analysis of historical data of return of the securities and return of a market return the estimates of α_i , β_i and σ^2_{ei} of a security are often found out. The expected return and risk of the security can be calculated for any given or expected value of R_m . For instance, If the estimated values of α_i , β_i and σ^2_{ei} of a security are 3 per cent, 2 and 200 respectively and if the market index is expected to provide a return of 15 per cent, with variance of 110, the expected return and risk of the security can be calculated as follow:

$$\begin{aligned} \bar{R}_i &= \alpha_i + \beta_i \bar{R}_m \\ &= 3 + 2(15) \\ &= 33 \text{ per cent} \end{aligned}$$

$$\begin{aligned} \sigma^2_i &= \beta_i^2 \sigma^2_m + \sigma^2_{ei} \\ &= (2)^2(110) + 200 \\ &= 640 \end{aligned}$$

Check Your Progress I

1. Consider a stock which has \bar{R}_m = return on the market index = 20%, α_i = 2% and β_i = 1.5. What is the expected return on this stock?

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2. Consider a stock which has β_i = 1.5, σ^2_m = variance of market index = 105 and σ^2_{ei} = Variance of residual returns of stock = 250. What is the expected risk of this stock?

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2.5 MEASURING RETURN AND RISK OF A PORTFOLIO UNDER SINGLE INDEX MODEL

The expected return of a portfolio under Single Index Model may be expressed as:

$$\bar{R}_p = \alpha_p + \beta_p \bar{R}_m$$

The portfolio alpha (α_p) is the weighted average of the alphas (the specific returns) of the individual securities. It can be expressed as:

$$\alpha_p = \sum_{i=1}^n \omega_i \alpha_i$$

Where

ω_i = Proportion of investment in an individual security.

α_i = Specific return of an individual security.

The portfolio beta is the weighted average of the Beta coefficients of the individual securities. Thus,

$$\beta_p = \sum_{i=1}^n \omega_i \beta_i$$

Where

ω_i = Proportion of investment in an individual security.

β_i = Beta coefficient of an individual security

The expected return of the portfolio is the sum of the weighted average of the specific returns and the weighted average of the market related returns of individual securities.

The Variance of the portfolio returns is determined to measure the risk of a portfolio. The risk of a portfolio is the combination of the weighted average of the market related risks of an individual securities and the weighted average of the specific risks of individual securities in the

portfolio which may be expressed as:

$$\sigma_p^2 = \beta_p^2 \sigma_m^2 + \sum_{i=1}^n \omega_i^2 \sigma_{ei}^2$$

The first term represents the systematic risk (or market risk) of the portfolios which is obtained by multiplying market index by square of portfolio beta. The second term represents the unsystematic risk (specific risk) of the portfolio which is the weighted average of the variances of residual returns of individual securities.

Let us take a hypothetical portfolio of four securities with the basic input data as shown below in the table for calculating portfolio return and variance.

Input Data

Security	Weight (ω_i)	Alpha (α_i)	Beta (β_i)	Residual variance (σ_{ei}^2)
P	0.3	0.5	1.7	290
Q	0.2	2.0	0.5	350
R	0.4	1.5	0.7	400
S	0.1	3.5	1.3	260
Portfolio value	1.0	1.5	1.02	106.7

The values of portfolio alpha (α_p), portfolio beta (β_p) and portfolio residual variance is calculated at the first step as shown below:

$$\begin{aligned} \alpha_p &= \sum_{i=1}^n \omega_i \alpha_i \\ &= (0.3)(0.5) + (0.2)(2.0) + (0.4)(1.5) + (0.1)(3.5) \\ &= 1.5 \end{aligned}$$

$$\begin{aligned} \beta_p &= \sum_{i=1}^n \omega_i \beta_i \\ &= (0.3)(1.7) + (0.2)(0.5) + (0.4)(0.7) + (0.1)(1.3) \\ &= 1.02 \end{aligned}$$

Portfolio residual variance=

$$\sum_{i=1}^n \omega_i^2 \sigma_{ei}^2$$

$$= (0.3)^2(290) + (0.2)^2(350) + (0.4)^2(400) + (0.1)^2(260)$$

$$= 26.1 + 14 + 64 + 2.6$$

$$= 106.7$$

The above value of portfolio alpha, portfolio beta and portfolio residual variance are shown in the last row of the table. Using these values, we can calculate the expected return for any value of projected market return. The expected portfolio return for a market return of 12 per cent would be:

$$\bar{R}_p = \alpha_p + \beta_p \bar{R}_m$$

$$= 1.5 + 1.02 (12)$$

$$= 13.74$$

The variance of the market returns is needed for calculating the portfolio variance. Assuming a market return variance of 310, the portfolio variance would be:

$$\sigma_p^2 = \beta_p^2 \sigma_m^2 + \sum_{i=1}^n \omega_i^2 \sigma_{ei}^2$$

$$= (1.02)^2 (310) + (106.7)$$

$$= 429.224$$

The set of efficient portfolios is generated by means of the same quadratic programming routine as used in the Markowitz model by using expected portfolios returns and portfolio variances calculated with the help of single index mode.

Check Your Progress II

1. What are the components of portfolio risk?

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Check Your Progress II

2. Consider a portfolio of four securities with the following characteristics:

Security	Weighting	α_i	B_i	Residual variance (σ_{ei}^2)
A	0.3	1.8	0.9	460
B	0.2	2.0	1.3	330
C	0.4	1.3	1.4	170
D	0.1	-0.8	1.7	260

Calculate the return and risk of the portfolio under Single Index Model, if the return on market index is 17.5 per cent and the standard deviation of return on market index is 15 per cent.

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2.6 SUMMING UP

- The Single Index Model was developed by William F. Sharpe. He has developed a simplified variant of the Markowitz model that reduces the data inputs in a substantive manner.
- The Markowitz model requires $n(n-1)/2$ covariances whereas Sharpe index model requires only n measures of beta coefficient.
- The basic idea underlying with this model is that all stocks are affected by movements in the stock market as measured by any one of the widely used stock market indices.
- The expected return of an individual security under Single Index Model may be expressed as:

$$\bar{R}_i = \alpha_i + \beta_i \bar{R}_m$$

- The return of the security is the sum of two components. One component is specific return represented by the alpha (α_i) of the security. Other component is market related return represented by the term $\beta_i \bar{R}_m$.
- The risk of a security σ^2 is the sum of two components. One component is market related risk and other component is specific risk to the security. This has been expressed as:

Total risk = Market related risk + Specific risk

$$\sigma_i^2 = \beta_i^2 \sigma_m^2 + \sigma_{ei}^2$$

- The expected return of a portfolio under Single Index Model may be expressed as:

$$\bar{R}_p = \alpha_p + \beta_p \bar{R}_m$$

- The expected risk of a portfolio under Single Index Model may be expressed as:

$$\sigma_p^2 = \beta_p^2 \sigma_m^2 + \sum_{i=1}^n \omega_i^2 \sigma_{ei}^2$$

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2.8 MODEL QUESTIONS

1. Explain Sharpe's Single Index Model. How do you interpret α and β parameters in the model?
2. Explain how security return and risk are estimated under single index model
3. Explain how portfolio return and risk are estimated under single index model.

2.9 ANSWER TO CHECK YOUR PROGRESS/POSSIBLE ANSWERS TO SAQ

Check your progress I

1. 32 per cent
2. 486.25

Check your progress II

1. Refer to 2.5

2. Portfolio Return (\bar{R}_p) = 23.43

Portfolio Risk (σ_p^2) = 441.61

SAQ

Refer to 2.3

BLOCK 5: Portfolio Revision

Unit 1: Meaning, Significance and Strategies of Portfolio Revision

Unit Structure:

- 1.1 Introduction
- 1.2 Objectives
- 1.3 Meaning of portfolio revision.
- 1.4 Significance of Portfolio revision
- 1.5 Portfolio revision strategies
- 1.6 Constraints in portfolio revision
- 1.7 Formula Plans
- 1.8 Summing Up
- 1.9 References and suggested Readings.
- 1.10 Model question
- 1.11 Answer to check your progress

1.1 Introduction:

Portfolio management is a tool of identifying, estimating, formulating, selecting, implementing, evaluating and revising the investment portfolio that gives the maximum return with the minimum risk. The portfolio management process can't be completed without the revision of the portfolio. Revision of a portfolio is one of the very important steps of the portfolio management process. Generally, it is not so tough for investors to select and construct a portfolio. It is necessary to monitor and revise the portfolio from time to time after the construction and implementation of the portfolio. Robert D Arnott says "Portfolios do not manage themselves. Nor can weather the ages unaltered. With each passing day, portfolios that we carefully crafted yesterday become less-than-optimal Change in the investor's only constant.

The aforesaid definition means that the portfolio can't be managed by them; the investors whether individual or institution has to monitor their portfolio from time to time and if it requires any changes in the portfolio then should be revised periodically. Otherwise, the ultimate objectives of the construction of the portfolio can't be fulfilled. Thus, the term portfolio revision simply refers to changing or revising the assets allocation of a portfolio based on the objectives of the investors. Portfolio revision involves two important things i.e. Portfolio rebalancing and portfolio upgrading. Portfolio rebalancing simply refers to reviewing and revising the portfolio mix and whereas portfolio upgrading means re-assessing the risk-return associated with various securities and buying and selling some securities based on re-assessment (Prasana, 2019).

The need for portfolio revision arises when the market witnesses some major changes. Moreover, the investor's related factors are also influencing the revision of the portfolio. The individual investors and assets management companies are adopting two different portfolio revision strategies i.e. active portfolio revision and passives of portfolio revision. The application of the strategies is done based on the market conditions and objectives of the investors. For the revision

of the portfolio periodically, it is required to follow some basic rules and regulations during the time of buying and selling securities in the portfolio. A formula plan means following the rules and regulations at the time of buying and selling the securities.

1.2 Objective

This unit aims to focus on one of the important steps of portfolio management i.e. portfolio revision a. After going through this particular unit, the student will be able to

1. Understand the basic concept and meaning of portfolio revision
2. Know the importance of the portfolio revision in the process of portfolio management
3. Analysis of the different portfolio revision strategies
4. Identifying the constraints in portfolio revision
5. Discuss formula plans for portfolio revision

1.3 Meaning of portfolio revision.

Portfolio revision simply refers to monitoring and revising the composition of the portfolio as per the requirement of the market conditions and objectives of the investors. It is one of the vital steps of the portfolio management process. The construction of a portfolio becomes worthless without the proper revision of the portfolio.

The portfolio revision involves two important things i.e. portfolio rebalancing and portfolio upgrading.

Portfolio Rebalancing: Portfolio rebalancing entails reviewing and revising the portfolio mix or shifting one financial security to other financial securities such as stocks to bonds or vice versa (Prasana, 2019).

Portfolio Upgrading: Portfolio Upgrading means re-assessing the risk-return associated various securities to find out the over-priced securities to sell and under-priced securities for purchase (Prasana, 2019).

Portfolio revision is a very big problem in the portfolio management. Every portfolio manager has to make the decision about what is the appropriate time to do a revision, and how to do a revision to maximize portfolio return with a minimum level of portfolio risk.

1.4 Significance of Portfolio revision:

The revision of portfolio basically arises for two major factors: one is the condition of the market does not remain change and second the need of the investors is also keeps changes from time to time. At the time of the construction of the portfolio market condition and the objective of investors to invest in the portfolio might be different from today. Time to time monitoring and changing the composition in the portfolio become very important task for the portfolio managers to fulfill the ultimate objective of the particular portfolio. The need of the portfolio revision is mentioned below:

1. An individual may feel compelled to invest more at a specific point in time. When an individual has some additional amount money to invest, he or she may need to revise their portfolio (Dr.S.Akilandeswari).
2. A changes in investment objectives necessitate portfolio reorganization. Depending on the current state of affairs, an individual's financial goal can be changed, resulting in changes in the portfolio, i.e. Revision of the portfolio.
3. There are risks and uncertainty in the financial market. Some of a person's possessions may be sold. Assets as a result of financial market movements.
4. Short term price fluctuation is also on the major reason of revision of portfolio mix.

Stop to consider

The term portfolio revision means the changing the composition of securities in the respective portfolio for achieving the optimum return with minimum risk. Portfolio revision is very necessary part of the portfolio management. A proper portfolio revision will help the investors and assets management companies to maximum the return and minimized the risk. Changes of market conditions and changes of investor's objectives towards their investment are the major's factor of the portfolio revision.

1.5 Portfolio revision strategies

There are two types of portfolio revision strategies:

1. Active portfolio revision
 2. Passive portfolio revision.
1. **Active portfolio revision:** For optimum returns and fewest risks, an Active Revision Strategy entails making regular adjustments to an existing portfolio over a set period of time. A portfolio manager can use the Active Modification Strategy to sell and buy assets on a regular basis for portfolio revision. Investors who apply active portfolio revision when they believe that the market is inefficient. In case of active portfolio revision strategies, the investor again carries out the analysis and selection of portfolio. The analysis of the portfolio is done on the basis of the fundamental factors like affecting economy, industry and the Company. Moreover, the technical factor like demand and supply also considered for analysis the portfolio. Active portfolio revision always helps the investors and portfolio managers to purchase and sells securities on regular basis for portfolio revision (Portfolio Revision Strategies in Investment Portfolio Management).
 2. **Passive portfolio revision:** Dislike the active portfolio revision, a passive portfolio revision method requires relatively minimal and infrequent portfolio adjustments over time. The investors who apply the passive portfolio strategy, believes that the market is efficient and expectations that are uniform. They see little point in actively trading and rebalancing their

portfolios on a regular basis. Adjustment of the portfolio is carried out according to specific specified criteria and methods known as formula plans in the passive revision approach. These formula strategies assist the investor in adjusting his portfolio in response to market movements and conditions.

Check your Progress

1. Define portfolio revision
2. How do you differentiate between active portfolio revision and passive portfolio revision
3. What is the significance of portfolio revision in the portfolio management?

1.6 Constraints in portfolio revision:

Portfolio revision is the process of adding and deleting the securities from the existing portfolio. The revision of the portfolio has been done based on the changes in the conditions of the financial market and investors' objectives towards their investment. Portfolio revision is necessary for minimizing the risk with adequate return. Purchase and sells of the securities for revision of the portfolio periodically arise some problems which act as constraints in the portfolio revision. The details about the limitation of the portfolio revision discuss below (egyankosh):

1. **Transaction Cost:** The transaction cost is one of the major costs that the investor has to bear for purchasing and selling the securities. Transaction cost includes the commission and the broker's fee that need to pay by the investors for executing the transaction. Purchasing and selling securities frequently for portfolio revision increases the transaction cost. The increasing transaction costs lead to reducing the profit from the portfolio revision (egyankosh).
2. **Taxes:** As per the income tax act 1961, the income that arises from the sales of the securities is treated as income from capital gains. There are two types of capital gain such as long term capital gain and short term capital gain. The rate of tax on short term capital gain is higher than the long term capital gain. For gaining the benefits of the long term capital, the investors must be held the financial assets for more than 12 months. As we all know, the investor has to frequently change the composition of the existing portfolio for proper revision of the portfolio; as a result, the income generated from the sales of the financial assets is considered as short term capital gain. Therefore, the investors need to pay a high rate of tax on short term capital gain (egyankosh).
3. **Statutory stipulation:** Most of the largest portfolio fund has been managed by assets management companies/investment companies and some mutual fund institutions. There

are many governments and private sector assets management companies and mutual fund institutions in India. These institutions have to compliance the rules, regulations and provisions of different regulatory bodies from time to time to operate their investment activities. As a result, Buying and selling securities frequently by considering all the legal provisions becomes very tough to work for these organizations (egyankosh).

4. **Intrinsic difficulty:** Portfolio revision is a time-consuming and challenging task. It is also unclear what process should use for portfolio revision. It is also not distinct what method, when and how to do portfolio revision. The assets management companies and mutual fund institutions adopted different approaches for portfolio revision. In other words, we can say that there is no proper method for portfolio revision which becomes one of the significant constraints in the portfolio revision process (egyankosh).

Stop to consider

There are two kinds of portfolio revision strategies: active and passive portfolio revision strategies. Passive portfolio revision strategy is the opposite of active portfolio revision strategy. Investors; who believe the market is inefficient, usually follow the active portfolio strategy and the investors who think that the market is efficient; apply the passive portfolio strategy. In the case of active portfolio revision; the investor is frequently revising the composition of their existing portfolio based on fundamental analysis and technical analysis. The investor does not frequently revise the structure of their current portfolio in the case of the passives portfolio revision strategy. The revision of the portfolio under the passive portfolio strategy is based on some specific formulas and criteria. These formulas and criteria are known as formula plans.

Portfolio revision is essential for good portfolio management. But; there are always some limitations in the portfolio revision such as transaction cost, taxes, statutory obligations; and not having the specific method of portfolio revision. Most of the constraints related to portfolio revision arise due to frequently revision of the composition of the existing portfolio.

SELF ASSESSMENT QUESTION:

Find out the best portfolio revision. And also mention the reason of choosing the particular portfolio revision strategy for revising the mixture of your existing portfolio.

1.7 Formula Plans

Unlike active portfolio revision strategy, the portfolio managers will not revision frequently the composition of the existing portfolio strategy in case of passive portfolio revision strategy. The revision of the composition of portfolio in passive portfolio revision is done based on some formulas and criteria. These Rules and regulations are known as formula plans. In simple term, a formula plan is certain predefined rules and regulation that is to be followed by the individual investors and portfolio managers for purchasing and selling the securities of the portfolio for portfolio revision. A formula plan helps the individual and portfolio managers to take the decisions of what, when and how many securities should Purchase and sell from the portfolio for the proper portfolio revision.

Advantages of the formula plan:

1. Formula plan provides basic rules and regulation of the portfolio revision to the investors.
2. Formula plans also help the investors to earn more return from the portfolio revision.
3. It also reduced some cost like transaction cost, taxes etc. Because of the formula plan the individual investors and portfolio manger's not frequently revises the portfolio. As a result the certain cost will be reducing.
4. It also help the investors to control on buying and selling of securities
5. The investor can take the decision what, when and how many securities should buy and sell at the time of portfolio revision.

Check your Progress

1. List out the constraints in Portfolio revision.
2. Discuss the advantages of portfolio revision

The details about the formula plans are as follows.

1. **Rupee cost Averaging:** it is one of the simplest and most effective formula plans. Under this formula plan, the investor should select the stocks with good fundamentals and long term growth prospect. The prices of the selected shares are very volatile in the market and the investor can expected the maximum profit from the stocks by applying rupee cost averaging. The investors are also committed to purchase certain amount of particular stocks at regular basis. For example: Mr. A as an investor decides to invest Rs. 20,000 every quarter in the particular stock/Mutual fund. He is following the rupee cost averaging method for his investment portfolio revision. The detail about his investment under the plan has shown in the following table (Samuel, 2014).

Table No 1: Rupee cost Averaging

Beginning of the quarter (1)	Market price (2)	Shares/Units purchased(numbers) (3)	Cumulative investment (4)	Market value (5)	Unrealized profit/loss (6)	Average cost/share (7)	Average Market price/share (8)
1	2,500	8	20,000	20000	0	2500	2500
2	2,400	8	39,200	19200	(800)	2450	2450
3	2,525	7	56,875	58,075	1200	2472.83	2475
4	2575	7	74,900	77,250	2350	2496.67	2500

Here,

- i) Column (3) = 20,000/column (1); rounded to the nearest whole number on the lower side, as fractional shares cannot be traded.
- ii) Column(4) = \sum Column (2) x Column (3)
- iii) Column (5) = Column (2) x \sum Column (3)
- iv) Column (6) = Column (5)- Column (4)
- v) Column (7)= Column (4)/ \sum Column (3)
- vi) Column (8) = \sum Column (2) / Column (1)

The above table reveals that the average markets price of per share in the column no 8 is always equal or greater than the average cost price of per share in the column no 7. It indicates that there is always unrealized profit. This formula plan will give more return than other passive investment strategy only in a bear market.

2. Constant Rupee Plan:

It is another formula plan which is used in the passive portfolio revision strategy. The amount invested in the shares is remaining constant in this plan. We can say in the operational terms that if the share price will increase, the investor will sell some shares to keep the total value of the shares remain constant. Similarly, if the market price of the share will fall in the market, the investor will purchase some numbers of the share to keep the value of the share remain constant. For keeping the total amount investment in the securities constant, the investor invested the remainder of the total fund in some fix income earning securities –debentures, bonds etc. And the investor has to decide the right time to switching from the bond or debenture to share and vice-versa. If the switching of the bonds to shares is done frequently or a small changes in the share price will leads to more transaction cost that will negatively effect on the net return to the investors. And if the switching is done only the major changes in the share price, it may result in loss of opportunity to earn profit.

The details about the constant rupee plan in discuss in the table no 2.

Suppose an investor has Rs. 40,000 to invest and he is planning to follow the constant rupee plan. As a result the investor invested Rs. 20,000 in shares which is aggressive portfolio in nature and remaining fund Rs. 20,000 in bonds which is defensive portfolio in nature.. The investor buy 800 shares @ Rs. 5per share. He also takes a decision that the switching will take place every time when the value of aggressive portfolio reaches ± 20 % of Rs. 20,000 that is 16,000 or below and 24,000 and above (Samuel, 2014).

Table no 2: Constant Rupee Plan:

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share price or index	Value of buy and hold strategy	Value of defensive portfolio	Value of aggressive portfolio	Total value of constant rupee portfolio	Action points	Total no of shares/units in aggressive portfolio
25	40,000	20,000	20,000	40,000		800
22	35,200	20,000	17,600	37,600		800
20 portfolio	32,000	20,000	16,000	36,000		800
20 revision	32,000	16,000	20,000	36,000	Buy 200 shares @20 per share	1000
22	35200	16,000	22,000	38000		1000
24 portfolio	38,400	16,000	24,000	40,000		1000
24 Revision	38,400	20,000	20,000	40,000	Sell 166.6 @ Rs.24/share	833.4
26	41,600	20,000	21,668	41668		833.4
28.8 portfolio	46,080	20,000	24,000	44,000		833.4
28.8 revision	46,080	24,000	20,000	44,000	Sell 138.94 @ Rs. 28.8/share	694.46
25	40,000	24,000	17,360	41,360		694.46

Note:

1. Column 3= Column (5)-Column (4)

2. Column 4= Column (7) x Column(1)
3. Column 5= Column (3) + Column (4)
4. Column 6 = revision or switching the portfolio which means the buying and selling of stocks for the portfolio revision
5. Here the transaction cost is not considered.
6. It is assumed that the trading of fraction share is possible
7. The above exercise reveals that if the investor follow this strategy, has increased the value of the investment to Rs. 41,360, whereas the buy-and-hold strategy would have only increased the value to Rs. 40,000, resulting in a gain of Rs. 1,360. However, at Price 28.8 a share, a buy-and-hold strategy would have been preferable. As a result, like any other strategy, this one does not guarantee higher returns than a buy-and-hold approach. It's sometimes wiser to stick with a buy-and-hold approach during an upswing..

3. **Constant Ratio plan:**

It is another type of formula plan that is used in the passive portfolio revision strategy. Under this the plan, the investor always tries to invest in the aggressive portfolio at a constant rupee value. And rest of the fund invested in the conservative portfolio. It is a formula plan where the investors keep his investment in the aggressive and conservative portfolio at a fixed ratio. This strategy forces the investors to buy the shares when the prices of the shares fall and sells the shares as their prices rises in the market.

The following illustration will help to understand the concept clearly.

The pre-determined ratio is 1:1. The initial fund of the investment is Rs. 40,000 that is divided equally between aggressive and conservative portfolios. The trigger point is fixed at levels of ± 0.1 , or more (Samuel, 2014) .

Table No 3 Constant Ratio plan:

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share price or index	Value of Buy and Hold strategy(Value of Conservative portfolio	Value of aggressive portfolio	Total value of constant ratio portfolio	Ratio	Revaluation action	Total number of shares in aggressive portfolio
In (Rs)	(In Rs.)	(In Rs)	(In Rs.)	(In Rs)			
25	40,000	20,000	20,000	40,000	1.00		800
23	36,800	20,000	18,400	38,400	.92		800
22.5	36,000	20,000	18,000	38,000	.90		800
22.5	36,000	19,000	19,000	38,000	1.00	Buy 44.44 shares @ Rs.22.5/share	844.4
20.25	32,800	19,000	17,100	36,310	0.9		844.4
20.25	32,800	18,050	18,050	36,100	1.00	Buy 46.92 shares @ Rs. 20.25	891.32
20	32,000	18,050	17,826	35876	0.99		891.32
22.4	35,840	18,050	19,966	38,016	1.11		891.32
22.4	35,840	19,008	19,008	38,016	1.00	Sell 42.76 shares @ RS. 22.4	848.56
24.6	39,360	19,008	20,874	39882	1.1		848.56
24.6	39,680	19,941	19,940	39,881	1.0	Sell 38 shares @ 24.6	810.56
27.0	43,200	19,941	21,885	41,826	1.1		810.56
27.0	43,200	20,913	20,913	41,826	1.0	Sell 36 shares@ 27.0	774.56
28.8	46,080	20,913	22,307	43,220	1.07		774.56
27.0	43,200	20,913	20,913	41,826	1.00		774.56
25.0	40,000	20,913	19,364		.93		774.56

Notes:

1. Column (2)= 1600 shares X column (1)
2. Column (3)= Column (5)- Column (4)
3. Column 4 = Column (8) X Column (1)
4. Column 5= Column 3+ Column 4
5. Column 6 = Column 4/ Column 3
6. Revaluation action takes place when the ratio between aggressive portfolio to conservative portfolio reaches ± 0.1 i.e. (0.90 below) and (1.1 above)
7. At these points, in order to keep the ratio t 1.0, the figure in column (5) is simply divided by 2. The difference in figures in column (4), so obtained, is divided by prevailing share price in order to determine how many shares need to purchase or sold at the price to maintain the ratio 1. If the shares have bought to maintain the ratio 1, the amount added

in the column no (4) and subtracted from the column (3). And when the shares have sold, the amount deducted from column(4) and added to the column (3) to maintain the ratio 1.0

8. As in any other ratio plan, this plan is too not infallible. From the example it has seen that when the market price per share is Rs. 27 and 28.8, the value of the buy- and- hold strategy (column 2) is higher than total value of constant ratio portfolio in (column 5)
This plan is work as like as the earlier plan in an upswing market. Like the earlier plans the value of the portfolio reduces as compare to buy-and –hold strategy in an upswings market under this plan.

1. Variable Ratio Plan:

The variable ratio plan expands on where the constant ratio plan leaves off by offering more flexibility. The plan allows the aggressive-to-defensive portion of a portfolio's ratio to adjust based on market movement or pre-determined parameters. It is just variation of constant ratio plan.

The variable ratio plan, for example, states that if the value of the aggressive portfolio falls by 20% or more from its previous bottom price per share, the approximate ratio will be 1:1 or 50%. However, if the value of the aggressive portfolio falls by 20% or more from its previous high, the proper ratio will be 7:3 or 70%, rather than 1:1 or 50% (Samuel, 2014).

The concept of variable ratio plan is explained by an example in the table no 4.

Table no 4: Variable Ratio Plan

(1) Share price or index	(2) Value of Buy-and- Hold Strategy	(3) Value of Conservative portfolio	(4) Value of Aggressive portfolio	(5) Total value of portfolio	(6) Ratio of Aggressive portfolio to total portfolio	(7) Revaluation action	(8) Total number of shares in aggressive portfolio
(in Rs)	(in Rs)	(in Rs)	(in Rs)	(in Rs.)			
25	40,000	20,000	20,000	40,000	0.50		800
22	35,200	20,000	17,600	37,600	0.47		800
20	32,000	20,000	16,000	36,000	0.445		800
20	32,000	10,800	25,200 (=36,000X7/10)	36,000	0.70	Buy 460 shares @ 20 /share	1260
22	35,200	10,800	27,720	38,520	0.72		1260
25	40,000	10,800	31,500	42,300	0.75		1260
25	40,000	21,150	21,150 (=21,150X 0.5)	42,300	0.50	Sell 414 shares @ Rs. 25	846
28.8	46,080	21,150	24,365	45,515	0.54		846

Notes:

1. Column (2) = 1600 shares* Column (1)

2. $\text{Column (3)} = \text{Column (5)} - \text{Column (4)}$
3. $\text{Column (4)} = \text{Column (8)} \times \text{Column (1)}$
4. $\text{Column (5)} = \text{Column 3} + \text{Column (4)}$
5. $\text{Column (6)} = \text{Column (4)} / \text{Column (5)}$
6. It has seen from the above table, the revaluation action has taken place when the share price reached Rs. 20 which is $0.8 \times \text{Rs. 25}$ and when it touched Rs. 25 ($1.25 \times \text{Rs.20}$)
7. Although the variable plan is superior to the constant ratio plan, it is not without limitations. It is also worth noting that the buy-and-hold approach outperforms the variable ratio plan at a price of Rs. 28.8 per share.
8. There is no foolproof or effective method for selecting and fixing the ratios in a variable ratio strategy. One ratio could be just as excellent as another. It is only with retrospect that we learn about it. This is due to the fact that market timing is impossible.

Stop to consider

Portfolio revision is necessary for efficient portfolio management. The individual investor, mutual fund institutions and other institutional investors revise their portfolios as per the requirement of the market condition. Changing the mixture of the portfolio frequently creates additional costs. As a result, many investors have applied a formula plan which is part of the passive portfolio revision strategy.

A formula plan is nothing is simply predefined rules and regulations followed by the individual investors and portfolio managers for purchasing and selling the securities of a portfolio for portfolio revision. A formula plan helps the investors to reduce the cost of portfolio revision.

Four formula plans - Rupee Cost averaging; Constant Rupee plan, constant ratio plan and variable-ratio plan have discussed this unit. Rupee Cost averaging is the simplest formula plan to understand. Under the rupee cost averaging method, the investor invested the securities with good fundamental and long term growth prospects. But under the constant rupee plan, the investor invested a constant amount in the securities and the keeping the amount invested in the securities remains constant, the rest of the fund invested in the fixed interest-bearing instruments like bonds and securities etc.

Under the constant ratio formula plan, the investor keeps his investment in the aggressive and conservative portfolio at a fixed ratio. And variable-ratio formula plan is the just opposite of the constant ratio plan.

SELF ASSESSMENT QUESTION:

Compare and Contrast Rupee cost Averaging, Constant Rupee plan, Constant ratio Plan and Variable ratio. You can use some imaginary data for the purpose.

1.08 Summing Up:

Portfolio revision is referred to as adding and subtracting to and from the composition of the existing portfolio for better portfolio management. Portfolio revision is essential for getting a good return from the investment. The individual investors and the institutional investors revise the composition of the existing portfolio as per the requirement of the market. The revision of the portfolio generally takes place for the changing condition of the market and changing the expectation of the investors from time to time.

There are two types of portfolio revision strategies - active and passive portfolio strategies. The revision of the composition of the existing portfolio frequently takes place in the case of active portfolio revision strategy. And in the case of passive portfolio revision strategy, the changes in the composition of the existing portfolio have been done based on specified rules and methods.

The portfolio revision is necessary for adequate return with minimum risk from the respective portfolio investment. But there are always some hindrances for the portfolio revision. The major constraint in the portfolio revision is transaction cost, taxes, statutory stipulation and intrinsic difficulty.

Active portfolio revision strategy becomes costly for the investors as it increases the transaction cost due to frequently revising the mixture of the existing portfolio. The passive portfolio revision strategy helps to reduce the transaction cost as the revision of the composition of the portfolio takes place based on some predetermined rules and methods.

These predetermined rules and methods are popularly known as formula plans. The most common uses formula plans are Rupee cost averaging, Constant Rupee plan, Constant Ratio plan and Variable ratio plan.

Formula Plan helps the investors to earn a return from the portfolio and help to control on buying and selling of securities for the portfolio revision. These formula plans do not assist in the selection of securities. Some alternative method will have to be used to choose the securities for the portfolio. The strategy aids in the timing of security purchases or sells for portfolio construction, ensuring that the investor does not lose money (Deeksha).

1.09 Suggested Books and References

1. Prasanna, C. (2019). *Investment Analysis and Portfolio Management*. McGraw Hill.
2. Thomas Samuel (2014), *Security Analysis and portfolio Management*. PHI Learning Private Ltd.

3. Security Analysis & Portfolio Management, Fischer, D.E. & Jordan, R.J; Pearson Education.

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1.10 Model Questions:

1. Define portfolio revision.
2. What is active portfolio revision strategy?
3. What do you mean by the passive portfolio revision strategy?
4. Write the meaning of Formula plan.
5. Comment on how formula plans assist investors in selecting the appropriate securities.
6. Why is it necessary to revise your portfolio? What are the limitations when it comes to portfolio revision?
7. Write a note on the followings
 - a) Rupee Cost averaging.
 - b) Passive Portfolio Strategy
 - c) Constant Ratio plan.
8. Discuss the different types of formula plan.
9. “In the Indian context, buy-and- hold is a better strategy compare to any other portfolio revision strategy”- Comment on it.
10. Discuss portfolio revision strategies in detail.

1.11 Answer to Check your Progress

Answer to Check your Progress

1. Define portfolio revision

Answer: (Portfolio revision is changing the mixture of a portfolio Refer to point no. 1.3.....)

2. How do you differentiate between active portfolio revision and passive portfolio revision

Answer :(Refer to the point no. 1.5)

3. What is the significance of portfolio revision in the portfolio management?

Answer:

Answer: (refers to point 1.4.....)

4. List out the constraints in Portfolio revision

Answer :(Refer to point no 1.6.....)

5. Discuss the advantages of portfolio revision

Answer: (Refer to point no. 1.6.....)

UNIT 2: PORTFOLIO EVALUATION

Contents:

- 2.1 Introduction
- 2.2 Objectives
- 2.3 Portfolio Performance Evaluation concepts
- 2.4 Functions of Performance evaluation
- 2.5 Need for evaluating portfolio performance
- 2.6 Determinants of Portfolio Performance
- 2.7 Criteria for evaluation of portfolio performance
- 2.8 Benchmark Portfolio for performance evaluation
- 2.9 Summing up
- 2.10 References and Suggested Readings

2.1 Introduction: The previous chapters dealt with various phases of portfolio management such as- security analysis, portfolio analysis, portfolio selection and revision. Once the revision has been done, the investor needed to evaluate the performance of the portfolio periodically to achieve his financial goal. The main goal of evaluating the portfolio performance is to measure value creation provided by the portfolio management industry. Of late, the demand of “reliable and admissible” performance measures has increased as investment in mutual and exchange traded funds has exploded in popularity among small investors in India since the early 90s. This chapter provides a theoretical background of the concept of portfolio performance evaluation, need of evaluation, various determinants and criteria for performance evaluation. This unit describes some of the main issues addressed in the literature on investment performance evaluation, with a view toward future work

2.2 Objectives: This unit is an attempt to analyze the theoretical background of portfolio performance evaluation. After studying this unit, you will be able to

- Understand the concept of portfolio evaluation
- Describe the need of evaluation of portfolio.
- Study the basic functions of portfolio evaluation.
- Discuss the criteria for evaluation of portfolio.
- Explain the issues involved in portfolio performance evaluation.

STOP TO CONSIDER

A mutual fund is a professionally managed investment vehicle that pools funds from investors to invest in securities like stocks, bonds, money market instruments, and other assets. The evolution of Indian mutual fund industry has been started from 1963 with the formation of the Unit Trust of India (UTI) as an initiative of the Government of India and the Reserve Bank of India. However, the real growth of the industry can be counted from 1987, as the SBI Mutual Fund became the first non-UTI mutual fund in India.

In the dynamic securities market, as the price of the securities frequently changes, the investors feel insecure in managing their own portfolio and to minimize the overall risk related to the portfolio it has been often seen that the investors hired professional portfolio managers to manage the portfolio profitably. The professional managers are usually engaged in identifying strength and weaknesses of a portfolio constructed for the purpose of investment and this process is simply termed as evaluation of portfolio performance. It is considered as a final stage of portfolio management where the investor tries to find out that to what extent their objective has been achieved and how well the portfolio has performed. The results of the portfolio is continuously monitored and evaluated by the Investment analyst and portfolio managers. On the basis of such monitoring and evaluation the investment analyst can make revision in the existing portfolio and they can add new profitable securities in the portfolio or can remove the securities which are not about to offer much return. Thus in other words, portfolio performance evaluation is essentially the process of comparing the return earned on a portfolio with the return earned on one or more other portfolio s or on a benchmark portfolio.

2.4 Functions of Performance evaluation: The portfolio evaluation process consist of two functions- one is performance measurement another one is performance evaluation. Performance measurement is considered as an accounting function, which measures the portfolio return earned during the holding period or investment period. On the other hand, performance evaluation addresses such issues as whether the performance was superior or inferior, whether the performance was due to skill or luck or etc. By a performance measure in finance, one means a score attached to each risky portfolio. This score is usually used for the purpose of ranking risky portfolios. That is, the higher the performance measures of a portfolio, the higher the rank of this portfolio. The goal of any investor who uses a particular performance measure is to select the portfolio for which this measure is the greatest. During the last decade, two alternative approaches have been developed for the construction of rational performance measures: the axiomatization approach and the utility-based approach. In the axiomatization approach, one starts with the formulation of a set of axioms (properties) that a rational performance measure should satisfy. Then one either characterizes performance measures satisfying these axioms or checks whether some particular performance measures satisfy the proposed set of axioms. The first axiomatic constructions of rational risk, reward, and performance measures were introduced by De Giorgi (2005) and Meucci (2005). The most solid axiomatization approach to the construction of rational performance measures was presented by Cherny and Madan (2009). In the utility-based approach to the construction of performance measures, one assumes that investors are equipped with some particular utility function. Using this specific utility, one then derives a performance measure that is related to the level of expected utility provided by a risky portfolio. That is, the higher the performance measure of a portfolio, the higher the level of expected utility the portfolio provides.

Check Your Progress

Question 1: What do you mean by portfolio performance evaluation?

Question 2: What are the functions of portfolio evaluation process?

2.5 Need for evaluating portfolio performance: Evaluating the performance of the portfolio is considered as a vital phase in portfolio management. The investment activities may be carried out by individual investors or by mutual funds or by investment companies, and according to different situations the performance evaluation becomes imperative.

2.5.1 Complex securities market: As there are number of securities traded in the securities market, it become complex for the investors to analyze and measure the risk and return for each securities available in market. It is essential for the potential investors to evaluate the portfolio performance at a periodical interval to make necessary revision in the existing portfolio.

2.5.2 Self evaluation: When an individual investor decided to invest in securities they need to construct and manage their portfolio by their own and to minimize the risk related to the portfolio it becomes imperative for them to evaluate the performance by themselves.

2.5.3 Evaluation of portfolio managers: A mutual fund or a investment company usually creates different portfolios with different objectives aimed at different sets of investor. Different portfolio managers are entrusted to evaluate different portfolios so that it can be compared with each other and better investment decisions can be taken for maximizing the return (*Kevin. S 2018*).

2.5.4 Information asymmetry: One of the widely held “folk theorems” in finance is that informed investors can achieve better risk return trade-off than uninformed investors. However, risk is difficult to define and measure in markets with asymmetric information, especially when one consider that it must be evaluated by uninformed observer (*Grinblatt M. et.al. 2015*). For this reason, there is a need of evaluation of portfolio by the professional managers and investment analyst.

2.5.5 Mutual Fund Evaluation: There are number of mutual fund agencies (both public and private sector) that are engaged in offering mutual fund services to their clients. These agencies compete with each other for mobilizing the investment funds with individual investors and other organizations by offering attractive returns, minimum risk, high safety and prompt liquidity. To select the best mutual fund, there is a need to compare the performance of each portfolio. Therefore, evaluation of the performance of mutual funds and their portfolio becomes necessary.

STOP TO CONSIDER

Information asymmetries refer to the fact that, in real world, information does not flow smoothly. Some people have access to information that others do not. Financial markets exhibit asymmetric information in any transaction in which one of the two parties involved has more information than the other and thus has the ability to make a more informed decision.

To be continued...

In many market situations, there lies the problem of asymmetric information between the buyer and seller. Asymmetric information creates a market failure that inhibits efficiency in the market. When stocks are bought and sold, there is a fundamental lack of information on the part of both the buyer and the seller about the company in question. In an ideal stock market, there should be very little trading since buyers and sellers would be wary of the other party knowing more information about the stock and thus feel concerned that they are getting a bad deal. However, in financial markets, people do not act rationally and a large volume of trading occurs every day. The traders profit from the asymmetry of information in the market since they make money off the difference in price that they charge buyers and sellers for a stock. As the large volume of trades is executed throughout the day, the information that the traders have is incorporated into the price of the asset, but that information can still lead to bubbles and crashes.

Source: <https://www.bloomberg.com/view/articles/2016-08-11/the-dirty-little-secret-of-finance-asymmetric-information>

2.6 Determinants of Portfolio Performance: Performance of the portfolio depends on certain critical decisions taken by a portfolio manager. An evaluation of these decisions helps us to determine the activities that need efficiency for better portfolio performance. The popular activities associated in this regard are: Risk taking, Stock Selection and Market Timing.

2.6.1 Risk taking: Portfolio managers have to bear additional risk to earn excess return. By using the Capital Market Line (CML) we can determine the return commensurate with risk as measured by the standard deviation of return. The normal return of a fund by using total risk would be

$$R_f + [(R_m - R_f)(\sigma_p / \sigma_m)]$$

The difference between the normal return and the expected normal return occurs because of risk diversification. Selectivity increases diversification risk however it influences on performance evaluation of portfolio.

2.6.2 Stock selection: Asset allocation is considered as a most important decision of investment strategy. This involves deciding about what percentage of the portfolio should be in stocks, bond, cash, etc., based on the goals and funds available with the portfolio manager, and also the current and anticipated market condition? Once the investor makes that decision, he has to select suitable investment within selected asset classes. For that portion of the portfolio that the portfolio manager allocates to equities, he should strive to buy shares in excellent businesses at prices that make business sense. Search for opportunities that offer the highest predictable annual compounding rate of possible, where the risk is reasonable in light of the potential reward. Further, the portfolio manager should make long term investments in the common stock of great business at prices that make economic sense given the business's intrinsic value.

2.6.3 Market Timing: A portfolio manager's performance has been seen so far in the context of stock selection for superior performance. Managers can also generate superior performance from a portfolio by planning the investment and disinvestment activities by shifting from stocks to bonds or bonds to stocks based on good market timing sense. Positioning of a portfolio is to be adjusted by correctly adjusting the direction of the market, either in the bull or bear phases. Managers with a forecast of a declining market can position a portfolio either by shifting resources from stocks to bonds, or restructure the component stocks in such a way that the beta of the equity portion of the portfolio comes down. One way of finding the performance of a portfolio in this regard is to simply look directly at the way the fund return behaves, relative to the return of the market. This method calls for calculating the returns of the portfolio and the market at different intervals and plot a scatter diagram to see the direction of relationship between these two. If a portfolio is constructed by concentrating on stock selection rather than keeping the market timing in mind, the average beta of the portfolio stands fairly constant and if we plot such a portfolio's returns and market returns, we observe a linear relationship. On the other hand, if a manager was able to successfully assess the market direction and reshuffle the portfolio accordingly, we would observe a situation of high portfolio betas at times of rise in market and low portfolio beta at times of decline in the market. Portfolio managers can also achieve superior performance by picking up high beta stocks during a market upswing and moving out of equity, one could calculate the quarterly returns for a fund and for the market index like Bombay Stock Exchange's National Index of a 5-year period.

Check Your Progress

Question 1: Why professional portfolio managers are required in Mutual Fund Investment? Discuss their role in performance evaluation.

Question 2: How are the returns on managed portfolio attributed to stock selection and market timing? Discuss and illustrate.

2.7 Criteria for evaluation of portfolio performance: There is need of continuous monitoring and review of the performance of the portfolio by the portfolio managers and investors who manage their own portfolios. Portfolio management comprises the evaluation of each portfolio, followed by revision and reconstruction.

Managers and analyst have to analyze that how well their investment evaluation strategies performed in terms of return per unit of risk, both in absolute terms and relative terms relative to overall market performance. They have to assess the extent to which the investment objectives aimed at are being achieved say in terms of income, capital formation, risk and returns, etc. Taking this into consideration, evaluation has to take into account whether the portfolio secured

above average returns, average or below average, as compared to the market return. The first criteria for performance evaluation is the ability to diversify the risk with a view to reduce and even eliminate all unsystematic risk and expertise in managing the systematic risk related to the market by use of appropriate risk measures, namely, betas, and selection of proper securities.

Secondly, superior timing and superior stock selection may result in above average return. Diversification in terms of Markowitz model or Sharpe's Single Indexed Model will reduce the market related risk and maximize the returns for a given level of risk. Market returns being related positively to risk, evaluation has to take into account: Rate of returns, or excess return over risk free rate and level of risk both Systematic (Beta) and unsystematic and residual risk through proper diversification.

Under the traditional theory, the evaluation is only in terms of the rate of return, particularly in comparison with other assets of the same risk class. The avenue for selecting and evaluating the portfolio on the basis of risk adjusted return has been opened up by the Markowitz Model and Modern Portfolio Theory. We have already studied in Block 4, Unit-1 that Modern Portfolio Theory has postulated that portfolio selection and evaluation should be on the basis of both risk and return and the objective should be to optimize the return for a given level of risk or to minimize the risk for a given level of return. Risk adjusted returns become the basis for evaluation, due to uneven fluctuations of returns and high degree of variability of returns. Due to later development in the quantification of risk by the statistical measures of standard deviation, variance and covariance of returns of securities in portfolio this becomes possible. After studying different portfolio theories under traditional approach, we have come to know that there was no composite index, which measures both return and risk under the traditional theory. However, in Modern Portfolio Theory it became necessary to develop some composite measures of both return and risk in portfolio performance, as the objective now is maximization of return and minimization of risk. Because of the trade-off between risk and return, simple maximization of returns or single goal of minimization of risk will be defeating the objectives of Modern Portfolio Management. Considering this drawbacks of traditional theory, later researchers have tried to develop a composite index to measure risk based returns taking into account the different components of risk, viz., and systematic, unsystematic and residual risk. The credit for evolving these criteria goes to Sharpe, Treynor and Jensen.

STOP TO CONSIDER

Nobel Prize winner William Sharpe and American economist Jack Treynor have developed the Sharpe ratio and the Treynor ratio respectively that are used to measure the risk-adjusted rate of return . While they may help investors understand investments and risk, they offer different approaches to evaluating investment performance. The Sharpe ratio helps investors understand an investment's return compared to its risk while the Treynor ratio explores the excess return generated for each unit of risk in a portfolio. (See discussion in detail in Block 5,Unit 2)

2.8 Benchmark Portfolio for performance evaluation: Benchmark portfolio is a tool

for the meaningful evaluation of a portfolio manager. The more the benchmark reflects the manager's stated style, the more accurately the performance of the manager's skill can be assessed. Specialized benchmarks are called "normal portfolios". They are especially constructed by mutual consent of the client and the manager to reflect the client's needs and the manager's style. Some management firms develop a normal portfolio, which they can use for all clients, and some develop it separately for each type of client.

When benchmarks are designed in advance, the portfolio managers know what the specific objectives are and construct the portfolio accordingly. The benchmark should reflect the appropriate investment universe in which the managers works. Without a yardstick for proper comparison, it becomes difficult to distinguish between active management skills and random results.

To use a particular benchmark (or set of benchmarks) as a measuring tape, against which to compare a fund, a manager should be able to size up the competition (i.e., the benchmark). Accordingly, Bailey (1995) proposes that a valid benchmark should be

1. **Unambiguous:** The names and weights of component securities should be known;
2. **Tradeable:** It should be available as a passive investment alternative for the manager;
3. **Measurable:** It must be possible to compute a valid return on the benchmark periodically (might not be possible for benchmarks with illiquid assets);
4. **Appropriate:** The benchmark must reflect the manager's style;
5. **Reflective of current investment opinions:** A manager should be able to form an opinion on the expected rate of return on the benchmark; and
6. **Specified in advance:** It should be able to give the manager a passive alternative ahead of time, to make clear the measuring tape.

Rather than using market index like the Sensitive Index of Bombay Stock Exchange or the Economic time Index, a benchmark portfolio would use a portfolio with predominantly value-oriented shares for a value manager, growth-oriented shares for a growth manager and small capitalization shares for small-cap (size) manager. It is quite possible for an investment manager to perform better than the benchmark, though the benchmark may itself under-perform in relation to a market index. The process of constructing benchmark portfolio involves-

- a) Defining the universe of stock to be used for the benchmark portfolio, and
- b) Defining the weightage of the stocks in the universe.

An investment manager's month-end portfolio can be examined for the last five years to get an idea of the average exposure of the manager to various factors (industry, capitalization, P/E etc.).

For example, if an investment manager tends to invest in securities in high capitalization, low PE, low growth stocks, higher weights can be assigned to these in the benchmark. The more stable the exposure and the investment style, the easier it should be to build benchmark with appropriate weights.

Performance attribution analysis, as mentioned earlier, is a means of evaluating an investment manager's performance, the return and the sources of return relative to a benchmark portfolio. This analysis looks to an investment manager's total 'excess' return, or 'Active Management Return' (AMR) relative to its benchmark over the given period. It also looks at the components of AMR stock selection, industry selection and market timing.

The benchmark portfolio return is 'buy-and-hold' return on a predetermined portfolio tailored to a manager's style. The cumulative excess return or cumulative AMR is the difference between actual portfolio return and the benchmark return over the evaluation period.

SELF ASKING QUESTION

Question: Do you think evaluation of Mutual Fund Performance is a vital aspect of mutual fund portfolio management? Discuss the reasons in support of your answer. (20+60 limited words).

Answer:

2.9 Summing up:

- ✓ In this unit we have learned that portfolio performance evaluation is essentially the process of comparing the return earned on a portfolio with the return earned on one or more other portfolios or on a benchmark portfolio.
- ✓ The portfolio evaluation process consist of two functions- one is performance measurement another one is performance evaluation. Performance measurement is considered as an accounting function, which measures the portfolio return earned during the holding period or investment period. On the other hand, performance evaluation

addresses such issues as whether the performance was superior or inferior, whether the performance was due to skill or luck or etc.

- ✓ Due to complex securities market, existence of information asymmetry, improve self-evaluation for investment decision there is utmost necessary of evaluation of portfolio performance.
- ✓ Risk taking, Stock Selection and Market Timing are three major determinants that have an effect on the portfolio performance evaluation.
- ✓ The first criteria for performance evaluation is the ability to diversify the risk with a view to reduce and even eliminate all unsystematic risk and expertise in managing the systematic risk related to the market by use of appropriate risk measures, namely, betas, and selection of proper securities. Secondly, superior timing and superior stock selection may result in above average return. Diversification in terms of Markowitz model or Sharpe's Single Indexed Model will reduce the market related risk and maximize the returns for a given level of risk. Market returns being related positively to risk, evaluation has to take into account: Rate of returns, or excess return over risk free rate and level of risk both Systematic (Beta) and unsystematic and residual risk through proper diversification.
- ✓ Benchmark portfolio is a tool for the meaningful evaluation of a portfolio manager. The more the benchmark reflects the manager's stated style, the more accurately the performance of the manager's skill can be assessed.

2.10 References and Suggested Readings:

1. Avadhani, V.A. *Security Analysis and Portfolio Management*. Himalaya Publishing House, 2014
2. Bhalla, V.K. *Investment Management: Security Analysis and Portfolio Management*. S. Chand & Company Pvt. Ltd., 2018
3. Fischer, E. Donald, Jordan, J. Ronald and Pradhan, A.K.. *Security Analysis and Portfolio Management*. Pearson Education Inc., 2019.
4. Kevin, S. *Security Analysis and Portfolio Management*. PHI Learning Pvt. Ltd, 2015.
5. Pandian, P. *Security Analysis and Portfolio Management*. Vikas Publishing House Pvt. Ltd. 2013.

2.11 Self- Assessment Questions:

1. What do you mean by portfolio performance evaluation? Explain various need of evaluating the portfolio performance.
2. Distinguish between performance measurement and performance evaluation of an investment portfolio.
3. What are the various factors influencing the portfolio performance evaluation and investment decisions? Explain.
4. Discuss the criteria for portfolio performance evaluation.

5. What are benchmark portfolio? How are they used to evaluate the performance of a portfolio manager? Discuss with suitable examples.

UNIT 3:

Sharpe's, Treynor's and Jensens's measure of portfolio performance

Contents:

- 3.1 Introduction
- 3.2 Objectives
- 3.3 Unconditional Performance Evaluation
- 3.4. Conditional Performance Evaluation and Multi-Factor Models
- 3.5. Practical implications of Sharpe Ratio, Treynor Ratio and Jensen Ratio
- 3.6 Summing up
- 3.7 References and Suggested Reading

3.1 Introduction: This unit illustrates the main measures of portfolio performance evaluation and its practical implication in portfolio performance evaluation. It is worth mentioning that this unit provides an exhaustive list of the main established measures of financial performance. The measures are classified into two sub-groups i.e. traditional measures (unconditional measures) and conditional measures. The traditional measures were mainly influenced by the Capital Asset Pricing Model (CAPM). Their major shortcoming is the assumption that risk is constant over the entire evaluation period. On the other hand, conditional measures relax this hypothesis by allowing portfolios risk and market premiums to vary over time with the state of the economy

3.2 Objectives: After studying this unit, you will be able to

- Discuss the main measures of portfolio performance.
- Distinguish between traditional (unconditional) performance measures and conditional performance measures.
- Apply various methods for evaluating portfolio performance in real world of investment.

3.3. Unconditional Performance Evaluation: Traditional, or unconditional, alphas compare returns and risks measured as averages over an evaluation period, and these averages are taken "unconditionally," or without regard to variations in the state of financial markets or the broader economy (formally, Z_t in Equation 2 is taken to be a constant). Our first class of performance measures includes all measures that are computed as a ratio. The most common way to calculate this category is to divide the performance (excess returns) by a risk measure.

3.3.1. Sharpe Ratio: William Sharpe (1966) developed a simple ratio to evaluate mutual fund performance. This is also termed as reward to variability ratio. It is the ratio of reward or risk premium to the variability of return or risk as measured by the standard deviation of return. A common mathematical definition of the Sharpe ratio is:

$$\text{Sharpe ratio} = \frac{R_p - R_f}{\sigma_p}$$

Where

$E(R_p)$ is the return of portfolio P;

R_f is the risk-free return; and

$\sigma(R_p)$ is the standard deviation of portfolio P (total risk).

STOP TO CONSIDER

William Forsyth Sharpe is an American economist, professor of finance, emeritus at Stanford University; who won the 1990 Nobel Prize in Economic Sciences, for developing models to assist with investment decision making. Sharpe is well known for developing the capital asset pricing model (CAPM) in the 1960s and for developing Sharpe Ratio (also known as Sharpe index, the Sharpe measure, and the reward-to-variability ratio)

Such ratio can be defined as the ratio of portfolio return in excess of risk-free rate over its standard deviation. Knowing that the square of the standard deviation is the variance (Markowitz definition of risk), Sharpe ratio is mainly derived from Markowitz portfolio theory. It can be used for assessing the performance of a portfolio which is meant to represent an individual's total investment. In fact, Sharpe ratio is suitable for individuals who invest only in one fund. On the other hand, when an investor wants to combine multiple portfolios, the covariance between volatilities will be an issue if we rely only on Sharpe ratio. Another drawback is that Sharpe ratio does not refer to a benchmark. Furthermore, its interpretation is difficult when excess return is negative.

$$E(R_p) - R_f < 0$$

Another problem is the assumption that portfolio returns are normally distributed. Higher moments (e.g. third and fourth moments) are not considered by the Sharpe ratio. In the literature, many authors tried to improve the Sharpe ratio by proposing some intuitive adjustments. Within this new category of measures, we have the information ratio, the Sortino ratio and Modigliani & Modigliani ratio.

Check Your Progress

Question 1: Mention the two classification of measure for portfolio performance evaluation?

Question 2: What is Sharpe Ratio? Mention some uses and limitations of using Sharpe Ratio for portfolio performance evaluation.

3.3.2. Information Ratio (IR) The Information Ratio, developed in 1973 by Treynor & Black, also known as appraisal ratio, is a measure of the risk-adjusted excess return of a portfolio over

the benchmark index, or its alpha, divided by its tracking error or non-systematic standard deviation. It can be written as follows:

$$RI = \frac{E(Rp) - E(Rb)}{\sigma(Rp - Rb)}$$

Where

$E(R_B)$ is the return of a benchmark portfolio (e.g. an index);

$\sigma(Rp - Rb)$ is the tracking error (standard deviation of the difference between portfolio P returns and the returns of the benchmark). In fact, the denominator of IR reflects the cost of an active management strategy. Hence, IR measures managers' ability to generate higher returns relative to a benchmark portfolio. It appraises the expected return from an active management strategy divided by cost of such strategy. To create value for investors, managers' should maximize the expected active return (numerator) and minimize the cost of their active management style (denominator). A higher IR suggests that managers can achieve higher returns without taking on additional risk.

The information ratio is similar to the Sharpe ratio. However, in the Sharpe ratio, risk-free return is considered as a benchmark and in the information ratio, risky index is considered as benchmark (such as the S&P500). The Sharpe ratio is useful for an attribution of the absolute returns of a portfolio, and the information ratio is useful for an attribution of the relative returns of a portfolio

Check your Progress

Question 1: Mention the two differences between Sharpe Ratio and Information Ratio.

Question 2: Why Information Ratio is considered as an important measure of portfolio performance evaluation.

3.3.3. Modigliani and Modigliani Ratio (M & M): This measure of performance has been popularized by Franco Modigliani, a Nobel Laureate economist, and his granddaughter, Leah Modigliani, an investment professional. It is called the Risk adjusted measure of performance, popularly known as the M&M Model. The M & M ratio is also derived from the Sharpe ratio. It measures the returns of portfolio P while taking into consideration the amount of the portfolio risk relative to a benchmark. The intuition behind this measure is that a manager who has taken the same risk as its benchmark should generate returns similar to the benchmark. If the manager's portfolio gives superior returns, it means that we are witnessing a higher performance. The latter is captured by the M&M ratio and can be considered as the incremental return added as compared to the level of market (benchmark) risk. The M&M measure can be written as follows:

$$RAP = \frac{\sigma M}{\sigma P} (Rp - Rf) + Rf$$

At equilibrium, $RAP = R_M$ (return of the benchmark: market portfolio). When $RAP > R_M$, the manager generates higher performances.

3.3.4. Sortino Ratio (SR): The Sortino ratio, named after Frank A. Sortino, estimates the risk-adjusted return of an asset or portfolio. Sharpe ratio assumes that returns are normally distributed. Therefore, such ratio does not make any distinction between the upside risk and the downside risk. In reality, rational investors are only afraid of the downside risk. The Sortino Ratio takes into consideration the downside risk. It focuses on returns that are below a certain threshold and can be written as follows:

$$SR_p = \frac{R_p - THR}{\sqrt{\frac{1}{N} \sum_{i=1}^N D(R_{p,i} - THR)^2}}$$

Where,

THR is a threshold return (a specified required rate of return) and

D is a Dummy variable set to 1 if the return of the portfolio is below THR and 0 otherwise. According to SR, only returns that fall below a specified required rate of return are taken into consideration. In fact, the Sharpe standard deviation is replaced by a new standard deviation measure which considers only returns below THR.

Check Your Progress

Question 1: Discuss the advantages of using M & M Measure over Sharpe ratio.

Question 2: How Sortino Ratio is different from Sharpe Index?

3.3.5. Treynor Ratio (TR): In the Sharpe measure, we consider the total risk of the portfolio represented by σ_p . Under the Capital Asset Pricing Model (CAPM), all non-systematic risk can be diversified away; hence, an investor should get returns only based on his non-diversifiable risk. Jack L. Treynor, an economist and investment professional, who also served as the Senior Editor and Advisory Board Member of the Journal of Investment Management, devised his measure. He assumes only the systematic risk as relevant and has replaced σ_P with β_P . The TR is measured as following:

$$Treynor\ ratio = \frac{R_p - R_f}{\beta_p}$$

Where,

$E(R_p)$ is the return of portfolio P;

R_f is the Risk-free return; and

β_p is the portfolio beta (systematic risk).

The TR considers the systematic risk of the portfolio instead of the total risk. One important drawback of this measure is that it requires the selection of an efficient market index. This is a very difficult task because the real market portfolio is unobservable. Therefore, the sensitivity of TR to the selected market index is a major concern. Finally, TR is relevant for the measurement of the performance of a portfolio that does not represent the whole patrimony of an investor. All the financial performance measures presented above do not explain the types of managers' skills that help create value for investors. In addition, they do not quantify the value added or destroyed. The second class of our traditional performance measures addresses these issues.

SELF ASKING QUESTION

Question: What is the essential difference between Sharpe and Treynor Index? Which do you think is more preferable? Why?

Answer: _____

3.3.6 Jensen's Alpha: Michael C. Jensen's devised this measure while working on a study of mutual fund performance published in 1967. His measure is the alpha or the return earned by the portfolio over and above of what was predicted by the CAPM by analyzing its riskiness. It indicated the return that a portfolio should earn for its given level of risk. The difference between the return actually earned on a portfolio and the return expected from the portfolio is a measure of the excess return or differential return that has been earned over and above what is measured for its level of systematic risk. The differential return gives an indication of the portfolio manager's predictive ability or managerial skills.

Using the CAPM Model, the expected return of the portfolio can be calculated

$$E(R_p) = R_f + \beta_p (R_m - R_f)$$

Where,

$E(R_p)$ is Expected portfolio return

R_f is Risk free rate

R_m is Return on market index and

β_p is systematic risk of the portfolio

The differential return is calculated as follows:

$$\alpha_p = R_p - E(R_p)$$

Where,

α_p is Differential return earned

R_p is actual return earned on the portfolio.

$E(R_p)$ is Expected return

Thus, α_p represents the differences between actual return and expected return. If α_p is a positive value, it indicates that superior return has been earned due to superior management skills. When α_p has done just as well as unmanaged randomly selected portfolio with a buy and hold strategy. A negative value indicates that the portfolio's performance has been worse than that of market or a randomly selected portfolio of equivalent risk.

STOP TO CONSIDER

Michael C. Jensen's devised the Differential ratio while working on The Performance of Mutual Funds during the period of 1945-1964, published in *Journal of Finance*, Vol. 23, no 2, pp. 389-416, 1967

3.4. Conditional Performance Evaluation and Multi-Factor Models: In the conditional performance evaluation (CPE) approach, the state of the economy is measured using predetermined, public-information variables. This takes the view that a managed portfolio strategy that can be replicated using readily available public information should not be judged as having superior performance, consistent with a version of semi-strong-form market efficiency as described by Fama (1970).

3.4.1. Fama-French Three-Factor Model : This model can be written as follows:

$$R_{pt} - R_{ft} = \alpha_p + \beta_1 (R_{mt} - R_{ft}) + \beta_2 (SMB_t) + \beta_3 (HML_t) + \epsilon_{pt}$$

Where,

SMB is the size factor (small minus big) and

HML is the book-to-market factor (High minus low).

These factors measure the historic excess return of small cap stocks over big cap stocks and value stocks over growth stocks.

3.4.2. Carhart Four-Factor Model: This model is an extension of Fama-French model. Carhart includes the momentum factor. The latter is a market anomaly showing that stocks with high past performance continue to outperform stocks with low past performance. The momentum factor is proxied by a zero-cost portfolio (UMD: up minus down) that is long on past winners (stocks with strong past performance) and short on past losers (stocks with poor past performance). Carhart four-factor model can be written as follows:

$$R_{pt} - R_{ft} = \alpha_p + \beta_1 (R_{mt} - R_{ft}) + \beta_2 (\text{SMB}_t) + \beta_3 (\text{HML}_t) + \beta_3 (\text{UMD}_t) + \epsilon_{pt}$$

3.5. Practical implications of Sharpe Ratio, Treynor Ratio and Jensen Ratio

Illustration 1: With a risk-free rate of 7%, and with the market portfolio having an expected return of 13% with a standard deviation of 6%, what is the Sharpe Index for portfolio A, with a return of 12% and standard deviation of 10% ? For portfolio B, having a return of 10% and a standard deviation of 8% ? Would you rather be in the market portfolio or one of the other two portfolios?

Solution:
$$\text{Sharpe ratio} = \frac{R_p - R_f}{\sigma_p}$$

$$\text{Portfolio A: } S_p = \frac{12-7}{10} = 0.5$$

$$\text{Portfolio B: } S_p = \frac{10-7}{8} = 0.4$$

$$\text{Market: } S_p = \frac{13-7}{6} = 1.0$$

The market is superior to either portfolio A or B.

Illustration 2: The following data are given about portfolios A and B, and the market portfolio

	Portfolio A	Portfolio B	Portfolio C	Portfolio D
Beta	1.10	0.8	1.8	1.4
Standard Deviation	20.0	17.5	26.3	24.5
Returns	14.5	11.25	19.75	18.5

If, Risk free interest rate of return 6% and market return 12%, calculate Sharpe Ratio, Treynor Ratio and Jensen Ratio.

Solution:

The formula for
$$\text{Sharpe ratio} = \frac{R_p - R_f}{\sigma_p}$$

$$\text{Sharpe Ratio of Portfolio A} = \frac{14.5-6}{20} = 0.425$$

$$\text{Sharpe ratio of Portfolio B} = \frac{11.25-6}{17.5} = 0.300$$

$$\text{Sharpe Ratio of Portfolio C} = \frac{19.75-6}{26.3} = 0.523$$

$$\text{Sharpe Ratio of Portfolio D} = \frac{18.5-6}{24.5} = 0.510$$

The formula for *Treynor ratio* = $\frac{R_p - R_f}{\beta_p}$

$$\text{Treynor ratio of Portfolio A} = \frac{14.5-6}{1.10} = 7.727$$

$$\text{Treynor ratio of Portfolio B} = \frac{11.25-6}{0.8} = 6.562$$

$$\text{Treynor ratio of Portfolio C} = \frac{19.76-6}{1.8} = 7.644$$

$$\text{Treynor ratio of Portfolio D} = \frac{18.5-6}{1.4} = 8.929$$

To calculate differential return using Jensen Formula, first we have to calculate the expected return of the portfolio by using CAPM Model.

$$E(R_p) = R_f + \beta_p (R_m - R_f)$$

$$E(R_p) \text{ of Portfolio A} = 6 + 1.10 (12 - 6) = 12.6$$

$$E(R_p) \text{ of Portfolio B} = 6 + 0.8 (12 - 6) = 10.8$$

$$E(R_p) \text{ of Portfolio C} = 6 + 1.8 (12 - 6) = 16.8$$

$$E(R_p) \text{ of Portfolio D} = 6 + 1.4 (12 - 6) = 14.4$$

Now, The differential return is calculated as follows:

$$\alpha_p = R_p - E(R_p)$$

$$\text{Differential return of Portfolio A} = 14.5 - 12.6 = 1.9$$

$$\text{Differential return of Portfolio B} = 11.25 - 10.8 = 0.45$$

$$\text{Differential return of Portfolio C} = 19.75 - 16.8 = 2.95$$

$$\text{Differential return of Portfolio D} = 18.5 - 14.4 = 4.1$$

Illustration 3. Mr. Kishore Kundan is having units in a mutual fund for the past three years. He wants to evaluate its performance by comparing it to the market.

	Fund	Market
Return	70.60	70.60
Standard Deviation	41.31	19.44
Risk-free rate	2	2
B	1.12	-

Find out Sharpe and Treynor indices. Comment.

Solution:

$$\text{Sharpe Index for Fund} = \frac{R_p - R_f}{\sigma_p} = \frac{70.60 - 12}{2041.31} = 1.419$$

$$\text{Sharpe Index for Market} = \frac{R_p - R_f}{\sigma_m} = \frac{41.40 - 12}{19.44} = 1.512$$

Sharpe Index for fund is lower than market and indicates that the fund has not performed well.

$$\text{Treynor ratio for Fund} = \frac{R_p - R_f}{\beta_p} = \frac{70.60 - 12}{1.12} = 52.3$$

$$\text{Treynor ratio for market} = \frac{R_p - R_f}{\beta_p} = \frac{41.40 - 12}{1} = 29.4$$

According to Treynor's Index the portfolio has performed better than the market.

Illustration 4. Gold and Diamond are the two mutual funds. Gold has a mean success of 0.15 and diamond has 0.22. The Diamond has double the beta of Gold fund's 1.5. The standard deviation of Gold and Diamond funds are 15% and 21.43%. The mean return of market index is 12% and its standard deviation is 7. The risk free rate is 8%.

- Compute the Jensen Index for each fund.
- Compute the Treynors indices for the funds. Interpret the results.

Solutions:

- Jensen Index by using CAPM; $E(R_p) = R_f + \beta_p (R_m - R_f)$

$$E(R_p) \text{ of Gold} = 8 + 1.5 (12 - 8) = 14$$

$$E(R_p) \text{ of Diamond} = 8 + 3 (12 - 8) = 20$$

Now, The differential return is calculated as follows: $\alpha_p = R_p - E(R_p)$

$$\text{Differential return of Gold} = 15 - 14 = 1$$

$$\text{Differential return of Diamond} = 22 - 20 = 2$$

- Treynor ratio for Gold = $\frac{R_p - R_f}{\beta_p} = \frac{15 - 8}{1.5} = 4.67$

$$\text{Treynor ratio for Diamond} = \frac{R_p - R_f}{\beta_p} = \frac{22 - 8}{3} = 4.67$$

According to Treynor's index, both the funds have same value.

Illustration 5. Mr. Jhunjunwala owns units from three different mutual funds namely AMF, UFF & KFF. The following particulars are available to him. He wants to dispose any one of the mutual fund for his personal expenditure. Which fund should he dispose?

FUNDS	Excess average return	Beta
AMF	7.7	1.02
UFF	11.3	0.99
KFF	11.6	1.07
Market	7.8	1.00

Solution: The performance of the funds can be evaluated by finding out the differential return.

Differential return of AMF= $(R_p - R_f) - \beta(R_m - R_f) = 7.7 - 1.02 \times 7.8 = -0.256$

Differential return of UFF= $11.3 - 0.99 \times 7.8 = 3.578$

Differential return of KFF= $11.6 - 1.07 \times 7.8 = 3.254$

Since portfolio AMF has a negative alpha value, Mr Rajbongshi can sell portfolio AMF and can keep the other two.

3.6 Summing up:

- Sharpe index is a measure of the risk premium relative to the market performance.
- Treynor index measures the fund's performance relative to the market performance.
- Jensen index compares the actual or realized return of the portfolio with the calculate or predicted return. Better performance of the fund depends on the predictive ability of the managerial personnel.
- The Sortino Ratio takes into consideration the downside risk. It focuses on returns that are below a certain threshold

3.7 References and Suggested Readings:

1. Avadhani, V.A. *Security Analysis and Portfolio Management*. Himalaya Publishing House, 2014
2. Bhalla, V.K. *Investment Management: Security Analysis and Portfolio Management*. S. Chand & Company Pvt. Ltd., 2018
3. Fischer, E. Donald, Jordan, J. Ronald and Pradhan, A.K.. *Security Analysis and Portfolio Management*. Pearson Education Inc., 2019.
4. Kevin, S. *Security Analysis and Portfolio Management*. PHI Learning Pvt. Ltd, 2015.
5. Pandian, P. *Security Analysis and Portfolio Management*. Vikas Publishing House Pvt. Ltd. 2013.

3.8 Self- Assessment Questions:

1. Explain various traditional methods of measuring portfolio performance evaluation.
2. Why may Treynor and Sharpe indices of performance measure give conflicting performance ranking?
3. What is Differential Return? Explain this with the help of Jensen Index.
4. What are risk adjusted return measures? Give two examples.
5. The following data are given about portfolios platinum and gold, and the market portfolio.

	Platinum	Gold	Market
Beta	1.2	0.8	1
Standard deviation	22	25	20
Returns	16.6%	14.4%	14%
Risk free interest rate	6%		

Calculate the following ratios for the portfolios platinum and gold and evaluate which will perform better under what circumstances?

6. Suppose you are asked to analyze two portfolios having the following characteristics:

	Observed return	Beta	Residual variance
Portfolio A	0.12	2.0	0.02
Portfolio B	0.11	1.8	0.01

The risk-free rate is 0.06. The return on the market portfolio is 0.15. The standard deviation of the market is 0.07.

- Compute the Jensen Index for portfolio A and B
- Compute the Sharpe Index for the market portfolio
- Compute the Sharpe Index for portfolio A and B
- Compute the Treynor Index for the portfolio A and B.

Block-6

Unit- 1

Derivative

Unit-1: Meaning and evaluation of derivatives, options and futures

1.1 Introduction

We all know that financial markets are volatile. A huge risk is involved in the investment made in financial assets. Because of globalization and liberalization, the world has witnessed multiple growth in trade and commerce. As a result, a huge fluctuation in the prices of financial instruments, interest rates, exchange rates etc. is observed in different financial markets around the world. To reduce the magnitude of risk and protect one from the uncertain financial losses, some new concept has emerged in the world of finance. Derivative is one of them. Financial derivatives or derivatives are the newly developed instrument to protect the investors against adverse moment of changes in future prices to minimize the extent of financial risk. Derivatives also creates opportunity to the people to earn massive amount of profit who are willing to bear enormous risk. The word 'derivative' comes from the verb 'to derive', originated in mathematics, which means it has no independent value. In the word of finance, derivative is a financial product the value of which is derived from another product. Derivatives are financial contracts whose value is derived from the value of an underlying asset. Derivatives are used as an armor to protect the financial assets from the market volatility. Derivatives has no existence without an underlying asset or group of underlying assets and market. The primary motive of entering into such contract is to earn profit by speculating the value of underlying asset in future as the value of underlying asset always keeps changing along with the market conditions. The need of derivatives contract arises to limit financial risk. In this unit we will learn what is financial derivative, what are the types of derivatives, why derivatives trading is important in financial market along with various other features of derivatives.

STOP TO CONSIDER

The word 'derivative' arises from the verb 'to derive', originated in mathematics, which means it has no independent value. Derivatives are financial contracts whose value is derived from the value of an underlying asset. Derivatives are used as a shield to protect the investors from the market volatility.

1.2. Objectives-

This unit is an attempt to analyze the financial derivatives in details. This unit will help you to-

- Understand the concept of financial derivatives

- Know the evolution of derivatives
- Know the definition and meaning of derivatives
- Acquaint with the knowledge of derivative trading and the various types of derivatives
- Know about futures, options and forwards and its differences

1.3 Derivatives definition and meaning

The Securities Contracts (Regulations) Act,1956 defines derivatives as “derivative includes the following-

- A security derived from a debt instrument, share, loan (whether secured or unsecured), risk instrument or contract for differences or any other form of security;
- A contract which derives its value from the prices or index of prices of underlying securities.

From the above definition it is very clear that to establish the contract of derivative, the existence of underlying asset/security is necessary. Stocks, bonds, currencies, commodities etc. are some of the examples of most commonly used underlying assets in derivative contract. Derivatives are risk reducing tools to hedge the uncontrollable risk inherent in the asset and to provide a shield against losses. Derivatives contracts can be standardized and non- standardized contracts. The standardized contracts of derivatives are the contracts which are traded in stock exchange. These derivatives are also known as exchange traded derivatives. On the other hand, non-standardized derivative contracts are not traded in stock exchange. These are over- the -counter contracts settled between the parties involved in the contract.

STOP TO CONSIDER

Derivates contracts are standardized and non- standardized. The standardized derivative contracts are traded on stock exchange and also called as exchange trade derivatives. Whereas, non- standardized derivatives are not traded on stock exchange. These are also called over-the-counter contracts.

1.4. Evolution of derivatives

Derivatives have been used by the people for a very long period of time. For centuries, these contracts are used by the Roman emperors, farmers and merchants to hedge price risk. Forward contract, a type of derivative contracts, was existed in ancient Greece and Rome. In Mesopotamia, it was said that the king passed a verdict in case of insufficient rain which resulted insufficient production of crops, the lenders would have to relinquish their debt to the farmers and thus the farmers were given a put option (a type of derivative) by the king. In 19th century the derivatives become more popular with the establishment of first formal commodity exchange market called 'Chicago Board of Trade'(CBOT) in America. This market was established by the farmers of America after realizing the importance of derivative contracts in 1848. Later, this market evolved into the first ever derivative market. Before that, in early 1700, the first organized commodity exchange was set up in Japan. In 1919, the Chicago Mercantile Exchange (CME), a spin-off of CBOT was formed. The currency futures were the first financial futures emerged in U.S in 1972. A separate board called Chicago Board Options Exchange (CBOE) was set up in 1973 to trade stock options. Gradually options trading become popular and in 1975 American Stock Exchange (AMEX) and Philadelphia Stock Exchange (PHLX) started trading options. With the introduction of floating rates for currencies in the international financial market has opened the door for development of financial derivatives.

Check your progress

1. What do you mean by financial derivative contract?
2. Name some the underlying assets for a derivative instrument.
3. What are standardized derivatives?

1.5: Types of derivatives

Different types of derivatives not only guarantee protection of investors' funds but these also help the investors to generate additional profits by enabling the investors to park their resources in various ways. Derivatives has been acting as a best tool for investors for prediction of the future cash flows. Derivatives are of several types. But there are four major types of financial derivatives which are generally taken into account. These are-

- 1) Futures
- 2) Forwards
- 3) Options
- 4) Swaps

- 1) **Futures:** These are the most constricted derivative contract amongst all the derivatives. Futures are the standardized contract between buyer and seller to buy or

sell something at a future date with a previously decided price. Futures contracts allowing the holder to buy or sell the asset with an agreed price on a specified date. That means the future contracts are traded in stock exchange and it sets an obligation for the parties to execute the contract. Since, these contracts are traded on stock exchange, there is no credit risk associated with futures. Generally, in this type of contract, settlement is done on daily basis.

E.g., Suppose A and B are two parties. They have entered into a future contract on 23rd May 2021 where B will buy gold futures on 23rd August 2021 at Rs. 45000 (per 10 grams) from A.

- 2) **Forwards:** Forwards contracts are more or less similar to future contract. Here also settlement takes place on a specified date set in advance at an agreed price between the parties. The future date and future price at which the transaction will take place is decided in advance. Since each forward contract is custom designed, and therefore uniqueness is present in terms of contract size, expiration date and type and quality of the asset. These are over-the-counter contract and not traded in stock exchange. Exchange is not the intermediary in this type of contract.

E.g., Suppose A and B are two parties. They have entered into a forward contract on 23rd May 2021 where B will buy commodity forwards on 23rd August 2021 at Rs. 40000 from A.

- 3) **Options:** Options contracts are different from the first two types of derivatives. Options binds only one party to carry on the contract and let the other party to take decision regarding the execution of the contract on a later date. Means, one party is on obligation to buy or sell the asset on a later date whereas the other party can make a choice and for that the later one has to pay a premium for the privilege. There are two types of options i.e., call option and put option. Call option provides the buyer the right (but not the obligation) to buy something at a later date at a given price. On the other hand, put option gives the right to someone but not the obligation to sell something at a later date on a previously decided price.
- 4) **Swaps:** These contracts enable the parties to swap their financial obligations. Interest rate swaps are most commonly used. These contracts are not traded in stock exchange. The amount of cash flows under this contract is based on a rate of interest. One cash flow is generally fixed and the other fluctuates on the basis of a benchmark interest rate. Swaps are of two types-
- **Interest rate swap:** This means exchanging of future interest payments between two parties based on a specified principal amount which helps in providing protection against future losses and smooth management of credit risk in financial institutions.
 - **Currency swap:** Currency swaps occurs when two parties swap an equal amount of money in different currencies. Here, the parties in contract

exchange the interest payment as well as principal amount in different currencies.

STOP TO CONSIDER

Derivatives are of several types. The most important types of derivatives which are frequently traded are forwards, futures, options and swaps.

1.5. Difference between forwards and futures:

Though forwards and futures contracts look similar, there are some differences between these two types of derivatives. Both the contract starts with an agreement between two parties, where buying and selling of the underlying asset, between the parties takes place on a future date at a price agreed upon today. But there are some differences between these two types of derivatives. Which are-

- Forwards contracts are non-standardised in nature and customizable. These are settled at the end of the agreement and traded between the parties over-the-counter. Whereas, futures are standardised contracts and traded on a stock exchange where prices are settled on daily basis.
- Forward contracts involve counter party risks, whereas there is no counter party risk involved in futures as these are traded on stock exchange. Therefore, the chance of default is very low.
- Forwards contracts are self-regulated contracts whereas futures are regulated by market regulators.

STOP TO CONSIDER

Forwards and futures are two types of derivatives which are mostly traded in financial market. Though these contract looks similar but these is some differences between these two types of contracts. Forwards are not traded on stock exchange and hence involves huge counter party risk whereas, futures contracts involve no counter party risk at all as these contracts are traded on stock exchange and therefore chances of defaultare very low.

1.6: Benefits of derivatives

The underlying benefits of derivative contracts make it more popular in financial market. It is an instrument of shifting risk from risk averse investors to the people who are willing to take more risk. Derivatives help in discovering current as well as future prices of the underlying which in turn leads to increase the tendency of long-term savings and investment among investors. Derivatives always act as a shield against inflation and deflation in the market. Some of the advantages of derivatives are-

- ✓ **Elimination of trade risk:** Elimination of trade risk arising out of market fluctuation which may menace economic activity is possible because of derivative contracts.
- ✓ **Determination of future price of underlying:** The future spot price of the underlying asset can be set in advance with the help of futures and forwards.
- ✓ **Effective tool for risk management:** With the help of derivative contract one party can easily transfer the risk to other party. Means the buyer gets the advantage to transfer the risk to seller.
- ✓ **Low cost of trading:** Derivatives involve low level of transaction cost and thereby getting more popularity in financial market.

However, one should always keep in mind that derivative instruments have some drawbacks also. In derivative contracts it becomes very difficult to detect the true value of the derivative as the value of derivative is based on the value of one or more underlying asset. Because of this nature, it is impossible to know the real value of derivatives.

STOP TO CONSIDER

Benefits of derivative trading:

- **Elimination of trade risk**
- **Determination of future price of underlying**
- **Effective tool for risk management**
- **Low cost of trading**

1.7. Market Participants

Based on the trading motives the participants of derivative market can be categorized into following categories-

- 1) **Hedgers:** Hedgers are the people who want to protect themselves against market volatility. In common parlance they are known as risk-averse traders who aim to

secure their investment against price fluctuations in the market. Derivatives are best tool for risk management of portfolios for these risk-averse traders.

For e.g. A is an importer and has to make payment on US \$ to import goods from another country. If it is expected that rupee is to fall to Rs. 77/\$ from Rs. 75/\$, then A can minimize his losses by buying a currency future at Rs. 76/\$.

- 2) **Speculators:** These people are exactly opposite to the hedgers. Unlike hedgers, the speculators are willing to take more risk. Speculators are known as risk-taker in the market. They enter into derivative contract to extract profit because of future price movements from the market. They constantly track the market to know whether prices would rise and fall in future and accordingly enter in futures and options contract.

For e.g., if a particular commodity price is expected to rise to Rs. 500 in one month, then one can make profit by buying one month future of the same commodity at Rs. 400

- 3) **Arbitrageurs:** They are the people in the derivative market aims to earn profit by taking no exposure or low exposure. They are the risk-free profit seekers in derivative market. Arbitrageurs generally buy low-price securities in one market and sell them at a higher price in another market.

For e.g., if an equity share is quoted in the stock market at Rs. 100 and Rs. 180 at futures market, then the arbitrageur will buy the stock at Rs. 100 and sell it Rs. 180 in futures market. And he will earn low-risk profit of Rs. 80.

STOP TO CONSIDER

Most common traders in derivative market are Hedgers, Speculators and arbitrageurs. Hedgers are the people who want to protect themselves against market volatility. In common parlance they are known as risk-averse traders who aim to secure their investment against price fluctuations in the market. Speculators are exactly opposite to the hedgers. Unlike hedgers, the speculators are willing to take more risk. Speculators are known as risk-taker in the market. Arbitrageurs are the people in the derivative market aims to earn profit by taking no exposure or low exposure.

1.8. Options derivative trading:

As stated earlier, options are a contract between two parties i.e., buyer and seller, where buyer has only the right but not any obligation to buy or sell the underlying asset. You cannot bound the buyer to execute the contract under options trading. Option trading is done basically by making speculation on the prices of the underlying asset or assets in the market. Here, people make option trading because they think that the price of an asset will rise or fall in future. There are two types of options contracts. Call option and put option.

- **Call option:** This type of options contract provides the holder of the asset the exclusive right but not the obligation to buy the asset at the price agreed earlier on or before the date of expiration of the contract. For e.g. If you purchase a call option today for a stock at a price of Rs. 400 and the date of expiration is three months from today. If the price of the stock rises to Rs. 500 within that period but you can buy the stock at Rs. 400 and make profit of Rs. 100 (Rs. 500- Rs. 400) by selling it at Rs. 500.
- **Put option:** Here, options holder has the right but not the obligation to sell the asset at the price agreed at the time of making the contract at any time before the date of expiry of the contract. For e.g., if you buy a put option today for stock at a strike price of Rs. 400 and the date of expiration of contract is three months from today, if price of the stock falls to Rs. 300 during that period but you can sell the stock at Rs. 400. On the other hand if the prices of the stock rises more than Rs. 400, you can make choice of exercising the contract or not.

STOP TO CONSIDER

Options derivative contract gives the holder the exclusive right but not the obligation to buy or sell the asset. There are two types of options. One is Call option and the other one is put option. Call option contract provides the holder of the asset the exclusive right but not the obligation to buy the asset at the price agreed earlier on or before the date of expiration of the contract. On the other hand, in put option the option holder has the right but not the obligation to sell the asset at the price agreed at the time of making the contract at any time before the date of expiry of the contract.

Check your progress

1. **What are the types of derivatives?**
2. **Differentiate between forwards and futures contracts.**
3. **Mention some advantages of derivative trading**
4. **Mention the participants of derivatives market.**
5. **Who are the hedgers in derivative trading?**

1.9. Summary:In this chapter we have learned the following –

- We all know that financial markets are volatile. As a result, a huge fluctuation in the prices of financial instruments, interest rates, exchange rates etc. is witnessed in different financial markets around the world. To reduce the magnitude of risk and protect one from the uncertain financial losses, some new concept has emerged in the world of finance. Derivative is one of them. Financial derivatives or derivatives are

the newly developed instrument to protect the investors against adverse moment of changes in future prices to minimize the extent of financial risk.

- The word ‘derivative’ comes from the verb ‘to derive’, originated in mathematics, which means it has no independent value. In the word of finance, derivative is a financial product the value of which is derived from another product. Derivatives are financial contracts whose value is derived from the value of an underlying asset.

- The Securities Contracts (Regulations) Act,1956 defines derivatives as “derivative includes the following-
 - A security derived from a debt instrument, share, loan (whether secured or unsecured), risk instrument or contract for differences or any other form of security;
 - A contract which derives its value from the prices or index of prices of underlying securities.

- Derivatives have been used by the people for a very long period of time. For centuries, these contracts are used by the Roman emperors, farmers and merchants to hedge price risk. Forward contract, a type of derivative contracts, was existed in ancient Greece and Rome. In Mesopotamia, it was said that the king passed a verdict in case of insufficient rain which resulted insufficient production of crops, the lenders would have to relinquish their debt to the farmers and thus the farmers were given a put option (a type of derivative) by the king. In 19th century the derivatives become more popular with the establishment of first formal commodity exchange market called ‘Chicago Board of Trade’(CBOT) in America. This market was established by the farmers of America after realizing the importance of derivative contracts in 1848. Later, this market evolved into the first ever derivative market. Before that, in early 1700, the first organized commodity exchange was set up in Japan. In 1919, the Chicago Mercantile Exchange (CME), a spin- off of CBOT was formed. The currency futures were the first financial futures emerged in U.S in 1972. A separate board called Chicago Board Options Exchange (CBOE) was set up in 1973 to trade stock options. Gradually options trading become popular and in 1975 American Stock Exchange (AMEX) and Philadelphia Stock Exchange (PHLX) started trading options. With the introduction of floating rates for currencies in the international financial market has opened the door for development of financial derivatives.

- There are four major types of financial derivatives which are generally taken into account. These are-
 - Futures
 - Forwards
 - Options
 - Swaps

- **Futures:** These are the most constricted derivative contract amongst all the derivatives. Futures are the standardized contract between buyer and seller to buy or sell something at a future date with a previously decided price. Futures are standardised contracts and traded on a stock exchange where prices are settled on daily basis.
 - **Forwards:** Forwards contracts are more or less similar to future contract. Here also settlement takes place on a specified date set in advance at an agreed price between the parties. These are over-the-counter contract and not traded in stock exchange.
 - **Options:** Options contracts are different from the first two types of derivatives. Options binds only one party to carry on the contract and let the other party to take decision regarding the execution of the contract on a later date.
- 5) **Swaps:** These contracts enable the parties to swap their financial obligations. Interest rate swaps are most commonly used. These contracts are not traded in stock exchange. Swaps are of two types-
- **Interest rate swap:** This means exchanging of future interest payments between two parities based on a specified principal amount which helps in providing protection against future losses and smooth management of credit risk in financial institutions.
 - **Currency swap:** Currency swaps occurs when two parties swap an equal amount of money in different currencies. Here, the parties in contract exchange the interest payment as well as principal amount in different currencies.
- **Benefits of derivatives-**
 - Elimination of trade risk
 - Determination of future price of underlying
 - Effective tool for risk management
 - Low cost of trading
 - Parties generally involved derivative market are hedgers, speculators and arbitrageurs
 - **Hedgers:** Hedgers are the people who want to protect themselves against market volatility. In common parlance they are known as risk-averse traders who aim to secure their investment against price fluctuations in the market. Derivatives are best tool for risk management of portfolios for these risk-averse traders.
 - **Speculators:** These people are exactly opposite to the hedgers. Unlike hedgers, the speculators are willing to take more risk. Speculators are known as risk-taker in the market. They enter into derivative contract to extract profit because of future price

movements from the market. They constantly track the market to know whether prices would rise and fall in future and accordingly enter in futures and options contract

- **Arbitrageurs:** They are the people in the derivative market aims to earn profit by taking no exposure. They are the risk-free profit seekers in derivative market. Arbitrageurs generally buy low-price securities in one market and sell them at a higher price in another market.

- Options derivative contract gives the holder the exclusive right but not the obligation to buy or sell the asset. There are two types of options. One is Call option and the other one is put option. Call option contract provides the holder of the asset the exclusive right but not the obligation to buy the asset at the price agreed earlier on or before the date of expiration of the contract. On the other hand, in put option the option holder has the right but not the obligation to sell the asset at the price agreed at the time of making the contract at any time before the date of expiry of the contract.

1.10. References and suggested reading

1. Pathak, B. *Indian Financial System*. Pearson Publishers
2. Kevin, S. *Security analysis and Portfolio management*, PHI learning

1.10. Model Questions

1. What do you mean by financial derivate? Explain the reasons for growth of derivatives market in India.
2. Write down the difference between forwards and futures contract.
3. Write a short note on derivative market participants.
4. How do you differ futures from options?
5. What are options? Discuss the types of options trading.
6. Write a note on evolution of financial derivatives.
7. Discuss the benefits and drawbacks of derivative trading.

1.11. Answer to check your progress

1. The word 'derivative' comes from the verb....., which means it has no independent value. (Fill in the blank)
2. Value of derivatives is derived from the value of (Fill in the blank)
3. Options are of types. (Fill in the blank)
4. Futures are traded in stock exchange. (State whether it is True or false)
5. Trading in derivatives has no drawbacks (State whether it is True or false)

6. are the people who want to protect themselves against market volatility (Hedgers/ speculators) choose the right one.

Block 6

Unit 2:

Portfolio management using Futures and options

Contents:

- 1.1 Introduction
- 1.2 Objectives
- 1.3 Overview of Future as a financial derivatives
- 1.4 Overview of options as financial derivatives
- 1.5 Meaning, definition of Portfolio Management
- 1.6 Uses of Future in portfolio Management
- 1.7 Uses of options in portfolio Management
- 1.8 Summing Up
- 1.9 References and suggested Readings.
- 1.10 Model questions

1.1 Introduction

Financial instruments are one of the vital components of the Indian financial system. Financial instruments or financial Assets can be classified into different categories such as cash instruments, derivatives instruments and foreign exchange instruments, etc. A derivative is one type of financial instrument that value is dependent on its underlying assets like resources, currencies, stock, bonds and stock index etc. The most common example of derivatives is forward, future, options and swaps.

Future is one of the financial derivatives in which one agreement is made between buyer and seller to buy and sell an asset at a predetermined price at some point of time in future. An option is also another type of financial derivative in which one party agrees with another party to buy or sell an asset at a specified price before a future date. An option gives the right to buyer and seller to execute their agreement. There are two types of options- call option and put option. The call option gives the right to the buyer to buy the assets; the put option gives the right to the seller to sell the assets.

Portfolio management refers to the arts and science of choosing and overseeing a group of investments that can fulfill the long term financial goals of the investors; at the same time, it can manage the risk of the investor. People have lots of options for savings or investing their surplus amounts of money. The investor who can't tolerate the risk, are always happy to invest in the financial instrument with fixed return and low risk or risk-free. The rate of return of these types of financial assets is reducing day by day. It arise the interest among the investors to invest in different capital market instruments like stocks, bonds and derivatives etc. There is always a risk for the investors to invest in the capital market instruments. Investing in capital market instruments requires lots of knowledge and time. It becomes though for the marginal investors to spend huge amount of times as well money. There are some institutions that collect the funds

from the small and marginal investors and invest the funds in the different capital market instruments of different sectors for getting the maximum return with minimum risk. These organizations are most commonly known as assets management companies. Now a days the importance of Assets management companies increasing, as they can provide an adequate amount of return with minimum risk. This can only possible only for managing the portfolio which means instead investing the in the same company in the same sector, investing the money in different companies of different sectors. With the passes of time, along with this mantra, the assets management companies are using some other tools in their portfolio for diversify the risks. Derivatives and options in particular have gradually established themselves as common tools in portfolio management for asset allocation, hedging, diversification, and/or leverage.

1.2 Objectives

This unit attempt to focus on the uses of financial derivatives - future and options for portfolio management. After going through this particular unit, the student will be able to

1. Understand the concept of future and options as financial derivatives.
2. Analyses the uses of futures for the portfolio management
3. Analyses the uses of options as a tool of portfolio management.

1.3 Overview of future as a financial derivative

A feature is standardized form of forward contract and it is traded in the stock exchanges. It is financial instrument in which the contract has made between buyer and seller to buy or sell an underlying asset or commodities at predetermine price in a specific period in future. The underlying assets in future contract can be stock, bonds, currencies, commodities, interest rates and precious metals like gold, silvers etc. The buyer of a futures contract has a long position and commits to buying the underlying asset and whereas the seller of the future contract has a short position; committed to sells the underlying assets at a specified price a specified period in future (Roger.G, 2013). Future contract can be categories in to different types – stock index future contract, interest rate future, bond index future and cost of living index future etc. In future contract both the parties has obligation to exercise the transaction whether the current price is more or less than the strike price. For example: if Mr. A is oil producer wants to sell a certain quantity of oil to buyer through future contract. The producer has to sell the specific quantity of oil to the buyer at predetermined price on the date of expiry of the contract. On the date of expiry of the contract if the market price of the oil is more that the agree price, then the producer is suffering loss and buyer is earning profit from the future contract. The profit and loss of future is always depending on the price of underlying assets. Future contract can be used by buyers and sellers for speculation as well as for hedging purpose. Many investor are using future contract as a tool of price discovery.

They are two types of future contract namely:

1. Commodity Future: In commodity future, the underlying assets are commodity or physical assets like wheat, cotton and other agriculture produced.

2. Financial Future: In financial future, the underlying assets are financial assets such as shares, foreign currencies, bonds and stock index etc.

1.3.1 Following are the characteristics of future contract.

1. Future contracts are traded in the stock exchanges.
2. It is standardized from in the terms of quantity and quality.
3. The buyer and the seller has obligation to buy and sell underlying assets at set price in a specific date in the future period.
4. The future exchange work as a clearing house in case of future contract. In futures contract, the obligation of the buyer and the seller is not to each other but to the clearing house in fulfilling the contract, which ensure the elimination of the default risk on any transaction.

1.4 Overview of option as financial derivatives:

An option is another type of financial derivative in which the buyer and seller have the right to execute the contract, but don't have any obligation to exercise the contract. Options are two types – call option and put option. In the call option, the buyer has the right to buy underlying assets, but no obligation to buy. And in case of put option, the seller has the right to sell the underlying assets at a predetermined price, but not the obligation to sell the underlying Assets. This can easily understood with the help of the following figure. The profit of an option is unlimited for the purchasers and limited to the writers of the options i.e. premium only. However, the loss of the purchaser is limited to premium, but the loss of writer is unlimited.

The three terms mostly used in option contract i.e. at the money, in the money and out of the money. The term in the money concept means if the strike price of the option is less than the o For example: If Mr. A purchases a call option at the strike price of Rs, 500 and on the maturity of the option contract if the price of the stock is Rs. 550, as a result Mr. A exercise the contract and gaining the amount of Rs. 50 (550-500). It is a in the money option because Mr. A has to pay less amount than the current market price of the stock. The term at the money refers if the strike price of the stock is equal to the current market price of the stock. For example- if the Mr. A purchase a call option of Rs. 100 and on the maturity date of the contract if the price of the stock Rs 100, then he may or may not be exercise the contract. If he exercises the option, he doesn't need to pay premium, but if he doesn't exercise the option; he has to pay the premium. Out the money option means when the strike price of the stock is lesser than the current market price and the investor exercise the option, then the option is known as out the money option.

Options:

	Call Option	Put option
Buyer	Right to buy the underlying Assets	Right to sell the underlying Assets
Seller	Obligation to sell the underlying Assets	Obligation to buy the underlying Assets.

*Figure no 1.1***1.4.1 Features of Option:**

1. Option has two basic types i.e. call and Put option
2. Option has strike price which is also known as exercise price. It is the price at which the investors can buy or sell the underlying assets.
3. Option contract has specific maturity period. Some option can be exercised before the maturity period and some option can be exercise only the date of maturity.
4. Option gives the right to the investor to exercise the contract, not obligation to exercise the contract. Call option gives the right to the investor to buy the underlying assets and put option give the right the investors to sell the underlying assets.
5. Most of the time, risk of the option contract is limited to premium only.

SELF ASSEMENT QUESTION

Try yourself to find out the differences between the future as financial derivatives and option as financial derivatives.

Stop to consider

Both Future and option are two very important and commonly used financial derivatives in the financial market. The investors are using these derivatives for both hedging and speculative purposes. Both are very much similar, because they are two parties who agree to buy and sell the underlying assets at a predetermined price at the specific period in the future. But there are differences between these two derivative instruments, in the futures contract the investor has right as well as the obligation to exercise the contract on the expiration date. It means that the both parties have to buy or sell the underlying assets at the predetermined price at the specified date in future. Whereas the option has gives the right to exercise the contract, but they don't have any obligation to exercise the contract. Call option gives the right to investor to buy the underlying assets, but not obligation to buy the underlying assets. And put option has give the right to investors to sell the underlying the assets at predetermined price, but not obligation to exercise the option contract. However the investors have for both the option has to pay premium to the writer of the option for not exercising the option. The risk of the option is generally limited to the premium only.

1.5 Meaning, Definition of portfolio management:

1.5.1 Meaning:

The term portfolio management refers the art and science of choosing an investment mix and policy, matching investments to objectives, allocating assets for individuals and institutions, and managing risk and performance. It is very difficult for the investors to take decision for choosing the best possible avenues. It requires lots of times and money for selecting the best possible avenues for the investment. We all know that the investment with high return always bears the high risk. The portfolio management is the tools which can be managed the risk and return by investing in the different investment avenues instead of investment in one company under the one Industry. Assets management companies are investing in the different securities of different companies under the different industries for diversify the risk with adequate return.

1.5.2 Definition of portfolio Management

Different authors have defined the portfolio management in different ways. Some of the important definition of the portfolio management has given below.

Morgan Stanley's Dictionary of Financial Terms offers the following explanation: —If you own more than one security, you have an investment portfolio. You build the portfolio by buying additional stocks, bonds, mutual funds, or other investments. Your goal is to increase the portfolio's value by selecting investments that you believe will go up in price (Seth).

According to modern portfolio theory, you can reduce your investment risk by creating a diversified portfolio that includes enough different types, or classes, of securities so that at least some of them may produce strong returns in any economic climate (Seth).

Thus, this explanation contains a number of important ideas: (Seth).

- A portfolio contains many investment avenues.
- Owning a portfolio involves making choices i.e. deciding what additional stocks, bonds, and any other financial instruments to be added; when to buy; what and when to sell; and so forth.
- Making such decisions is a form of management.
- The management of a portfolio is goal-driven. For an investment portfolio, the specific goal is to increase the value.
- Managing a portfolio involves inherent risks.

Check your Progress

1. Explain the meaning of financial derivatives.
2. Discuss the importance of financial derivatives in the financial market.
3. How do you define the portfolio Management?

1.6 Uses of futures in portfolio Management:

Futures can be used in moderate way to control the risk of investment. There are different strategies in future contracts are adopted for reducing the risk. Some of the important strategies uses for the future contract have discussed below.

1. **Going long:** It is one of the most basic future strategy in which the investor purchase a future contract. The basic reason of purchasing the future contract is that the investor is expecting to increase price of the underlying assets by expiration. Going long on a futures contract delivers the inherent promise of a leveraged return on the underlying asset's growth. This futures trading technique has unlimited upside as long as the asset appreciates, making it a possible home run. If the value of the underlying asset falls down, the investor may have to put up more money to keep the position open (Royal, 2019).
2. **Going Short:** Going short is another type of future trading strategy. In this strategy the investors sells the future contract. The investors are expecting the value of the underlying assets will fall, so they are selling the future contract. It is the reverse side of the going long strategy. Going short has many of the same advantages as going long, most notably the leveraged return on the depreciation of the underlying asset. However, unlike a long

position, going short has no limit on the amount of money investors would lose (Royal, 2019).

3. **Bull Calendar Spread:** In this future strategy, the investors are buying and selling the future contract on same underlying assets with different expiry date. The investors are generally applying this strategy, when they expect the buying future contract moves up comparatively more than the selling future contract. The bull calendar spread appeals because it helps the investors to achieve significant profits on a conservative strategy with smaller margin. This smaller margin helps juice investor's percentage return (Royal, 2019).
4. **Bear calendar spread:** As like the bull calendar spread, in this strategy also the investors are buying and selling the future contract on same underlying assets with different expiration. The difference is that the investors apply this strategy when they expect the selling future contract to increase comparatively more than the buying future contract. The bear calendar spread appeals because it helps to make the investors good money with a conservative strategy while the broker requires smaller margin. With a lower margin, investors can increase their percentage return on a successful deal (Royal, 2019).

Stop to consider

Futures are one of the most advanced and sophisticated segments of the derivatives markets, with the potential for massive gains and leverage. There are different types of future trading strategies are available in the derivatives market with different risk and rewards. These strategies are basically used for maximizing the return and minimizing the losses of the future contracts. Futures traders can go with long or buying a futures contract and short or selling a futures contract. All other futures trading methods are built around these two fundamental trades, and traders can use spreads and other tactics to decrease risk depending on how they think the underlying asset will perform.

1.7 Uses of options in portfolio Management:

There are numbers of option strategies which can use in portfolio management. These strategies are:

Sl. No	Name of the option strategies	Sl. no.	Name of the option strategies
1	Long call	12	Long strangle
2	Short call	13	Short strangle
3	Synthetic long call: buy stock, buy put	14	Collar
4	Long put,	15	Bull call spread strategy: buy call option, sell call option
5	Short put	16	Bull put spread strategy: sell put option, buy put option,
6	Covered call, long combo: sell a put, buy a call,	17	Bear call spread strategy: sell ITM call, buy OTM call,
7	Long Combo : Sell a put, buy a call	18	Bear put spread strategy: buy put, sell put
8	Protective call / synthetic long put	19	Long call butterfly: sell 2 ATM call options, buy 1 ITM call option and buy 1 OTM call option
9	Covered put,	20	Short call butterfly: buy 2 ATM call options, sell 1 ITM call option and sell 1 OTM call option
10	Long straddle	21	Long call condor: buy 1 ITM call option (lower strike), sell 1 ITM call option (lower middle), sell 1 OTM call option (higher middle), buy 1 OTM call option (higher strike);
11	Short straddle	22	Short call condor: short 1 ITM call option (lower strike), long 1 ITM call option (lower middle), long 1 OTM call option (higher middle), short 1 OTM call option (higher strike).

ITM- In the money; OTM= Out of the money and ATM= at the money

1.7.1 All the aforementioned strategies are discussed below in brief:

1. **Long call strategy:** long call strategy means buying a call option only. In long call option, the investor has right to buy the option, but not obligation to buy. It is one of the most simple option strategies to understand. The investor is very much bullish in long call strategy. The investors can earn profit in long call if the current market price of the underlying assets is more than strike price. Because the investor can buy the underlying assets less than the market price. The profit of the investors is unlimited and risk of the investors is limited to premium amount only. Break -even point = Strike price +premium (NSE, 2009).
2. **Short Call strategy:** Generally call option means the investor has right to buy the underlying Assets at the strike price, but not obligation to purchase. Short call strategy just opposite to long call strategy. In case of short call, the investors are very aggressive and bearish about the underlying assets. The investor feels that the price of the underlying assets will be fall. The profit of the option is limited to the amount of premium and loss of the option is unlimited. The break-even point of the option= Strike price+ Premium (NSE, 2009).
3. **Synthetic long call: buy stock, buy put:** Generally when the investors are very bullish about the underlying Assets, he purchases a call option. If the price of the underlying assets will fall down, then the investor will suffer losses. For reducing the risk, the investor buy put on the stock as an insurance against the price fall. The investor can earn profit, if the price of the underlying assets will rise. And if the price of the underlying assets will fall, the investor can exercise the put option. The profit of the strategy is unlimited and loss is limited to $\text{Stock price} + \text{Put Premium} - \text{Put Strike price}$ (NSE, 2009).
4. **Long put strategy:** It is a bearish strategy. Long put gives the right to the investor to sell the underlying assets at the strike on the date of maturity of the option. The investor has no obligation to sell the underlying assets. The investor of the option is very bearish about the underlying assets. It is a just opposite of call option. The investor can earn profit if the spot of the underlying assets is less than the strike price and profit of the option is unlimited. Risk of the strategy is amount of premium paid (NSE, 2009).
5. **Short put strategy:** Short put is the opposite of long put. The investor who sells put is very bullish about the underlying assets and expected that the price of the underlying assets will rise, and he can earn the premium. The risk of the strategy = $\text{Put Strike Price} - \text{Put Premium}$ and $\text{BEP} = \text{Put Strike Price} - \text{Premium}$ (NSE, 2009).
6. **Covered call:** In the case of covered call, the investor purchase stocks simultaneously with sell a call at a strike price. The profit of the option strategy is call strike price-amount paid for purchasing stock) + Premium received. The risk of the strategy is unlimited. If the price of the stock falls to zero, then he losses the entire value of the stock but he can retain the premium amount (NSE, 2009).
7. **Long combo: sell a put, buy a call:** It is a bullish strategy. The investors, who are expecting to raise the price of the underlying assets, use this strategy. This strategy

involves selling an Out of the money (lower strike) Put and buying an out of the money (higher strike) Call. The profit on this option is unlimited and risk is also unlimited.

- 8. Protective call / Synthetic long put:** The investors are generally apply the strategy when they believes the market will go down but also want to protects unexpected rise in the price of the underlying assts. The risk of the option is limited and profit is up to Maximum is stock price- call premium (NSE, 2009) .
- 9. Covered put:** The investors are basically applying this strategy when he believes the market is moderately bearish. The covered put strategy is just opposite of covered call strategy. A Covered Call strategy is neutral to bullish, whereas a Covered Put approach is neutral to bearish. The risk of the option strategy is unlimited if the price of the underlying assets rises substantially. And profit of the option is = (sales price of the stock- strike price) + Put premium (NSE, 2009).
- 10. : Long straddle:** This long Straddle strategy applies when the investors view that the price of the underlying assets is expected to show large movement in near future. This technique entails purchasing both a call and a put on the same underlying assets for the same maturity and strike price in order to profit from a movement in either direction, a rising or falling the value of the underlying assets. If the price of the underlying assets rises, the call is exercised, and the put expires worthless; if the price of the underlying assets falls, the put is exercised, and the call expires worthless. The profit from the strategy is unlimited and risk of the strategy is limited to the initial premium paid (NSE, 2009).
- 11. Short Straddle:** The opposite of a Long Straddle is a Short Straddle. It is a method to use when an investor believes the market will not move much. He sells a Call and a Put with the same maturity and strike price on the same underlying assets. It generates a profit for the investor. Because neither the Call nor the Put will be exercised if the underlying assets does not move considerably in either direction, the investor keeps the Premium. However, if the underlying assets swings dramatically in either way, up or down, the investor's losses can be substantial. The risk of the option strategy is unlimited and gain is limited to premium received (NSE, 2009) .
- 12. Long Strangle:** A Strangle is a Straddle with a little tweak to make it easier to execute. This method entails buying an out-of-the-money (OTM) put and an out-of-the-money (OTM) call on the same underlying stock assets an expiration date at the same time. The investor is directional neutral here as well, but is seeking for higher volatility in the stock/index and big price movement in either direction. Because OTM options are purchased for both Calls and Puts, executing a Strangle is less expensive than executing a Straddle, which typically uses ATM strikes. Because a Strangle is less expensive to start than a Straddle, the returns could be higher. The risk of the option strategy is limited to initial premium paid and profit is unlimited (NSE, 2009) .
- 13. Short Strangle:**

The Short Strangle is a variation of the Short Straddle. It seeks to increase the profitability of the deal for the option seller by expanding the breakeven points so that the underlying assets must move significantly more for the Call and Put option to be worth executing. This strategy entails selling an out-of-the-money (OTM) put and an out-of-the-money (OTM) call on the same underlying assets and expiration date at the same time. Because OTM calls and puts are sold, the net credit obtained by the seller is often less than a Short Straddle, but the break even points are also widened. For the Call to work, the underlying stock must move sufficiently and the Put to be worth exercising. If the underlying asset does not move much, the seller of the Strangle gets to keep the Premium (NSE, 2009).

- 14. Collar:** A Collar is similar to a Covered Call but adds a second leg: buying a Put to protect against the stock's price falling. It's a protected call with a minimal risk. So the term collar is buying a stock, insuring against the downside by buying a Put, and then partially financing the Put by selling a Call. The risk and profit of the option strategy is limited only (NSE, 2009) .
- 15. Bull call spread strategy: buy call option, sell call option:** This option strategy made of buying one in-the-money (ITM) call option and selling another out-of-the-money (OTM) call option. The call with the lower strike price is frequently in-the-money, whereas the call with the higher strike price is frequently out-of-the-money. The underlying security and expiration month for each call must be the same. The strategy's overall effect is to reduce the cost and breakeven point of a buy Call (Long Call) Strategy. Because the investor will only profit if the underlying assets rise, this approach is used when the investor is somewhat bullish to bullish. The investor suffers lose (cost of the trade) if the stock price falls to the lower (bought) strike, and earns profit (cost of the trade) if the stock price rises to the higher (sold) strike (NSE, 2009).
- 16. Bull put spread strategy: sell put option, buy put option:** When the stock or index is either range bound or climbing, a bull put spread can be advantageous. The idea is to protect the downside of a sold Put by purchasing a lower strike Put that functions as insurance for the Put sold. The lower strike Put acquired is further OTM than the higher strike Put sold, resulting in a net credit to the investor because the Put purchased (further OTM) is less expensive than the Put sold. This approach is similar to the Bull Call Spread, except it is used to generate a net credit (premium) and revenue. If the stock or index rises, both Puts will expire worthless, and investor can only retain the premium (NSE, 2009) .
- 17. Bear call spread strategy: sell in the money call, buy out of the money call:** Investors apply this strategy, when they feel that the price of the underlying assets will either range bound or falling. Under the option strategy, Investors buy out of the money call option and simultaneously sell a in the money call option of same underlying assets. The risks of the option strategy is limited to the differences between the two strike prices minus the

net premium and profit of the strategy limited to premium received from the short call minus premium paid for the long call (NSE, 2009).

- 18. Bear put spread strategy: buy put, sell put:** When the investors are moderately barriers about the market direction, generally apply this option strategy. This option strategy constitutes buy at in the money put option and sell out of the money put option of the same underlying assets with the same expiry date. The risk and return of the strategy is limited only. The risk of the strategy = Premium paid for the long position- premium received from the short position. And reward of the strategy is limited to differences between two strike prices – the premium paid for the two positions (NSE, 2009) .
- 19. Long call butterfly: sell 2 at the money call options, buy 1 in the money call option and buy 1 out of the money call option:** Investors are generally adopting the strategy when the investors are neutral about the direction of the market and expecting little movement in the value of the underlying assets. This strategy includes selling of two at the money call options and buying one in the money call option and one out of the money call option. The maximum gain in the strategy is limited and gain takes place when the underlying assets at the middle strike at expiration.
- 20. Short call butterfly: buy 2 at the money call options, sell 1 in the money call option and sell 1 out of the money call option:** It is just opposite of long call butterfly. Investors are applying the strategy for the volatile markets. This strategy consist of buy of two at the money options and sell one in the money and one out of the money call option. Both risk and return of the strategy is limited (NSE, 2009).
- 21. Long Call condor:** The investors are adopting the strategy when they believe that the underlying market will trade in a range with low volatility until the options expire. This option strategy constitute of buy one in the money call option, sell one in the money call option, sell one out of the money call option and buy one out of the money call option. The risk and gain of the option strategy is limited. If the stock/index remains range bound and shows little volatility, the ensuing position is profitable. The investor can earn maximum profit if the stock closes between the middle strike prices at expiration (NSE, 2009).
- 22. Short call condor:** A Short Call Condor is a tactic that is quite similar to a short butterfly. The distinction is that the strikes on the two middle bought options are different. In a volatile market, the strategy works well. The strategy includes selling one in the money call option (lower strike), buying one in the money call option(lower middle), buying one out of the money call option (higher middle) and selling one out of the money call option (higher strike). The risk and reward of the option strategy is limited. The profit of the strategy takes place when the market price of the underlying assets very high volatility and there is a big move in the price of the underlying assets. The maximum profit takes place if the underlying asset closes on either side of the upper or lower strike prices at expiration (NSE, 2009) .

SELF ASSEMENT QUESTION

Try yourself to identify the best option strategy when the market is very much volatile and also find out the reason of choosing the specific option strategy from the above discussion.

Stop to consider

Option strategies in portfolio management:

Derivatives and options, in particular, have grown in popularity as asset allocation, hedging, diversification, and/or leverage tools in portfolio management. Their non-linear pay-offs allow investors to generate return profiles that are impossible to achieve with traditional investment vehicles like equities and bonds alone. As a result, their growing visibility has been accompanied by a slew of promises about their ability to boost payouts while lowering risks.

There are various option strategies that can be applied by the investors for minimising the risks and maximising the profits from their investments. The selection of the strategy is depends on the direction of the market and volatility in the price of the underlying assets. Some of the most common option strategies are: long call, short call, long put, short put, long strangle, short strangle, long straddle and short straddle. Some of the option are very similar to each other like collar is similar to covered call, long call condor is very similar to long butterfly option strategy and short call condor is also very similar to short butterfly option strategy. Like similarities, there are some option strategies which are just opposite of each other i.e. long put is opposite of long call, short put is opposite of long put, covered put is opposite of covered call, short straddle is opposite of long straddle, short call butterfly is

Check your Progress

1. Discuss the roles of future strategies in the portfolio Management
2. Describe the uses of option strategies in the portfolio management
3. Write a note on
 - a) Long call
 - b) Long put
 - c) Short call
 - d) Short put.
4. Explain in details any four option strategies.

1.8 Summing Up

Financial derivatives both future and options are using as a tools of portfolio management. A futures contract is an agreement between a buyer and a seller to trade an asset or commodity at a certain time in the future. The most popular futures contracts are traded on regulated exchanges and have standardized contract specifications governing how much of a security is to be bought or sold, when transactions will take place, what features the underlying security must have, and how delivery or transfer of the security will be handled. A futures contract has many of the same qualities as an option contract, but an option is not the same as a futures contract. The buyer of an option contract has the right, but not the responsibility, to buy or sell a security at a set price at a specific date in future. An option contract's buyer has limited liability and can only lose the premium or price paid for the option. The seller of an option, like the parties to a futures transaction, bears limitless liability. As a result, as with a futures contract, the option seller is frequently required to post margin (Clarke Roger G., 2013). The investors can apply the different future and option strategies for minimizing the risk and maximizing the return from their investment. But the selection of the strategy is differing from the market condition to condition (Roger.G, 2013).

1.9 Suggested Books:

1. Prasana, C. (2019). *Investment Analysis and Portfolio Management* . Mc Graw Hill.
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1.10 Model questions:

1. What is Future Contract? State the characteristics of Future contract.
2. What do you mean by option contract? Mention the characteristics of Option contract.
3. Distinguish between future contract and option Contract.
4. Explain different types of future strategies.
5. Discuss the different types of option strategies.
6. Discuss the options strategies that apply in bullish the market.
7. Discuss the option strategies that are applied in bearish market.
8. “Option plays an important role in the portfolio management” – Elaborate it.

Answer to Check Your Progress

1. Explain the meaning of financial derivatives:

Answer: Refers to point no. 1.1 Introduction.....

2. Discuss the importance of financial derivatives in the financial market

Answer: Refers to paragraph 3 of point no 1.1 Introduction

3. How do you define the portfolio Management?

Answer: Refers to point no 1.5.1

4. Discuss the roles of future strategies in the portfolio Management

Answer: Refers to the point no. 1.6

5. Describe the uses of option strategies in the portfolio management.

Answer: Refers to the point no. 1.7