M.Com. IV SEMESTER

COURSE- MC 401

Security Analysis & Portfolio Management

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DSC

Lesson 1-15

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CONTENTS

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MC 401: SECURITY ANALYSIS & PORTFOLIO MANAGEMENT

Max Marks: 80

Internal Assessment: 20

Note: There will be Ten (10) questions in all spreading into Five Units consisting of two questions from each unit. The candidate will be require to attempt one question from each unit. Each question will carry Sixteen (16) marks.

Course Objective: To equip the students with essential tools, techniques, models and investment theory necessary for analyzing different types of securities, making sound investment decisions and optimal portfolio choice.

COURSE CONTENTS

UNIT-I

PORTFOLIO ANALYSIS: Estimating rate of return and standard deviation of portfolio. Effect of combining the securities, Markowitz Risk-return optimization.

PORTFOLIO PERFORMANCE EVALUATION: Measure of return risk adjusted measures of return, market timing, evaluation criteria and procedures. Investment policies of individuals, Tax saving schemes in India.

UNIT-II

Fundamental Analysis, Technical Analysis and Efficient Market Hypothesis.

UNIT-III

SINGLE INDEX MODEL OR MARKET MODEL: Portfolio total risk/ portfolio market risk andunique risk, Simple Sharpe's optimisation solution.

UNIT-IV

CAPITAL-MARKET THEORY: Capital market line, security market line, risk free lending andborrowings.

UNIT-V

FACTOR MODELS: Arbitrage pricing theory, two factor and multi-factor models, Principle ofarbitrage, arbitrage portfolios.

SUGGESTED READINGS:

Fischer, D.E. and Jordan R.J., Security Analysis and Portfolio Management, Prentice Hall,1983.

Reilly, F.K., Investment Analysis & Portfolio Management, Drygen Press, 1985.

CHAPTER – 1

ELEMENTS OF INVESTMENT

Structure:-

1.0 LEARNING OBJECTIVES

After reading the chapter, you will be able to:-

- Describe the types of assets available for investment
- Understand the concept of risk assessment with investment
- Describe the sources of investment information

1.1 INTRODUCTION

Investment is the commitment of funds for a period of time with the expectation of

receiving more than the current outlay. The returns could be in the form of annual income and/or appreciation in price. Many readers would already have studied investment analysis from the perspective of the firm. Inthis chapter, we will examine financial decisions from the perspective of persons investing in corporate securities and other assets. These could be individuals, societies and trusts, mutual funds etc.

Why invest? While the reasons for investing are unique to each individual, common reasons could be to have money for emergencies, to beat inflation, buy a car or house, pay for education, indulge in travel and hobbies, to give to children or charity and for retirement. It is important for each investor to have a financial plan in order to achieve these goals.

Various types of assets are available for investment such as land, buildings, fixed deposits, shares, bonds, gold etc. As investors, we need to understand the implications of investing in various assets, and the associated risks and returns. Most investors hold a combination of assets, known as a portfolio. Since, a portfolio may have different risk and return characteristics as compared to the simple aggregation of its component assets, we also need to analyse the risk/return characteristics of portfolios and select portfolios suited to individual risk and return preferences. As individual needs and the risk and return of the portfolio change over time, the selected portfolio needs to be reviewed periodically and revised if necessary.

1.2 TYPES OF ASSETS

Assets can be broadly classified into tangible assets, financial assets and intangible assets. Tangible assets consist of real/physical assets such as buildings, land, precious metals, commodities and luxury or collector's items. Financial assets/paper assets represent a claim on physical assets or future cash flows. They include savings deposits, fixed deposits, cash back insurance policies, shares, bonds and derivative instruments. Intangible assets include patents, trademarks, goodwill etc. Some assets such as collector's items may have more sentimental value than financial value. In this chapter, we will be concentrating on financial assets, although majority of the concepts and techniques can also be applied to real assets.

Financial assets can be further divided into debt and equity, based on the timing and nature of expected cash flows. Debt is a fixed period loan, which comprises of periodic or cumulative interest payments and return of the principal on maturity. Equity, on the other hand, represents ownership of a company, where returns are received in the form of dividends and

capital appreciation. Over the years, a variety of financial instruments have evolved in response to the needs of borrowers and investors.

Financial assets can be held in the form of personal contracts or in the form of securities. In personal contracts, the amount of money invested, rate of interest and period of deposit etc. are based on mutually agreeable terms between the borrower and the lender. For example, the bank announces interest rates applicable for various periods and amounts invested, while the investor decides the amount of money and time period for his deposit. The principal is paid back on maturity or on premature withdrawal with a penalty. Such deposits normally cannot be sold or transferred to a third party. Securities on the other hand, are issued in fixed denominations and are fungible (each unit is indistinguishable from the other) and tradable. Examples of securities include shares and bonds.

The choice of investment depends on many things including the investment period, the amount of money available for investment, need for liquidity, current income versus capital appreciation, tax considerations and ability to take risk. The features of some commonly held assets are briefly describedbelow:

Tangible Assets

Real Estate can be viewed as an investment that provides regular income in the form of rental and appreciation in value. In India, there is scarcity of land and the value of property normally appreciates in the long run. The rate of appreciation and rental depend on whether the property is commercial or residential, the city/town and exact location. Since all individuals require housing services, one way to hedge against fluctuations in rentals is to purchase a house. Tax benefits are available on payments for housing loans; self-occupied houses are also given concessions in property tax. However, real estate requires a large investment and may need to be financed. The disadvantagesare that it cannot be liquidated in parts, it also takes time and effort to sell because each property is unique. At the time of purchase, the buyer must ensure that the title deed is genuine, and provide for transaction costs such as stamp duty and brokerage. After purchase, arrangements need to be madefor its physical safety to prevent encroachment, fire, theft of contents etc. Although property forms a major part of the investment portfolio for many individuals, there is no historical data on property returnsin India due to the lack of transparency. ***Real Estate Investment Trust*** (REITs) and ***Real Estate Mutual Funds*** recently introduced in India should help overcome many of these disadvantages.

Gold is a very liquid asset that has been traditionally held by central banks all over the world. Gold jewellery is also a common investment in most Indian households. The disadvantage of investment in gold is that it requires expenditure for safe storage and its purity can only be guaranteedif purchased and stored in the form of certified bars. Investors can invest in gold exchange traded fundsto overcome these disadvantages.

Art: Appreciation is value depends on the painter and future demand and supply for the paintings. The market is unorganized and there is the problem of fakes, for which proper documentationand authentication is necessary.

Financial Assets - Personal Contracts

Savings bank accounts offer a safe deposit facility for cash and a nominal interest rate, with facilities for instant withdrawal and transfer. Fixed deposits in banks offer a higher rate of interest. However, the funds are locked in for a fixed period of time and there is a penalty for premature withdrawals. There are also some flexible plans, which combine the features of savings and fixed deposit accounts.

Tax saving instruments u/s 80C

Public provident fund: Contributions to the fund qualify for deduction from income up to the permissible limit and interest and withdrawals are tax free. The disadvantage is the lock in period of 15 years, with limits on loans and withdrawals before maturity.

Pension plans: These are annuity schemes where contributions qualify for deduction in the years when payments are made but the interest and principal are taxable at the time of withdrawal (pension payments).

Insurance: Some life insurance plans build in an investment component, which offer periodic and/ or terminal cash benefits. The returns can be compared with other investments if the payment for pure insurance is deducted from the annual premium before calculating returns.

In all such schemes, the individual investor should consider the alternative investment avenues and decide whether it is better to pay tax and invest elsewhere or invest in these schemes. Theliquidity, and returns and risks of alternative investment avenues need to be considered.

Financial Assets - Securities

Debt Securities: Bonds and debentures are debt securities like loans that offer a predetermined rate of interest for a fixed period. Central government bonds will usually offer the lowest interest among all debt securities as they are risk-free and need to compensate the lender only for the time and the inflation.

State government bonds and municipal bonds would incorporate some premium for risk and offer slightly higher interest rate. Although the probability of default in any government backed bonds is very low, there is lower liquidity in these bonds. Corporate bonds should normally offer higher returns than all the other bonds to compensate for the risk associated with the issuer of the bond. The interest will be based upon the credit rating of the issue, the lower the rating the higher the risk premium. In the corporate bonds, the public sector bonds are perceived to be safer than private sector bonds because of the implicit backing of the government.

Equity shares represent partial ownership in a company. Returns are earned in the form of dividends and appreciation in the value of shares. The equity holders have a residual claim on the earnings and assets of the company; interest and preference dividend are paid before equity dividends and in case the company is liquidated, all other claimants are paid first. Because of this, the returns on equity are normally higher than interest on corporate bonds and preference shares. Preference shares combine some of the features of debt and equity. They normally have no maturity date, and represent ownership in the company like equity shares, but do not have voting rights. They have a fixed dividend payable every year just like interest payments on debt. Normally, dividend is cumulative, i.e. gets added to the amount payable in subsequent periods if not paid when due. The shareholders get voting rights ifdividend is not paid consecutively for three years. Redeemable preference shares are more like debt asthe principal amount is repaid at the end of a fixed period.

Derivatives are financial instruments that derive their value from underlying assets. The underlying asset can be real assets, financial assets, stock market indices, exchange rates etc. Derivatives include futures, options, warrants, convertible bonds, mortgage derivatives and securitized assets.

1.3 RETURN AND RISK

Investors sacrifice current consumption in order to be able to consume more in the future.

The required rate of return therefore depends on the time for which funds are locked up, the expected rateof inflation during that period and risk involved. The real risk-free rate of return can be considered asthe compensation for time. Since inflation erodes the future purchasing power of money, the return has to be higher to account for expected inflation. Investors are also concerned with the safety of their returns, so more risky investments have to offer higher returns to attract investors.

The expected return on any asset depends on the initial outlay and timing of expected cash flows. For debt, the calculation is relatively simple as cash flows are known and fixed in advance. For equity, we need to project future expected cash flows i.e., expected dividends and projected stock price. For both debt and equity, there is a risk that expected return. There could be fluctuation in expected returns in the form of delayed or rescheduled payments or not-payments. The estimation of risk and return is, therefore, a very important part of investments analysis. Realized return can also be higher than expected return if there are unexpected favorable events that result in increased annual payments such as dividends or prices of assets owned.

The absolute and relative returns on assets have varied over the years. In order to be able to forecast returns, we also need to examine the factors that influence returns on debt and equity. This includes the impact of global and country specific economic conditions, the influence of macroeconomicvariables such as inflation and interest rates, oil prices, and the importance of industry and company specific variables. This analysis of information related to economic. Industry, and company - specific data, to arrive at a fair present or future price of a security is known as fundamental analysis.

There are various theories and models that attempt to explain the complex dynamics of risk andreturn. The Efficient Market Hypothesis (EMH) basically asserts that it is not possible to consistently outperform the market by using historical prices, fundamental analysis or even insider information. The Capital asset Pricing Model (CAPM) and the competing arbitrage pricing Theory (APT) describe how assets should be priced relative to risk. We study these theories and their implications and see whetherthey are applicable in the Indian context.

The prices of certain assets such as stocks, commodities and precious metals fluctuate every day. The same asset would give higher profit if purchases could be timed to buy when prices are low and sell when prices are high. Technical analysis claims that a study of past prices

and volumes can help forecast future price movements. Though this is contradictory to the efficient market hypothesis, these techniques have become very popular and are reported in leading economic dailies and finance sites.

Portfolios and Individual Requirements

Investors forgo current consumption in order to have higher income in the future. Most individualinvestors also plan build up capital for security in their old age. Depending on their age, current financialsituation and forecasted earnings, they need to decide on the amount to be saved and the composition of their portfolios. This means they need to determine the proportion to be invested in property, money back insurance policies, shares and bonds etc. and whether to diversify internationally or not. All investors want higher returns while keeping risk at an acceptable level, and investment advisors try to build optimum portfolio for each one. In order to do this, we study the modern portfolio theory and traditional portfolio analysis. We will learn how to combine assets in order to reduce risk and also the factors that should be kept in mind when assessing individual requirements. There is no single prescription available for all investors, each one has to choose based on his or her financial needs, tax status and risk/return preferences.

Mutual Funds

An individual can choose to invest directly or through an institution such as a mutual fund, pension fund or an insurance company. There has been a phenomenal growth in the amount of money being managed by mutual funds in the Indian economy. Institution have the advantage of being managed by professionals, however, returns vary with the type of scheme and the capability of the managers.

1.4 INVESTMENT VS.SPECULATION

It is important at this point to make a distinction between investment and speculation. Investment is the long-term commitment of funds, with the expectation of returns in the form of periodic returns and/or capital appreciation. On the other hand, speculation seeks abnormally high return mainlydue to fluctuation in prices over a very short period, but in the process incurs more risk. An investor seeks to protect his capital with expectation of moderate returns, while a speculator risks his capital for higher returns. Gambling, like speculation, or gambling depending on the motives of the purchaser. An investor may study the fundamental strength of the company

and hold, its share to avail of dividend and capital appreciation over the period of time. A speculator who feels that shares are undervalued and price is likely to rise in the near feature may by then to be sold soon thereafter. The same individual may also act as an investor, a speculator or a gambler at different points of time. We will be study security analysis and portfolio management from the point of view of an investor, though a speculator can also use the concepts and techniques.

While speculator and gamblers act in their own interest in an attempt to make quick profits, they add liquidity (ease of finding a trading partner), to financial markets. They also add to the depth (deep market need very large orders to cause price fluctuations) and breadth (wider distribution of ownership) of the market, which makes it more competitive and efficient. However, speculative purchasing and selling can also make markets more volatile and can lead to market bubbles and crashes.

The Financial System

As investors, we are concerned with what we actually get, i.e., return on investment after taxes and expenses. For example, dividend income is tax free, while interest income is taxable. Investing electronically may be cheaper than placing an order through a broker. The structure of the financial markets, government policies, regulation and tax structure affect the functioning of the market and influence the return on investment. In this text, we will study financial markets within the framework of the Indian system.

1.5 JOBS IN INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT

Careers in finance offer a variety of jobs in corporate finance and in the financial services sector ranging from strategic financial planning to sales. The financial services sector including stock trading, assets management, insurance, private equity, and commercial banking is a fast growing sector in India and the global economy. Knowledge of security analysis and portfolio management is useful for financial planners in any organization including bankers, mutual fund managers, stock brokers, Venture capitalists, insurance companies, depositories, custodians, clearing houses etc. The subject is covered in degree courses in business studies with specialization in finance at the bachelor's level and masters level. Certifications are also available from CRISIL, Institution of Chartered Financial Analysis of India (ICFAI), National Stock Exchange (NSE), Bombay Stock Exchange (BSE) and Association of Mutual Funds of

India (AMFI). Certification is mandatory for certain jobs; for example, any person engaged in marketing and selling of mutual fund products has to pass the AMFI certification test (advisors module) and obtain a registration number from AMFI. Brokers, dealers and salespersons in the derivatives market have to be certified by an institution approved by SEBI. Prospective students should choose appropriate courses keeping in mind their career goals, and the time resources required.

Investment is the commitment of funds for a period of time with the expectation of receivingmore than the current outlay. Various investment avenues are available, which need to be evaluated with respect to the risk, return, liquidity, divisibility etc. There are real assets and financial assets; financial assets can further be divided into debt, equity and derivatives. Financial assets can also half inthe form of personalized contracts and securities. Historical returns for the same class of assets and relative returns between asset classes have varied over time. As investors, we are interested in expected future returns, which we attempt to forecast using fundamental analysis, and theories of risk and return such as EMH, CAPM and APT. As the risk and return of portfolios is not a weighted averageof the individual components, we also study portfolio analysis to optimize the risk return trade-off and learn how to design portfolios to suit individual needs.

In other words, the investment advisor and investor will be in a better position to make rational choices. However, there is no prescription that guarantees the maximum profit. In this world with infiniteinvestment choices that involve a variety of risks and returns, the final decision rests with each individual as to how the tools are to be used, where and when to invert, and whether to invest or not. Even if the money is invested through a mutual fund or an investment advisor each investor has to takeresponsibility for these decisions, because the money to be invested and the consequences of the investment belong to him alone.

Security Analysis requires as a first step, the sources of information, on the basis of which analysis is made. The securities market is a perfect auction market where pre demand/supply pressures determine the price. These demand/supply pressures depend upon the available money and the flow of information. It is in this context that sources of information become relevant. Besides the market analysis and estimate of the intrinsic value around which the market price revolves, would also need an analysis of the flow of information.

1.6 TYPES OF INFORMATION

The types of information, which are relevant for our purpose, are of the following categories:

(i) World Affairs: International factors, which influence domestic, output and employment and for investment in the domestic market by F.F.Is, O.C.B.s etc. Also foreign political affairs, wars, crude oil prices and the state of foreign markets affect our markets.

(ii) Domestic Economic and Political Factors; Gross domestic products, agricultural output, monsoon, money supply, inflation, Govt, policies, taxation, etc., affect our markets.

(iii) Industry information: Market demand, installed capacity, competing units, capacity utilization, market share of the major units, market leaders, prospects of the industry, international demand for exports, inputs and capital goods abroad, import competing products, labour problems and Govt, policy towards the industry are all relevant factors to be considered in investment decision making.

(iv) Company information: corporate data, annual reports, stock exchange publications. Dept, of company affairs and their circulars, press releases on corporate affairs by Govt, industry chambers or associations of industries etc. are also relevant for security prices analysis.

(v) Security Market information; The Credit rating of companies, data on market trends, security market analysis and market reports, equity research reports, trade and settlement data, listing of companies and delisting, record dates and book closures etc. BETA factors, etc. are the needed information for investment management.

(vi) Security Price Quotation: Price indices, Price and volume data, breadth, daily volatility, range and rate of changes of these variables are also needed for technical analysis.

(vii) Data on Related Markets: Such as Govt, securities, money market, forex market, commodities market etc. are useful for deciding on alternatives avenues of investment.

(viii) Data on Mutual Funds: Their schemes and their performance, N A V and repurchase prices etc. are needed as they are also investment.

(ix) Data on Primary Market/New Issues, etc.

1.7 NEED FOR INFORMATION

Investors and Market Analysts depend on the timely and correct information for making investment decisions. In the absence of such information, their decision will depend on hearsay and hunches. In order to enable the correct investment decisions to be made, investors need to know the sources of information. In the fast expansion of the markets, and increasing complexity of economies, the amount of information is also fast growing. The collection of information and its analysis is time consuming and expensive. Beside analysis of the information also requires expertise which all investorsmay not have. The available books on the subject deal with the theoretical aspects and not much practical analysis and down to earth operational aspects. Here, as elsewhere, knowledge is power. As such the investors are left to make decision by hunches and intuition and not on scientific analysis of the data. Those who have better information use it to make extra mileage on such information. It is also possible that insiders who have the information before it becomes public take advantage of it called insiders trading. At present the SEBI has acquired powers to control insider trading, malpractices and rigging up prices in the secondary markets in India, and penalize the offenders.

1. World Affairs: The day-to- day developments abroad are published in Financial Journals likeEconomic Times, Financial Express, Business Line, etc. Some foreign journals, like wall street journal, London economist, and Far East economic Review and Indian journals like, Business India, Fortune India etc. also contain developments of economic and financial nature in India and abroad. IMF News survey, World Bank and IMF Quarterly Journal, (namely, Finance and Development) News Letters of Foreign Banks like those of Grindlays, Standard, etc., contain all the needed information on world development.

2. National Economic Affairs: The daily newspaper particularly financial papers referred to above contain all the national information; Beside Journal like Economics and Political Weekly, Business India, Data line business. Business Today, Fortune India contain the material on economic developments. RBI's Annual Reports, Reports on currency and finance and RBI monthly Bulletins and CMIE reports all contains a wealth of information on the economy and the country. The Economics Survey of the Govt, of India and reports of C.E.O., D.G.T.D. and Dept, of companies, etc. do providethe information on, economy, industry, trade sector of the country. The reports of the Planning Commission and annual reports of various ministries also contain a lot of information and data on the respective organization.

3. Industry Information: There are various Associations - Chambers of Commerce,

Merchants'Chambers and other agencies who publish Industry data. The reports of planning commission, govt, of India, publications from Industry and commerce Ministries also contain a lot of information. The CMIE publishes various volumes and update them from time to time containing data on various sectors of the economy and industries, and the subscribers get these volumes and reports. Directory of information published by the B.S.E. also contains information on industries and companies and this is updated fromtime to time. Many Daily financial papers brings out regularly studies on various Industries and their prospects. Industry data micro level is available in Govt, publications, industry-wise, but in view of a large time lag involved in their reports, the monthly reports of various Associations of Industries give more up- to-date and timely information.

4. Company information: the information on various companies listed on stock exchanges is readily available in daily financial papers. Besides the fortnightly journals of capital market, Dalalstreet, business India contain a lot of information on the industries and companies, listed on stock exchanges. Results of equity and market research are also published in these journals. As referred to earlier the
B.S.E (Bombay stock exchange) publishes directory of capital market and dalal street also publish these data. Computer software weekly reviews, monthly reviews giving data on various aspects oflisted companies.

The annual reports of companies and their half yearly unaudited results are another source of information on the companies. The financial journalists give write ups on various companies after interviewing their executives and these are published in economic times and other financial dailies, like business line & financial express.

5. Security market information: a number of big broker firms who have equity research are sending newsletter on market information with fundamental and technical analysis, combined in those report's to their clients. The capital market, dalal street, business India and few other stock market journals like fortune India, investment week, etc. contain the information on security markets. The ICFAIalso publishes a monthly called chartered financial analyst which contains economic data company information and market information security analysis. Beta factors and a host of other items, useful for security analysis. The data on Trade cycles and settlements, record dates, book closures etc., are contained in financial papers like Economic Times, Business Line, Financial Express etc., after they arereleased by stock exchanges and

companies. While the newsletter of Merchant Bankers, brokers' firms. Investment Analysts, are available to subscribers or their own clients, others are available for all at stipulated prices. Data on Fll, FIs and MFs purchases and sales and net on a daily basis are available with SEBI and published in the Financial Press.

6. Security Price Quotations: The daily quotations on various Stock Exchanges OTCEI and NSE are published in the daily papers. Each stock Exchange is publishing its own daily quotations list giving out opening, high low and closing quotations of all traded securities. They also publish volume of trade for individual securities and also the total for all securities traded on a daily basis, in terms of shares and value of trades.

The Price indices, for all securities, industry-wise, region-wise etc., are published by the RBI

B.S.E and major Stock Exchanges, in the country. Besides each financial Daily has its own Index published in its paper. All these indices; daily volumes, highs, lows, advances, declines etc., of well traded Companies,

Gainers and losers and such similar information, useful for both technical and fundamental analysis is available from all Stock Exchanges and published in financial Dailies and journals. The Capital Market and Dalal Street journals also give company information regarding their fundamentals, P/E, EPS, GPM etc., along with the price data. Daily highs and lows can be seen as against yearly highs/low for each of the securities in financial Dailies.

The pattern of shareholding, distribution schedule, floating stock, past price data is available in all software and B.S.E. Directory. B.S.E. publishes all the useful for technical analysis and these data are compiled by the computer specialists and floppies are available on official Daily quotations and Technical charts of each of the major companies listed on Stock Exchanges. The computer software data are also sold by software companies for those who have computer facility. For others, these data can be collected from daily papers, weekly and fortnightly Journals on Stock Market, like Financial Express, Economy Times, Dalai Street and Capital Market. Etc.

7. Data on Related Markets; Data on Money markets Govt. Securities Market are available in the publications of RBI Indian Bank Association, Securities Trading Corporation and banks NSE. Thesedata are published on a daily basis on the financial Dailies and journals. The

publications who deal withthese markets are however fewer in number compared to those on stock and capital markets. The information on forex markets is available in IRB publication, foreign exchange dealers association and foreign banks. These data are published in the form of exchanges rates and cross Currency rates in financial dailies regularly. The developments in these markets are reviewed in the dailies or weekly andfortnightly journals.

The data on Bullion market and rates for gold and silver are available on a Daily basis in the financial press. These data are published in RBI Bulletins and are also available in CMIE reports. Many of these data on forex markets in countries abroad can be obtained from London Economist, Eastern Economic Review, and Wall Street journal.

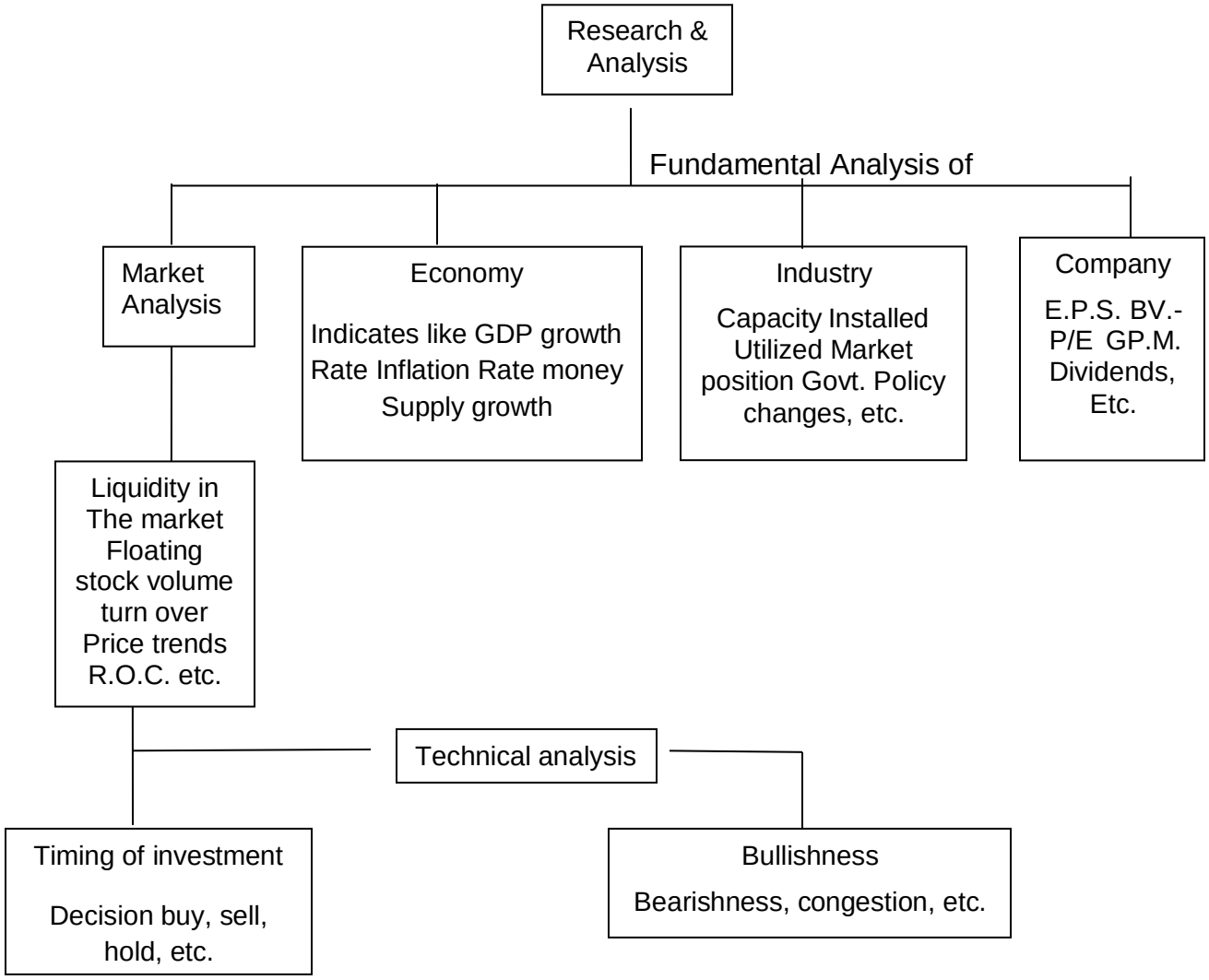
8. Data on mutual funds UTI etc: these are published in the daily financial papers - at least once in a week in the investment weekly or investors' guide. They give the current schemes, NAV of each scheme if quoted as against the market price, if traded, repurchase price, redemption rate, etc. in respect of close ended funds and daily purchase and sale prices for open ended funds. Besides, however all the journals, magazines and reports on stock markets also contain the relevant information on mutual funds, as many of their schemes are quoted and traded on the stock exchanges? Thus, the capital market, dalal street and business India also contain information on mutual funds. Since 1999, the data on mutual funds - their sales and repurchase, NAV of schemes etc. are available from the association of mutual funds (AMFI).

9. Data on primary market: new issues in the pipeline are first known to the SEBI as they get the draft prospectus for vetting and even before that, they would come to know of them from merchant bankers' reports. But consolidation and publications of this information is done by a magazine called "PRIME" publication. Prime publishes all information of new issues in the pipe line - industry- wise and size wise analysis and public over subscription and under subscription etc. the performances ofcompanies. Merchant bankers, underwriters and broker etc. in the new issue market are also analyzed by them. Geographical and centrewise collection of new issues and other relevant company informationare given by them.

Following them a number of magazines, merchant bankers, registers and brokers like Karvys are publishing them. Financial journalists are giving a write up on the forthcoming new issues as also some cable operators. The RBI and Dept, of company affairs in addition to SEBI collect and publish these data from time to time in their reports once in a quarter, half yearly and yearly.

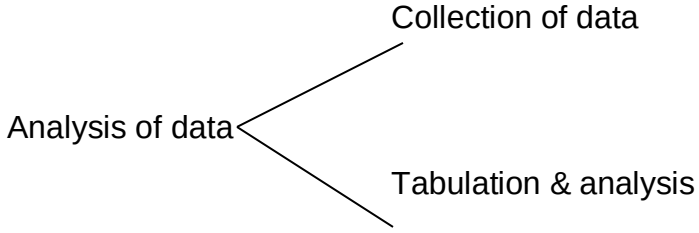
Use of these Data

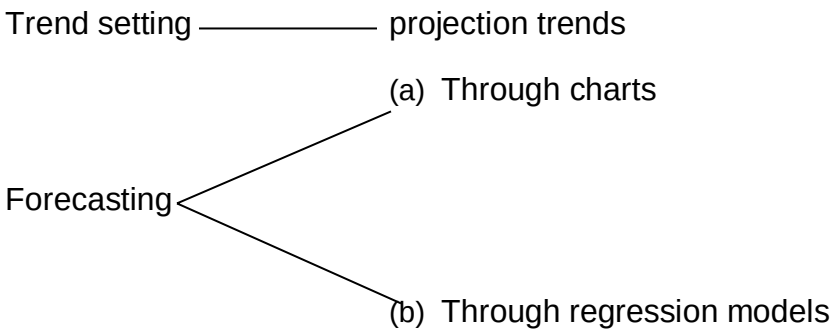
The broker firms, investment consultancy firms, portfolio managers require all the investment information on companies, industry and economy, for their analysis and research. Their tasks in the connection can be set out as follows.



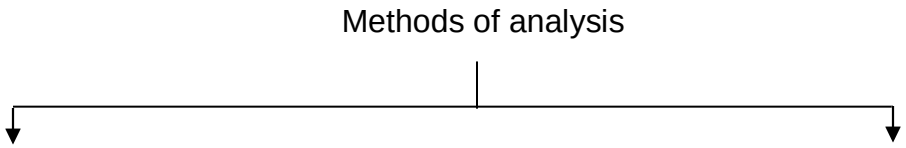
Study of market sentiment

ROC is rate of change of prices and volumes. Research methods are very varied starting fromdeskwork to plant visits.





Primary data analysis	secondary data analysis
Visit to plant, factory Interview of company Executives, supplies and distributers Questionnaire method Survey and sample study	Analysis of balance Sheet and income Expenditure data Ratio analysis Trend analysis Sources and uses of funds analysis



FundamentalAnalysis

Analysis of economy
Industry and company
Selection of a
diversifiedPortfolio of
companies

Technical Analysis
Market data on prices,
volume rate of changes
moving averages Selection
of timing

Steps to be followed -

(a) Pattern of ownership of shares

(b) Proportion of public holding

(c) Floating stock for trading

(d) High/low prices for the year

(e) Daily volatility of prices- Opening, high, low and closing

(f) Breadth of the market

(g) No. of shares traded and their volumes vis-a-vis the total volume for all companies

(h) Declines/advances among scrip

(i) Chart of daily price trends, moving average trends - to get signals of buy/sell etc.

Trace out the intrinsic value of the share by fundamental analysis - adjust for the expectations and sentiment in the market to take a decision whether the price in the market is fair or not.

Study of the company through financial variables (BV, EPS, P/E, etc), visit the plant and interview the chief executives of the company for knowing the expectations, as also of the merchant bankers and financial institutions, are the further steps.

Scrip's chosen on all these counts are properly timed through technical analysis for a proper investment decision making. An analysis of risk in terms of variability of returns (standard deviation) of each company vis-a-vis the market, use of beta factor for risk which is systematic and diversification of investments into various industries and companies to reduce the unsystematic risks are the further steps in portfolio management.

It will thus be seen that the sources of information for investment purpose is only for the first step. Collection and collation and analysis of the data are the more important next steps. The direction of analysis may be fundamental analysis or technical analysis. The data and information set out in this chapter are necessary for not only proper investment decision, but for portfolio management, revision and evaluation. Equity research and market analysis, so necessary for stock broking investmentconsultancy and portfolio management are also based on the information collection and data processing for which the sources of information referred

to in the chapter are vitally important.

1.8 SELF CHECK EXERCISE:

1. Define tangible assets.
2. Explain Risk and Return.
3. Distinguish between investment and speculation

1.9 SUMMARY:

Investment is the commitment of funds for a period of time with the expectation of receivingmore than the current outlay. The return could be in the form of annual income or appreciation in price. Various types of assets are available for investment such as land, buildings, fixed deposits, shares, bonds, gold etc. Investors sacrifice current consumption in order to be able to consume more in the future.

1.10 GLOSSARY:

Investment: An investment is an asset or item acquired with the goal of generating income or appreciation.

Financial asset: A financial asset is a liquid asset that gets its value from a contractual right or ownership claim. Cash, stocks, bonds, mutual funds, and bank deposits are all are examples of financial assets.

Tangible assets: Tangible assets are physical; they include cash, inventory, vehicles, equipment, buildings and investments.

Intangible assets: Intangible assets do not exist in physical form and include things like accounts receivable, pre-paid expenses, and patents and goodwill.

Return and Risk: A person making an investment expects to get some returns from the investment in the future. It is the uncertainty associated with the returns from an investment that introduces a risk into a project. The expected return is the uncertain future return that a firm expects to get from its project.

Speculation: Speculation includes the buying, holding, selling, and short-selling of stocks, bonds, commodities, currencies, collectibles, real estate, derivatives or any valuable financial instrument. It is the opposite of buying because one wants to use them for daily life or to get

income from them (asdividends or interest).

1.11 ANSWERS TO SELF CHECK EXERCISE:

1. For answer refer to section 1.2
2. For answer refer to section 1.3
3. For answer refer to section 1.4

1.12 TERMINAL QUESTIONS:

1. What are the different types of assets? Explain in detail.
2. Differentiate between investment and speculation.
3. Explain in brief the types and need for information in investment analysis.

1.13 SUGGESTED READINGS

Meredith, G.G., Capital Investment Decisions, N.Y., Harper & Row,
1969.Newlyn, W.T., Theory of Money, Clarendon press, Oxford,
1971.
Prime, John H., Investment Analysis, New Jersey, Prentice Hall, 1967.
Sudhindhra Bhat, Security Analysis and Portfolio Management, Excel
Books.
Fischer, D.E. and R.J., Security Analysis and Portfolio Management, Prentice
Hall, 1983.Reilly, F.K., Investment Analysis & Portfolio Management, Drygen
Press, 1985.

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CHAPTER-2

SECURITIES - RISK AND RETURN ANALYSIS

Structure

2.0 LEARNING OBJECTIVES

After reading this chapter, you will be able to:-

- To understand the types of securities
- To explain Probability V/s Absolute loss in risk management
- To explain volatility in price
- To understand Statistical tools for risk calculation
- To discuss types of risk
- To understand the concept of risk & expected Return
- To analyse risk return relationship

2.1 INTRODUCTION

Investing is a hybrid of an art and a science, unlike natural science and like medicine, law, and economics. There are some aspects of investing that are best approached scientifically. The development of computer skills has sped up the application of scientific approaches. However, as

businesses are run by individuals, they are susceptible to issues brought on by their poor judgement. The corporations also operate in a highly competitive and dynamic environment, and many of them do so on a national and international scale. The judgement aspect still predominates in investment decisions as a result. Although it is doubtful that investing will ever be considered a science, study, education, and experience have turned investment into a discipline. A disciplined, reliable, and organised procedure without rigidity in either thought or approach is what is meant by discipline.

Financial Analysis

The informational and predicative component of investing is financial analysis. It offers data on the past, present, and future while also quantifying expectations. Financial analysis is used to make decisions on corporate financial policies, capital budgeting, and the wise choice of assets to invest in. Economic, capital market, sector, and specialised security evaluations are some of the analytical tools that have been utilised for these objectives.

Economic Analysis

In terms of the country's output of goods and services, inflation, profitability, monetary and fiscal policy, and productivity, economic analysis provides both short- and long-term estimates for the entire economy. As a result, it serves as the basis for financial market, industry, sector, and firm projections of the future.

Capital Market Analysis

In order to determine the value and return expectations for securities and to distinguish between overpriced and underpriced securities, capital market analysis looks at the industries and securities of specific companies. Sector analysis sits between capital market analysis and security analysis, combining elements of both. Sector analysis, which is more comprehensive than business and industry analysis, can be seen as a link between the capital market setting and key stock groupings that either cross or combine numerous industries (e.g., according to economic sector, growth rate, or earnings cycles).

Comparative Selection of Securities

It is necessary to appraise securities before choosing among different investment options so that their relative attractiveness in terms of return and risk may be assessed at any moment. Only consistent analytical techniques may be used to achieve this goal, and industry and business forecasts must be based on internally consistent sets of economic and capital market estimates. Since consistency and comparability are crucial, they ought to serve as the process' dual objectives

for investment analysis. While comparability looks for accurate data on firms for each time period, consistency applies to data for a single company over time. The investor cannot use solid judgement to spot instances of overvaluation and undervaluation without consistency and comparability.

Making Investment Decisions

The best way to understand how investment decisions are made is as an integrated process to which security analysis uniquely contributes. The definition of objectives and the evaluation of success in portfolio management call for the consistent use of economic, capital market, and sector analyses. By highlighting the securities that are either fairly priced or underpriced and most likely to deliver the desired results, security analysis aids investment decision-makers.

The following goals serve as the foundation for developing investment policies and asset allocation strategies:

1. To continuously preserve the purchasing power of its assets, adjusted for inflation, and to generate a satisfactory "real" rate of return.
2. To minimise portfolio risk and volatility while maintaining sufficient spending stability from year to year.

2.2 TYPES OF SECURITIES

Debt securities, equity securities, derivative securities, and hybrid securities—a mix of debt and equity—are the four primary types of security.

Debt Securities

Debt securities, also known as fixed-income securities, are a representation of borrowed money that needs to be repaid, with terms defining the sum borrowed, the interest rate, and the maturity date. In other words, debt securities are financial instruments that can be traded between parties, such as bonds (such as government or municipal bonds) or certificates of deposit (CDs). Debt securities, such as bonds and certificates of deposit, typically require the holder to pay periodical interest payments, the principal amount owed, as well as any other contractual obligations that may be specified. These securities are typically sold for a set period of time before being redeemed by the issuer. Based on a borrower's credit history, track record, and solvency—the capacity to repay the loan in the future—the interest rate on a debt security is decided. In order to make up for the amount of risk taken, a lender would need to charge a higher interest rate the larger the possibility that the borrower would default on the loan. It is vital to note that the daily dollar volume of trading in debt securities is substantially higher than that in stocks. The rationale is that institutional

investors, together with governments and not-for-profit organisations, own the majority of debt securities.

Equity Securities

Shareholders' ownership interest in a company is represented by equity securities. To put it another way, becoming a shareholder of an organisation requires making an investment in its equity capital. Holders of equity securities are not entitled to a regular payment, but they can make capital gains by selling their stocks, which is how they vary from holders of debt securities. Another distinction is that equity securities give the holder ownership rights, making him a shareholder with a stake corresponding to the number of bought shares. If a company files for bankruptcy, the equity holders can only split the interest that is left over after all obligations have been met by the holders of debt security. Companies regularly pay dividends to shareholders who share in the earned profits from their main company operations, but debt holders do not get dividend payments.

Derivative Securities

Financial instruments known as derivative securities have a value based on fundamental factors. Assets like stocks, bonds, currencies, interest rates, market indexes, and goods are examples of variables. Utilizing derivatives is primarily done to weigh risks and reduce them. It is accomplished through gaining access to difficult-to-reach assets or markets, providing favourable conditions for speculation, and providing insurance against price fluctuations. In the past, derivatives were employed to guarantee stable currency rates for items that were transacted abroad. International traders required an accounting system to fix the exchange rates of their various national currencies. Four primary categories of derivative securities exist:

1. **Futures**

Futures, often known as futures contracts, are agreements between two parties to buy and deliver an item at a predetermined price at a later period. Futures are exchanged on an exchange with standardised contracts. The parties engaged in a futures transaction must acquire or sell the underlying asset.

2. **Forward**

Although forwards, or forward contracts, are comparable to futures, they are exclusively traded in retail settings. The terms, amount, and method of settlement for the derivative must be agreed upon by the buyer and seller before the formation of a forward contract. The risk incurred by both

sellers and buyers is another distinction from futures. When one party declares bankruptcy, there is a chance that the other party won't be able to defend its rights, which could reduce the value of its position.

3. Options

Options, or options contracts, are comparable to futures contracts in that they involve the purchase or selling of an asset between two parties at a defined price at a future date. The main distinction between the two types of contracts is that, in the case of an option, the buyer is not obligated to carry out the action of purchasing or selling.

4. Swaps

In a swap, one type of cash flow is exchanged for another. For instance, a trader can change from a fixed interest rate loan to a variable interest rate loan or vice versa via an interest rate swap.

Hybrid Securities

As the name implies, a hybrid security is a kind of security that combines features of both debt and equity securities. Hybrid securities are frequently used by banks and other organisations to raise capital from investors. Similar to bonds, they often make a greater interest payment promise at a set or variable rate until a specific future date. The frequency and timing of interest payments are not guaranteed, unlike with bonds. Even better, an investment may be withdrawn at any time or converted into shares. Preferred stocks, which enable the holder to receive dividends before the holders of common stock, convertible bonds, which, depending on the conditions of the contract, can be converted into a known quantity of equity stocks during the life of the bond or at maturity, are examples of hybrid securities. Hybrid securities are intricate goods. Even seasoned investors may find it challenging to comprehend and assess the risks associated with trading them. When purchasing hybrid securities, institutional investors can have trouble comprehending the terms of the agreement they enter into.

2.3 PROBABILITY V/S ABSOLUTE LOSS IN RISK MANAGEMENT

Probability and absolute loss are two distinct concepts that are used in risk management to evaluate and manage risks. Absolute loss is the amount of loss that would occur if an event were to occur, whereas probability is the possibility that an event will occur. Probability, which is frequently used to measure the degree of risk associated with a specific event or scenario, is a significant aspect in estimating the chance of a risk occurring. Probabilities are frequently

expressed in risk management as percentages or decimal values between 0 and 1, where a higher probability denotes a higher likelihood of the event occurring. On the other hand, absolute loss is a measurement of the real financial or other loss that would come from the occurrence of the event. This is crucial for risk management because it makes it easier to estimate a risk's possible effects and choose the right amount of risk transfer or mitigation. Probability and absolute loss are both significant elements of risk management, and it is frequently necessary to take both into account when choosing risk management tactics. For instance, a risk management strategy may need to be different for a high-probability event with a low absolute loss than for a low-probability event with a large absolute loss.

2.4 VOLATILITY IN PRICE

Price volatility is the degree of change in a financial asset's price over time. It is a gauge of how much an asset's price swings, and it is often computed using statistical concepts like variance or standard deviation. A variety of causes, such as movements in supply and demand, economic or political events, adjustments to interest rates or inflation, and changes in investor or market mood, can all contribute to volatility. When these elements alter, the price of an asset may quickly fluctuate, increasing volatility. Volatility for investors can present both a risk and a possibility. On the one hand, if an investor is holding an asset that undergoes a sharp price decrease, extreme volatility can result in huge losses. On the other side, extreme volatility can also present opportunities for profit if a trader can purchase a security at a discount and then sell it at a premium after the market stabilises.

2.5 STATISTICAL TOOLS FOR RISK CALCULATION

Statistical tools are widely used in risk management to calculate and analyze risk. Here are some common statistical tools for risk calculation:

- Probability distribution: Probability distribution is a mathematical function that describes the likelihood of different outcomes in a random event. It is often used in risk management to model the probability of different scenarios, such as the probability of a financial loss occurring.
- Correlation analysis: Correlation analysis is used to measure the strength of the relationship between two variables. In risk management, correlation analysis can be used to assess the relationship between different assets or between an asset and a market index.
- Monte Carlo simulation: Monte Carlo simulation is a statistical method that uses random sampling

to generate possible outcomes for a given set of variables. It is often used in risk management to model the potential outcomes of different scenarios and assess the likelihood of different risks.

- Sensitivity analysis: Sensitivity analysis is used to measure how changes in one variable can impact the outcome of a model or simulation. In risk management, sensitivity analysis can be used to assess the impact of different scenarios on a portfolio or investment strategy.
- Value at Risk (VaR): Value at Risk is a statistical measure used to estimate the potential loss that could be incurred from an investment or portfolio over a certain time period with a given level of confidence. It is often used in risk management to assess the potential downside risk of a portfolio or investment strategy.

2.6TYPES OF RISK

Risk is the likelihood that the anticipated return from the security will not occur. Every investment entail risks that increase the riskiness of future investment returns. Political, economic, and industry considerations could all be contributing contributors to uncertainty. Future risk may be systematic, depending on its source. Unsystematic risk pertains to a particular industry or company, whereas systematic risk affects the market as a whole. The first three risk variables listed below are organised in a systematic fashion, whereas the remainder are not. Depending on whether it affects the market as a whole or simply one industry, political risk can be categorised. Risk in finance is the likelihood that the results will be different from what is anticipated. The volatility of returns is the definition of risk in the Capital Asset Pricing Model (CAPM). According to the "risk and return" theory, investments in riskier assets should generate higher projected returns to make up for the higher volatility and greater risk.

Systematic versus Non-systematic Risk

Traditional sources of risk that affect returns are divided into two categories by modern investment analysis: those that are ubiquitous in nature, like market risk or interest rate risk, and those that are specific to a given security concern, such business or financial risk. As a result, we must take these two types of total risk into account. These words are defined in the discussion that follows. We have systematic risk and nonsystematic risk when we divide total risk into its two components, a general (market) component and a specific (issuer) component, which are additive:

Total risk = General risk + Specific risk

= Market risk + Issuer risk

= Systematic risk + Non-systematic risk

- **Systematic Risk:**

The diversifiable or non-market portion of the overall risk can be eliminated by an investor by creating a diversified portfolio. The market risk, or non-diversifiable element, is what is left. Systematic (market) risk is the term for variation in a security's total returns that is directly related to broad trends in the market or economy. Because systematic risk directly includes interest rate, market, and inflation concerns, practically all financial instruments, including bonds and equities, carry some degree of systematic risk. No matter how well the investor diversifies, the risk of the whole market cannot be avoided, hence the investor cannot escape this portion of the risk. Most stocks will suffer if the stock market falls quickly, and most stocks will gain value if it rises sharply, as it did in the latter several months of 1982. Regardless of what any one investor does, these moves continue to happen. It is obvious that market risk is important to all investors.

- **Non-systematic Risk:**

The variance in a security's total returns that is independent to market performance The non-systematic (non-market) risk is referred to as notes variability. This risk is specific to a given security and is linked to other risks, including business and financial risk and liquidity risk. Even though all securities have a certain amount of non-systematic risk, it is typically associated with common stocks.

Difference between systematic and non-systematic risk

All assets are affected by broad macro variables, which are the cause of systematic (market) risk. The causes of non-systematic (non-market) risk are specific to a security.

Types of Systematic Risk

1. Market Risk: Market risk is the variation in a security's returns brought on by changes in the overall market. All securities are subject to market risk, which includes events like recessions, wars, shifts in economic structure, modifications to tax laws, and even shifts in consumer preferences. Systematic risk and market risk are sometimes used interchangeably.

2. Interest Rate Risk:

Interest rate risk is the variation in a security's return brought on by variations in the level of interest rates. Security prices typically move opposite of interest rates when such changes occur, all other circumstances being equal. The valuation of securities is related to the cause of this movement.

Bonds are more directly impacted by interest rate risk than are common stocks, and it is a significant risk for all bondholders. Bond prices move the other way from changes in interest rates.

3. Purchasing Power Risk:

Purchasing power risk, commonly referred to as inflation risk, is a factor that impacts all securities. This is the chance that money invested may lose some of its purchasing power. Even if the nominal return is safe, there is risk associated with the real (inflation-adjusted) return when inflation is unclear (e.g., a Treasury bond). This risk is linked to interest rate risk since lenders need to charge higher inflation premiums to cover the loss of buying power, which causes interest rates to typically climb when inflation does.

Types of Unsystematic Risk

1. Regulation Risk: Because of specific rules or tax laws that provide them a benefit of some sort, some investments may be more alluring than others. For instance, municipal bonds pay interest that is not subject to federal, state, or local taxation. Municipals can price bonds to offer a lower interest rate as a result of that particular tax exemption because the net after-tax yield may still be appealing to investors. The danger of a regulation change that can have a negative impact on an investment's reputation is significant. Many existing limited partnerships that relied on special tax considerations as part of their overall return were significantly less attractive in 1987 as a result of changes to the tax code. Prices for many limited partnerships fell when investors were left with securities that were, in fact, different from what they had initially expected.

2. Business Risk:

Firm risk refers to the risk associated with operating a business in a specific sector or setting. For instance, U.S. Steel, one of the biggest producers of steel, has particular issues. Similar issues arise for General Motors as a result of recent events like the global energy market and Japanese imports.

3. Reinvestment Risk:

The YTM calculation makes the assumption that the investor will reinvest all bond coupons at a rate that is equal to the bond's computed YTM, generating interest on interest for the duration of the bond at the computed YTM rate. In essence, this computation takes for granted that the yield to maturity is equal to the reinvestment rate.

4. Bull-Bear Market Risk:

This risk results from the fluctuation in market returns brought on by the alternating forces of bull and bear markets. A bull market is a period of time during which a securities index rises steadily

after a period of time during which it fell, known as a trough. When the market index reaches its high and begins to trend lower, the bull market is over. A bear market is the period of time when the market falls to its subsequent low point.

5. Management Risk:

All things considered, management is composed of mortal, imperfect, and prone to error, decision-making individuals. Management mistakes can hurt people who invested in their companies. Forecasting errors is a challenging task that may not be worthwhile, which leads to an unnecessarily pessimistic view. When shareholder owners assign daily decision-making power to managers who are hired employees rather than substantial owners, a connection between agent and principal is created. According to this hypothesis, owners will exert more effort than employees to increase the company's value. According to numerous studies in the area, buying stock in companies where CEOs have substantial equity stakes can help investors cut their losses from hard-to-analyse management errors.

6. Default Risk:

It is that portion of an investment's overall risk that arises from modifications to the investment's financial stability. For instance, changes in the firm's financial integrity will be reflected in the market price of its securities when a corporation that issues securities moves either further away from bankruptcy or closer to it. Default risk is the variation in return that investors encounter as a result of changes in the credit worthiness of a company in which they have invested. Nearly 80% of the losses experienced by investors due to default risk are not brought on by actual defaults and/or bankruptcies. Investor losses from default risk typically occur from declining security prices due to a corporation's weakening financial standing; by this point, the market price of the ailing firm's securities will have already dropped to close to zero. This isn't always the case, though; "creative" accounting techniques used by companies like Enron, WorldCom, Arthur Anderson, and Computer Associates may keep stock values quoted even when the company's net worth is utterly depleted. Therefore, the total losses brought on by the course of financial degradation would not exceed the bankruptcy losses by much.

7. International Risk:

Country risk and currency rate risk are both examples of international risk. Exchange Rate Risk: In today's more globally interconnected investing environment, all investors who make overseas investments run the risk of receiving uncertain returns when they convert their foreign winnings back to their home currencies. Investors today must be aware of and comprehend exchange rate risk,

which may be defined as the variability in returns on securities induced by currency movements. This is in contrast to the past, when the majority of US investors ignored overseas investing choices. Currency risk is another name for exchange rate risk.

8. Country Risk:

Political risk, often known as country risk, is a significant risk for investors today. The political and, consequently, economic stability and sustainability of a country's economy must be taken into consideration as more investors, both directly and indirectly, make direct and indirect investments abroad.

9. Liquidity Risk:

The risk connected with a specific secondary market where a securities trades is called liquidity risk. Liquid investments are those that can be swiftly purchased or sold without experiencing a significant price reduction. The risk associated with liquidity increases with the degree of uncertainty surrounding the timing and cost concession. While a small OTC stock may have significant liquidity risk, a Treasury bill has little to no liquidity risk.

10. Political Risk:

It results from a politically powerful group taking advantage of a politically weaker group, and as a result of multiple factions' attempts to strengthen their respective positions, the variability of return on the impacted assets increases. Political risk refers to the variability of return that results from changes made by the legislative, judicial, or administrative branches of the government, regardless of whether they are motivated by business or political reasons.

11. Industry Risk:

An industry can be viewed as a group of businesses that compete with one another to market a common good. Industry risk is the part of an investment's overall return variability that is brought on by occurrences that have an impact on the businesses and products that make up the industry.

2.7 RISK AND EXPECTED RETURN

The two primary factors affecting an investment decision are risk and projected return. Simple terms: How much do individual results depart from the expected value? Risk is correlated with the variability of the rates of return from an investment. Risk can be quantified statistically using any of the dispersion metrics, including variance, standard deviation, and coefficient of range. The risk involved in investment depends on various factors such as:

1. The length of the maturity period; investments are riskier when the maturity period is longer.

2. The creditworthiness of the security issuer – The borrower's capacity to make regular interest payments and repay the principal will confer safety to the investment and lower risk.
3. The instrument's or security's nature affects the risk as well. In general, risk-free or least risky investments include government securities and fixed deposits with banks; riskier investments include corporate debt instruments like debentures and ownership instruments like equity shares. Once more, the relative risk ranking of instruments and investment safety are related.
4. Due to the volatility of return rates and the fact that equity investors are still subject to the residual risk of bankruptcy, equity shares are regarded as the riskiest investment.
5. 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
6. The risk associated with an investment is also influenced by its liquidity. An asset's liquidity is defined as its capacity to be quickly sold without a loss or with a little loss.
7. In addition to the aforementioned elements, there are other more factors that influence risk and investment, such as economic, industry, and firmspecific factors. The rate of return that the investor anticipates is a significant additional aspect in making an investment decision. The yield and capital growth make up the investor's anticipated rate of return.

Determinants of the Rate of Return

The investor's estimated rate of return is thus largely determined by three factors:
1. The risk-free real rate for time preferences.
2. The anticipated inflation rate.
3. The risk specific to the investment, which is related with it. Hence,

Required return = Risk-free real rate + Inflation premium + Risk premium ROR = Current yield + Capital gain yield

2.8 RISK-RETURN RELATIONSHIP

In general, taking on more investment risk is the only way to achieve larger investment returns. This isn't necessarily true in every situation, though. For instance, diversification an investment portfolio can frequently yield a comparable return with lower risk than an undiversified investment portfolio. However, as a portfolio gets bigger, there is a limit to how effective diversification may be. The risk-return trade-off is a key tenet of successful investing. There are numerous different asset classes and investment kinds, including, but not limited to, money market securities, bonds, public equities, private equity, private debt, and real estate. The investment risk associated with each of these asset

classes varies. Investments with varying risk-return profiles might help satisfy the various risk appetites of different investor groups. Governments issue the first asset class, risk-free bonds, which are typically regarded as "risk-free" investments since a government can print money to settle its debts. As a result, riskfree bonds are the safest asset and offer the lowest rate of return on investments. We can observe that as the risk-return range increases, each asset class becomes riskier. Each asset class's prospective investment return does, however, also rise. Private equity is the fifth asset class, and it entails financial investments in privately held businesses that are not exchange-listed. These investments often carry more risk than common stocks, including added hazards like liquidity risk. Private equity does, however, provide investors the best possible investment returns despite these increased risks.

2.9 SUMMARY

The likelihood that the expected return from the security will not occur might be referred to as risk. Uncertainties are a part of every investment, which increases the risk of future investment returns. Political, economic, and industry considerations could all be contributing contributors to uncertainty. Depending on the cause of the risk, it may become systematic in the future. Systematic risk pertains to the market as a whole, whereas unsystematic risk is unique to a particular industry or company. The risk factors discussed below, only the first three are systematic in character. Depending on whether it affects the market as a whole or simply one industry, political risk can be categorised. The systematic risk of a security that cannot be mitigated by diversification is measured by beta. Beta is a measure of risk that compares the risk of a single stock to the risk of the entire market portfolio of equities.

2.10 UNIT END QUESTIONS

Short Answers:

1. Define Risk.
2. Write note on Probability V/s Absolute loss in risk management
3. Write note on Purchasing Power Risk.
4. Explain Business Risk.
5. Differentiate between Systematic versus Non-systematic Risk.
6. Discuss Risk and Expected Return. 7. Describe the various types of securities. 8. Enumerate the difference between Equity and Hybrid securities.

2.11 SUGGESTED READINGS

- Bonus Shares, A Study of the Dividend and Price Effects of Bonus Shares Issues, Bombay,

MacMillan, 1973.

- Graham, Benjamin, David, L., Dodd, Sidney Cottle, et al., Security Analysis: Principles and Techniques, 4th ed., New York McGraw – Hill Book Co. Inc., 1962.
- Granger, Clive W and Morgenstem Oskar, Predictability of Stock Market Prices, Lexington, Health Lexington, 1970.
- Granville, Joseph E., A Strategy of Daily Timings for Maximum Profit, Englewood Cliffs, N.J., Prentice-Hall, 1960.
- Gup, Benton E., Basics of Investing, N.Y. Wiley, 1979.
- Gupta L.C., Rates of Return on Equities: The Indian Experience, Bombay, Oxford University Press, 1981.
- Sudhindra Bhat, Security Analysis and Portfolio Management, Excel Book

CHAPTER-3
PORTFOLIO ANALYSIS-I

Structure:-

3.0 LEARNING OBJECTIVES

After reading this chapter, you will be able to:-

- Understand how portfolio risk and return are calculated

3.1 INTRODUCTION

Security analysis deals with the analysis of securities within the framework of return and risk. Portfolio analysis begins where the security analysis ends. The concept of portfolio analysis has very important relevance for investors, because portfolio which is combinations of securities may or may not take on the aggregate characteristics of their individual parts. Various combinations of securities when held together behave in a different manner and give different returns as compared to the analysis of different securities. A combination or portfolio of securities can give better and beneficial results only if they are grouped together in a manner to secure the optimum combination of risk and return.

MEANING:

Portfolio analysis deals with the determination of future risk and return in holding various combinations of individual securities. The portfolio expected return is the weighted average of the expected returns, from each of the individual securities, with weights respecting the proportionate shareof the security in the total investment. The portfolio expected variance, in contrast; can be something less than a weighted average of security variances. Therefore, an investor can sometimes reduce risk by adding another security with greater individual risk compared to any other individual security in the portfolio. This strange result occurs because risk depends greatly in the portfolio. This strange result occurs because risk depends greatly on the covariance among returns of individual securities. Why an investor does have so many securities in his portfolio? If anyone security, let us say, security X, gives the maximum return, why not to invest all the funds in that security and thus, to maximise the returns? Answer to this query lies in risk attached to investments, objective of investment, safety, capital growth, liquidity and hedge against decline in the value of money etc. The concept of diversification deals with this question. Diversification aims at reduction or even elimination of non-systematic risk and achieving the specific objectives of investors. An investor can even estimate his expected return and expectedrisk level of a given portfolio of assets from proper diversification.

3.2 TRADITIONAL AND MODERN PORTFOLIO ANALYSIS:

Traditional portfolio analysis has been of a very subjective nature for each individual. The investors made the analysis of individual securities through the evaluation of risk and return conditions in each 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.

Moreover, traditional theory believes that the market inefficient and the fundamental analysiscan take advantage of the situation. By analysing internal financial statements of the company, he can make superior profits through higher returns. The technical analyst believed in the market behaviour and past trends to forecast the future of the securities. These analyses were mainly under the risk and return criteria of single security analysis.

As against the traditional theory the modern portfolio theory emphasises the need of maximisation of returns through a combination of securities whose total variability is lower. It is not necessary that success can be achieved 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. This theory, thus, takes into consideration the variability of each security and covariance for their returns reflected through their interrelationships. Thus, as per the modern theory expected returns, the variance of these returns and covariance of the returns of the securities within the portfolio are to be considered for the choice of a portfolio. A portfolio is said to be efficient, if it is expected to yield the highest return possible for the lower risk or a given level of risk. The modern portfolio theory emphasis the need for maximisation of returns, through a combination of securities, whose total variability is lower. The risk of each security is different from that of others and by a proper combination of securities, called diversification, one can arrive at a combination, where the risk of one is off set partly or fully by that of the other. Combination ofsecurities can be made in many ways. Markowitz developed the theory of diversification through scientific reasoning and method.

3.3 RETURN OF PORTFOLIO:

From investors' point of view, it is rarely advisable to invest the entire funds of an individual oran institution in a single security. Therefore, it is essential that each security be viewed in a portfolio context. Each security in a portfolio contributes returns in the proportion of its investment in security. Itis but natural that the expected return of a portfolio should depend on the expected return of each of thesecurity contained in the portfolio. It is also important that amounts invested in each security should be logically decided.

Assuming that the investor puts his funds in five securities; the holding period return of the portfolio is described in the table given below:

Security	**Proportion of funds invested inin each security**	**Expected Returnof Holding Period**	**Contribution of EachSecurity to Return**
A	20	10%	2.00

B	20	20%	5.00
C	20	10%	2.00
D	15	15%	2.25
E	20	15%	3.00
Weights 100		**Weighted return**	**14.25%**

The above table describes the simple calculation of the weighted average return of a portfolio for the holding period.

3.4 RISK ON A PORTFOLIO:

Risk on a portfolio is not the same as risk on individual securities. The risk on the portfolio is reflected in the variability of returns from zero to infinity. The expected return from portfolio depends on the probability of the returns and their weighted contribution to the risk of the portfolio. Two measures ofrisk are used in this context- the average (or mean) absolute deviation and the standard deviation. The following table shows how the absolute deviation can be calculated:

Event	**Probability**	**Return %**	**Probability x Return**	**Deviation**	**Probability x Deviation**	**Probability x Absolute Deviation**
1	2	3	4	5	6	7
A	.10	10	1.0	-5	-0.5	0.5
B	.20	-10	-2.0	-25	-5.0	5.0
C	.30	20	+6.0	5	1.5	1.5
D	.40	25	+10.0	10	4.0	4.0
Expected return			**15.00**	**average**	**0**	
					Absolute deviation	**11.0**

First of all the expected return determined in this case it is 15.00% next, all possible outcomes are analysed to determine the amount by which the value deviates from the expected amount. These figures shown in column 6, a weighted average using probabilities as weights

will equal zero. To assetsthe risk the sign of deviations can be ignored column 7, shown the weighted average of the absolute values of the deviations, using the probabilities as weights, equal to 11%. This constitutes the first measure of likely deviation.

Another measure is standard deviation and variance. It is slightly more complex but preferably analytical measures. In this the deviations are squared, making all the values positive. Then the weighted average of these amounts is taken, using the probabilities as weights. The result is termedthe variance. It is converted to the original units by taking the square root. The result is termed as the standard deviation.

Event	**Probability**	**Deviation**	**Deviation Squared**	**Probability x deviation squared**
1	2	3	$4=(3)^2$	5 = (2x4)
A	.10	-5	25	2.5
B	.20	-25	625	125.0
C	.30	5	25	7.5
D	.40	10	100	40.0
	Variation = weighted average Squared deviation			175.0
	Standard deviation = Vl75 =13.2287			

Although both these measures are used interchangeably, the standard deviation is generally preferred for investment analysis. The reason is that the standard deviation of a portfolio can be determined from the standard deviation of the returns of its component securities, no matter what the distributions. No such relationship of comparable simplicity exists for the average absolute deviations.

We can think of a portfolio's standard deviation as a good indicator of the risk of a portfolio, to the extent that it adding a stock to the portfolio increases the portfolio's standard deviation, the total stock adds risk to the portfolio. But the risk that the stock adds to the portfolio will depend

not only on the stock's total risk, its standard deviation, but on how that risk breaks down into diversifiable and non diversifiable risk. If an investor holds only one stock, there is no question for diversification and his risk is, therefore, the standard deviation of the stock. For a diversified investor, the risk of a stock is only that portion of the total risk that cannot be diversified away or its non-diversifiable risk. The non- diversifiable risk is generally measured by Beta (β) coefficient. Beta measures the relative risk associated with any individual portfolio as measured in relation to the risk of the market portfolio. The market portfolio represents the most diversified portfolio of risky assets an investor can buy since it includes all risky assets. This relative risk can be expressed as:

$$\beta = \frac{\text{non- diversifiable risk of assets or portfolio}}{\text{Risk of market portfolio}}$$

Thus, Beta coefficient describes the relationship between the stock's return and the market index return. A Beta of 1.0 indicates an asset of average risk. A beta coefficient greater than 1.0 indicates above average risk and less than 1.0 indicates a below average risk. One important point tobe noted is that in the case of a market portfolio, all the diversification has been done, thus the risk of the portfolio is all non- diversifiable risk which cannot be avoided. Similarly, so long as the asset's returns are not perfectly positively correlated with the returns from other assets, there will still be some scope to diversify away its unsystematic risk. We can thus say that Beta depends upon only non- diversifiable risk.

The Beta of a security portfolio is nothing but the weighted average of the Betas of the securitiesthat constitute the portfolio, the weights being the proportions of investments in the respective securitiesas shown in the following table:

Securities	**Proportion in the Portfolio**	**Beta**	**Weighted Average of Betas**
A	60% (.6)	1.5	1.5 X .6 = .9
B	40% (.4)	0.9	0.9 X .4 = .36
	Beta of the portfolio		1.26

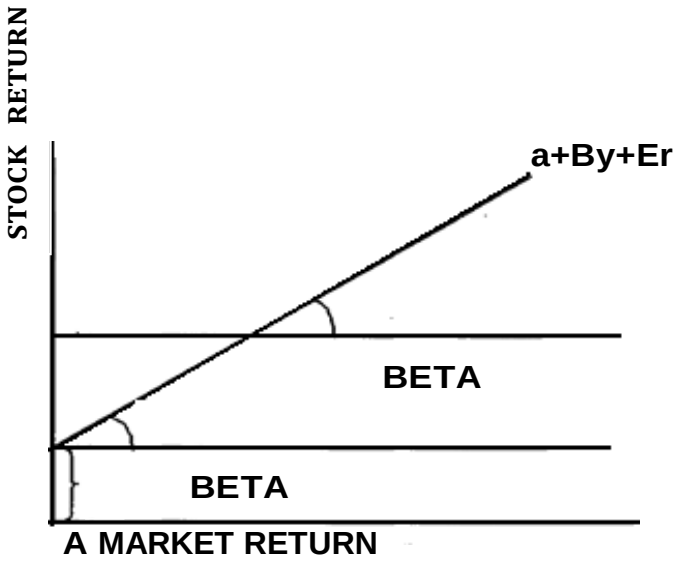
The systematic relationship between the return on the security or a portfolio and the return inthe market can be described by using a simple linear regression identifying the return on a security or portfolio as the dependent variable and the return on market portfolio as the independent variable:

Thus X = a+ By + Er.

Where X = return on the security in thegiven period and Y is the market return.

α= the intercept where the regression linecrosses the Y-axis.

BY= the slope of the regression line. Er= error term containing all residuals



CHAPTER-4

PORTFOLIO ANALYSIS-II

Structure:-

4.0 LEARNING OBJECTIVES

After reading this chapter, you will be able to:

- Appreciate the advantages of diversification
- Apply the Markowitz technique for efficient diversification
- Calculate portfolio risk using the Market Model
- Separate risk into systematic and unsystematic risk

4.1 INTRODUCTION

The traditional belief is that diversification means "not putting all eggs in one basket". Diversification helps in the reduction of unsystematic risk and promotes the optimisation of returns for a given level of risks in portfolio management. Proper diversification involves

two or more companies/industries whose fortunes fluctuate independent of one another or in different directions. One single company/ industry is always more risky than two companies/industries. Two company's in textile industry are more risky than one company in textile and one in IT sector. Two companies/industries which are similar in nature of demand a market are more risky than two in dissimilar industries.

4.2 DIVERSIFICATION OF INVESTMENTS

Risk involved in investment and portfolio management can be reduced through a technique called diversification. The traditional belief is that diversification means "not putting all eggs in one basket". Diversification helps in the reduction of unsystematic risk and promotes the optimisation of returns for a given level of risks in portfolio management. Diversification may be any of the following forms:

- **Different Assets** e.g. gold, bullion, real estate, government securities etc.
- **Different Instrument** e.g. Shares, Debentures, Bonds, etc!
- **Different Industries** e.g. Textiles, IT, Pharamaceuticals, etc.
- **Different companies** e.g. new companies, new product company's etc.

Proper diversification involves two or more companies/industries whose fortunes fluctuate independent of one another or in different directions. One single company/ industry is always more risky than two companies/industries. Two company's in textile industry are more risky than one company in textile and one in IT sector. Two companies/industries which are similar in nature of demand a market are more risky than two in dissimilar industries.

Some accepted methods of effecting diversification are as follow:.

(i) Random Diversification. Randomness is a statistical technique which involves placing of companies in any order and picking them up in random manner. The probability of choosing wrong companies will come down due to randomness and the probability of reducing risk will come down due to have suggested that diversification at random does not bring the expected return results. Diversification should, therefore, be related to industries which are not related to each other.

(ii) Optimum Number of Companies. The investor should try to find the optimum number of

companies in which to invest the money. If the number of companies is too small, risk cannot be reduced adequately and if the number of companies is too large, there will be diseconomies of scale. More supervision and monitoring will be required and analysis will be more difficult, which will increase the risk again.

(iii) Adequate diversification. An intelligent investor has to choose not only the optimum number of securities but the kind of securities also. Otherwise, even if there are a large number of companies, the risk may not be reduced adequately if the companies are positively correlated with each other and the market. In such a case, all of them will move in the same direction and many risks will increase instead of being reduced.

(iv) Markowitz diversification. Markowitz theory is also based on diversification. According to this theory, the effect of one security purchase over the effects of the other security purchase is taken into consideration and then the results are evaluated.

4.3 MARKOWITZ MODEL

Dr. Harry M. Markowitz was the person who developed the first modern portfolio analysis model. Markowitz used mathematical programming and statistical analysis in order to arrange for the optimum allocation of assets within portfolio. He infused a high degree of sophistication into portfolio constructionby developing a mean-variance model for the selection of portfolio. Markowitz approach determines for the investors the efficient set of portfolio through three important variables.

Return, standard deviation and coefficient of correlation.

Markowitz model is called the "Full Covariance Model". Through this method the investor can find out the efficient set of portfolio by finding out the trade off between risk and return, between the limits of zero and infinity.

4.4 ASSUMPTIONS OF MARKOWITZ MODEL

1. The markets are efficient and absorb all the information quickly and perfectly. So an investorcan earn superior either by technical analysis or fundamental analysis. All the investors are in equally category in this regard.
2. Investors are risk averse. Before making any investments, all of them, have a common goal- avoidance of risk.

3. Investors are rational. They would like to earn the maximum rate of return with a given level of income or money.
4. Investors base their decisions solely on expected return and variance (or standard deviation) ofreturn only.
5. For a given risk level, investors prefer high returns or lower returns. Similarly, for a given level ofexpected return, they prefer less risk to more risk.
6. The investor can reduce the risk if he adds investments to his portfolio.
7. Investors consider each investment alternative as being represented by a probability distributionof expected returns over some holding period.

A portfolio of assets under the above assumptions is considered to be efficient if no other portfolio of assets offers higher expected return with the same (or lower) risk or lower risk with the same(or higher) expected return.

4.5 PARAMETERS OF MARKOWITZ DIVERSIFICATION

Based on thorough and scientific research, Markowitz has set down his own guidelines fordiversification:

i. The investments have different types of risk characteristics. Some are systematic or marketrelated risks and the others are unsystematic or company related risks.
ii. His diversification involves a proper number of securities not too less nor too many.
iii. The securities have no correlation or negative correlation.
iv. There is the proper choice of the companies, securities or assets whose returns are not relatedand whose risks are mutually off setting to reduce the overall risk.

Markowitz lays down three parameters for building up the efficient set of portfolio:

- Expected returns.
- Standard deviation from mean to measure variability of returns.
- Covariance or variance of one asset return to other asset returns.

To generalize, higher the expected return, lower will be the standard deviation or variance and lower is the correlation. In such a case, better will be the security for investor choice. If the covarianceof the securities' returns is negative or negligible, the total risk of portfolio of all

securities may be lower as compared to the risk of the individual securities in isolation.

By developing his model, Markowitz first did away with the investment behavior rule that the investor should maximize expected return. This rule implied that the non-diversified single portfolio with the highest expected return is the most desirable portfolio. Only by buying that single security can expected return be maximized. The single security portfolio can be much preferred if the higher return turns out to be the actual return. However, in real world, there are conditions of so much uncertainty that most risk averse investors, join with Markowitz in adopting diversification of securities.

4.6 EFFECTS OF COMBINING THE SECURITIES

Holding more than one security in the portfolio is always less risky than putting all the eggs in one basket. As per Markowitz, given the return, risk can be reduced by diversification of investment intoa number of scrips. The risks of any two scrips are different from the risk of a group of two companies together. Thus, it is possible to reduce the risk of a portfolio by incorporating into a security whose riskis greater than that of any of scrips held initially.

Example. Given two scrips A and B, with B considerably less risky than A, a portfolio composedof some of A and some of B may be less risky than a portfolio composed of only less risky B.

Let

	A	**B**
Expected Return	40%	30%
Risk (a) of security	15%	10%

Coefficient of correlation, between A and B can have any of the three possibilities i.e. -1, 0.5 or +1.

Let us assume, investment in A is 60% and in B 40%.

Return on portfolio = (40 x 0.6) + (30 x 0.4)

	= 36%
Risk on portfolio	= (15x0.6)+ (10x0.4)
	= 13%, which is normal risk.

Moreover, when two stocks are taken on a portfolio and if they have negative correlation, therisk can be completely reduced, because the gain on one can offset the loss on the other. The effect of two securities can also be studied when one security is more risky as compared to the other security.

Example. Take stocks A and B. the returns expected from each stock, their probabilities of occurrence, expected returns and variances are given as follows:

Return%	**Stock A**	**Stock B**
Probabilit	7 or 11	13 or 5
y	0.4 each return	0.4 each return
Expected return %	7.20	7.20
Variance	4	4
Standard deviation	2	4
A's expected return	= .4 x 7 + .4 x 11 = 7.2	
B's expected return	= .4 x 13 + .4 x 5 = 7.2	

Formula to calculate Rate of return on

$$\text{Portfolio} \quad = R_p = \sum_{i=1}^{N} X_1 R_1$$

Where R_p = Expected return of portfolio.

X_1 = Proportion of total portfolio invested in security.

R_1 = Expected return of security.

N = Total number of securities in portfolio.

Suppose the investor holds 2/3 of stock A and 1/3 of stock B, expected return can be calculatedfor both possibilities as follows:

$$\text{Possibility } 1 = \frac{2}{3} \times 7 + \frac{1}{3} \times 13 = 9$$

$$\text{Possibility } 2 = \frac{2}{3} \times 11 + \frac{1}{3} \times 5 = 9$$

$$\text{Therefore } R_p = 9$$

The above illustration shows that holding a combination of 2/3 of A and 1/3 of B, the expectedreturn will always is equal to 9. In both the situations, the investor will gain even if the worst occurs.

Thus, the investor can reduce the portfolio risk by holding two securities in a portfolio. However, research studies show that it is important to know what proportion of the stock should be bought by the investor in order to minimize the risk. The investor should be able to find two scrips in such a way that one is giving a higher return whereas the other scirp is not performing well even though one of the scrips is more risky and it will lead to a good combination. This is very difficult and continuous task because the investors will have to continue to find out two securities which are related to each inversely like the example given for stocks A and B. moreover, securities should also be correlated to each other in such a way that maximum returns can be achieved.

INTERACTIVE RISK THROUGH COVARIANCE

When individual securities are held by the investor, the risk involved is measured by standard deviation or variance. But when two securities are held in the portfolio, it is essential to

study the covariance between the two. Covariance of the securities will help in finding out the interactive risk. Thecovariance between securities is considered to be positive when the rates of return of the two securitiesmove in the same direction. But if rates of return of the securities are independent, covariance is zero. Ifrates of return move in the opposite direction, the covariance is said to be negative. Mathematically the covariance, between two securities is calculated with the help of the following formula:

$$COV_{AB} = \sum_{i=1}^{N} \left(R_A \overline{R}_A\right)\left(R_B \overline{R}_B\right)$$

COV_{AB} = covariance between two securities A and B.

R_A = Return on stock A

R_B = Return on stock B

$\overline{R}_A$ = Expected return on stock A

$\overline{R}_B$ = Expected return on stock B

N = Number of observations

The probabilities remaining same and using the figures of the previous example of stocks A and B:

	Range of Return	**Expected Return**	**Deviations**
Stock A	7	9	-2
Stock B	13	9	4
			Product -8
Stock A	11	9	2
Stock B	5	9	-4
			Product -8

$$\text{Covariance} = \frac{1}{2}(7-9)(13-9)+(11-9)(5-9)$$

$$= \frac{1}{2}\left[(-8)+(-8)\right] = \frac{1}{2}\times -16 = -8$$

Thus, the covariance between stock A and B is negative

COEFFICIENT OF CORRELATION

The coefficient of correlation is another measure designed to indicate the similarity or dissimilarly in the behavior of two variables. Taking the above mentioned stock A and B, coefficient of correlation can be calculated with the following formula:-

$$Y_{AB} = \frac{CONAV}{\sigma A\, \sigma B}$$

By putting the values given in the question we get:

$$Y_{AB} = \frac{CONAV}{2\times 4} = -1.0$$

The coefficient of correlation between Stock A and B is -1.0 which indicated that there is a perfect negative correlation and rates of return move in opposite direction. If Y is 1, then perfect positivecorrelation exists between securities and returns move in the same direction. If Y is 0, then t indicates that stock's returns are independent of each other. Thus, the correlation between two securities depends upon the covariance between the two securities and the standard deviation of each security..

SECURITIES ON PORTFOLIO RISK

Holding two securities in the portfolio can reduce the portfolio risk also. According to Markowitz, the security with covariance which is neither negative nor low amongst themselves, is the best manner to reduce risk. According to him, investing in a large number of securities is not the right kind of securitywhich brings the maximum results. The following formula has been given by Harry Markowitz. The formula includes standard deviation and covariance also:

$$\sigma_p = \sqrt{X_1^2\sigma_1^2 + X_2^2\sigma_2^2 + 2X_1X_2\left(Y_{12}\sigma_1\sigma_2\right)}$$

Where σ_p = Portfolio Standard Deviation

X_1 = Percentage of total portfolio in Stock A

X_2 = Percentage of total Portfolio in stock B

σ_2 = Standard deviation of stock A

σ_2 = Standard deviation of stock B

Y_{12} = Coefficient of Correlation between Stock A and Stock B

4.7 SELF CHECK EXERCISE:

1. Explain return on portfolio.
2. Explain risk on a portfolio.
3. Describe the assumptions of Markowitz model
4. Parameters of Markowitz diversification.

4.8 SUMMARY:

Portfolio means a collection or combination of financial assets (or securities) such as shares, debentures and government securities. Business portfolio analysis as an organizational strategy formulation technique is based on the philosophy that organizations should develop strategy much as they handle investment portfolios. Modern Portfolio Theory (MPT) proposes how rational investors will use diversification to optimize their portfolios, and how a risky asset should be priced. The basic concepts of the theory are Markowitz diversification, the efficient frontier, capital asset pricing model,the alpha and beta coefficients, the Capital Market Line and the Securities Market Line.

4.9 GLOSSARY:

Portfolio: Portfolio means a collection or combination of financial assets (or securities) such as shares,debentures and government securities.

Portfolio Leverage: An investor adds leverage to the portfolio by borrowing the risk-free asset.

Risk-free Asset: A hypothetical asset which pays a risk-free rate. It is usually provided by an investment in short-dated Government securities. The risk-free asset has zero variance in returns.

Specific Risk: Risk associated with individual assets - within a portfolio these risks can be reducedthrough diversification.

4.10 ANSWERS TO SELF CHECK EXERCISE:

1. For answer refer to section 3.3
2. For answer refer to section 3.4
3. For answer refer to section 4.4
4. For answer refer to section 4.5

4.11 TERMINAL QUESTIONS

1. What is portfolio analysis? Explain traditional and modern portfolio analysis.
2. Explain diversification of investments.
3. Explain Markowitz model of portfolio analysis.
4. What are the effects of combining the securities?

4.12 SUGGESTED READINGS

Meredith, G.G., Capital Investment Decisions, N.Y., Harper & Row,
1969.Newlyn, W.T., Theory of Money, Clarendon press, Oxford,
1971.
Prime, John H., Investment Analysis, New Jersey, Prentice Hall, 1967.
Sudhindhra Bhat, Security Analysis and Portfolio Management, Excel
Books.
Fischer, D.E. and R.J., Security Analysis and Portfolio Management, Prentice
Hall, 1983.Reilly, F.K., Investment Analysis & Portfolio Management, Drygen
Press, 1985.

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CHAPTER-5
PORTFOLIO CHOICE

Structure:-

5.0 LEARNING OBJECTIVES

After reading this chapter, you will be able to:

- Analyze how decision makers can structure their problems to the investors
- Understand how an investor allocates financial resources among different security alternatives.
- Identify an alternative way to the investor to make rational choice among the alternative portfolio.
- Know the different approaches in creating equity portfolio.

5.1 INTRODUCTION

As investor is faced with a choice of securities to be included in the portfolio among an enormous member of securities. Each and every investor wants to invest in more than one security so as to maximize his return and minimize risk. This process is known as diversification

of large number ofsecurities with different risk and return characteristics available to investors. When one considers the number of possible securities and thus portfolios in which each can be held the decision process seemsoverwhelming. In this lesson we analyse how decision makers can structure their problems as to the investor.

5.2 MEANING OF UTILITY THEORY

Utility theory is the foundation stone for the theory of portfolio choice. It enables an investor or financial analyst how to use and allocates financial resources among different security alternatives. Thistheory hovers around the concept of 'utility', which is (in present context) cardinal measurement in money of the yield generated by the. commitment of funds in various security alternatives. The theory strives to explain how a rational investor chooses an optimum portfolio among .many feasible portfolio, given the investment outlay and the price of securities. Though the theory is based upon rigorous assumptions many of which may not hold good in real life situation, yet the understanding of the theory is essential for proper understanding of investment decision making process.

Utility as a concept in economic analysis is the quantum of satisfaction derived by a consumer from the consumption of a commodity which is assumed to be measured in cardinal terms. This, in present context, refers to yield generated by a chosen portfolio during a given period, which ismeasured in monetary terms.

Assumptions of Utility Theory. The Theory of Portfolio choice is based on following Assumptions:

i. **Rationality:** the rationality assumption requires that an investor makes investment decisions with a sole objective to maximise wealth and has the perfect knowledge about the availability and the prices of securities in the market. Further, that he/she prefers more of wealth than less of it.

ii. **Constant value of money:** the assumption that real value of money or the purchasing power remains constant, taken to avoid necessary complications in the analysis arising due to changing value of money.

iii. **Money stock is constant:** that the stock of money to be invested in securities is given and the investor is to allocate that entire stock in making the portfolio. In other words, an investor has a given stock of money and further that different portfolios are constructed

by making investment of that money in the each portfolio.

iv. **Prices held constant:** as in the case of rationally, it was assumed that the investor has the perfect information about the prices of securities in the market. Here this assumption is made more rigorous by assuming that these prices remain constant during the process of portfolio construction and analysis by the investor.

v. **Lavestore's risk preferences:** there are three possibilities for investor's taste for risk. The investor is averse to risk i.e. neutral toward risk, and seeks risk. The investor is risk neutral when the expected value of portfolio is equal to cost involved in portfolio i.e. the expected value is just equal to cost. Risk aversion means that an investor will reject a fair game because the disutility of the loss is greater than the utility of an equivalent gain. Whereas, the risk neutrally implies that an investor is indifferent to whether or not a fair game is undertaken. Risk seeking means that an investor would select a fair game. Here in the present context it is assumed that risk preference of an investor is given.

Given these assumptions, investor's behaviour to maximise wealth can be illustrated with the help of marginal utility curve(s). The shape of marginal utility curves of wealth maximisation is dependent upon the risk preference of an investor/analyst. It may be either increasing or decreasing, and it may even be constant in the case of risk neutral investor. Whereas in the case of risk averse investor the slope is decreasing and for risk lover increasing as given in Fig.1:

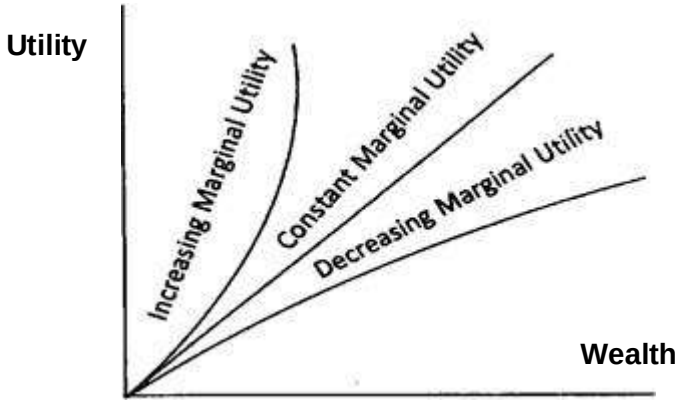
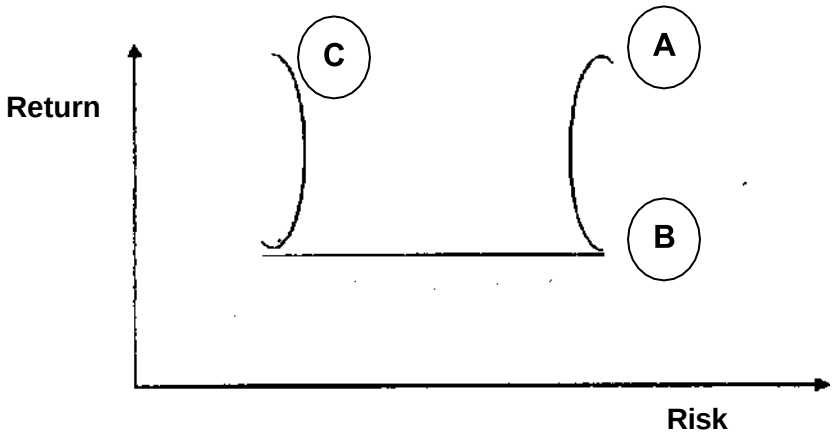


Fig.1 Wealth and Utility

On the country the utility function (or expected utility function, where the expected utility or justutility is the summation of outcomes times the associated probability) of an investor,

having different preferences for risk given the stock of wealth and the objective to maximise



wealth, is represented bythe Fig.2:

Fig.2 Utility function with different risk aversion coefficients.

Where: A is utility function of a risk-seeking investor.

B is utility function of a risk-neutral investor,

andC is utility function of a risk-averse

investor.

Alternatively, this behaviour of an investor can be presented through utility of wealth spaceinstead of return and risk space (Fig. 2) as in fig.3

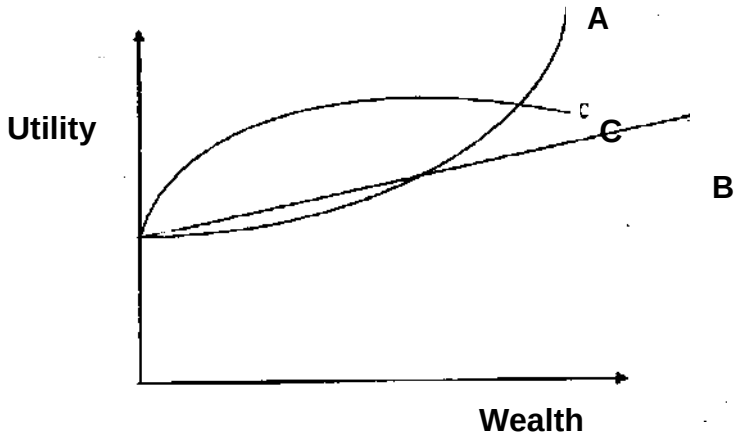


Fig.3 utility function with different risk aversion coefficients.

Where: A = utility function of a risk-seeking investor.

B = utility function of a risk-neutral investor, and C

= utility function of a risk- averse investor.

It emanates from the aforesaid analysis that risk averse investor would reject the fair gamble because his second derivate of utility function is negative or less than zero. Risk neutral investor is indifferent to fair gamble since in his case the second derivative of utility function is zero, whereas, risk- lover investor having second derivative of utility positive or greater than zero would select a fair gamble.This risk preference and the behaviour of an investor in the paradigm of utility analysis is being presented in tabular form hereunder.

TABLE 1

Risk Preference Behaviour of an Investor under Utility Analysis

Risk preference	Behaviour of an investor
1. Risk aversion	Reject fair gamble
2. Risk neutrality	Indifferent to fair gamble
3. Risk preference	Select a fair gamble

Now, if the wealth at the disposal of an investor for construction of portfolio increases, question arises how would he behave? Will he invest more or less in risky securities? Suppose, earlier portfolio size of an investor is Rs. 50,000, if this is increased to Rs. 75,000, the question is will the additional investment in rising securities will be equal to, less than or more than Rs.25,000. If the investor increases the amount invested in risky securities as size of portfolio or wealth increases, the investor is said to exhibit decreasing absolute risk aversion. If the investors, investment in rising assets in unchanged as wealth changes, then the investor is said to exhibit constant absolute risk aversion.

Most evidence would indicate that, as wealth increases, the rupee amount invested in risky assets should increase, or that investor's exhibit decreasing absolute. Regardless of which position of absolute risk aversion best describes investor's behaviour, if they can specify their feelings regarding absolute risk aversion, then the number of possible portfolio options they need consider can bereduced.

Furthermore, another pertinent question is how the percentage of wealth in risky assets changes as the size of portfolio changes. For example, if the investor puts 50 percent of her wealth in risky investments when her wealth is Rs. 100000, does she to Rs. 200000? If she does,

then the investor's behaviour is said to be characterised by constant relative risk aversion. If she invests as greater percentage of her wealth in risky aversion refers to the change in the percentage refers to the change in rupee amount invested in risky assets as wealth changes.

While there is general agreement that most investors exhibit decreasing absolute risk aversion, there is much less agreement concerning relative risk aversion. Often people assume constant relative aversion. The justification for this, however, is often convenience. It any case if investors can articulate their feelings about the percentage they would invest in risky assets as wealth changes, and then they can reduce the number of portfolio they must consider.

5.3 INDIFFERENCE CURVES

Indifferent curve analysis is an alternative way to enable the investor to make rational choice among the alternative portfolios. Needless to say the objective of these techniques is to explain the behaviour of the rational investor whose objective is to maximise profits/return. Rational investor is the person/return over less of it. Sometimes investors do not behave in a MIB way i.e. they prefer less profits/ return due to tax consideration or otherwise. The portfolio choice behaviour of such investors is, no doubt, out of scope of this technique.

Etimologically, the term 'indifferent' means state of 'non- preference'. That is a rational investoris undecided about the preference of one or the other portfolio on the risk return space. The curve obtained by joining the points of equal preference of portfolio on the risk return space is indifference curve. In other words, it is a curve derived by joining the risk return space is indifference curve. In other words, it is a curve derived by joining the risk-return combination of different portfolios which are equallypreferred by all investors. A typical indifference curve is presented in Fig.4

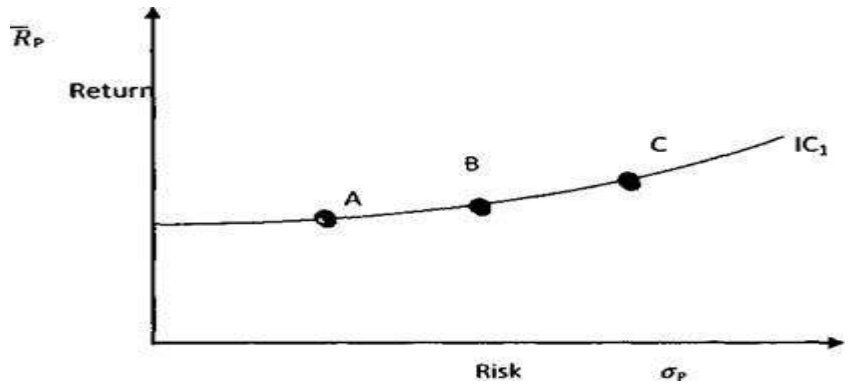
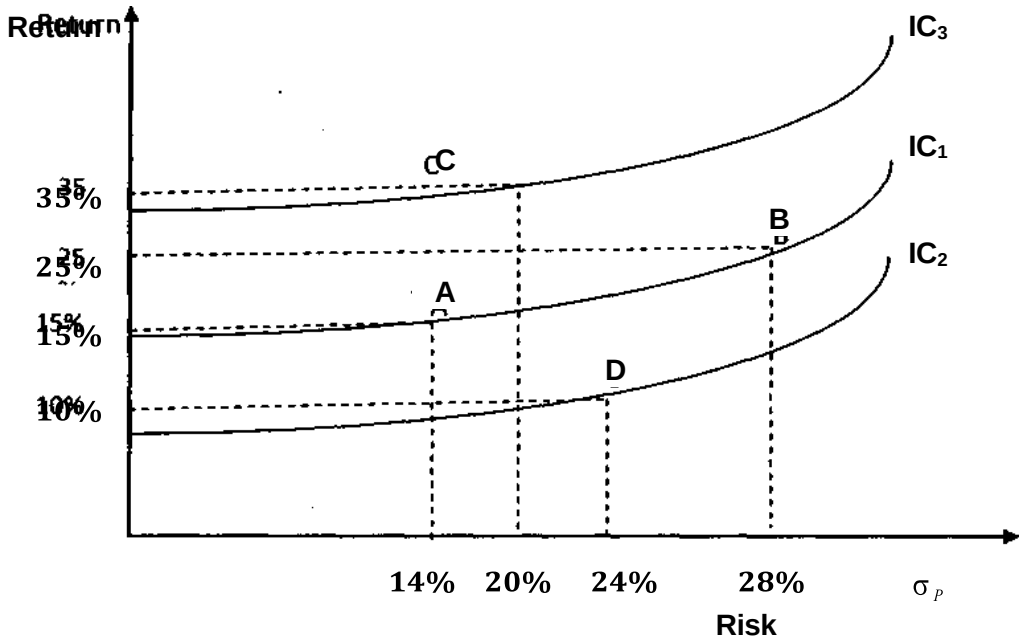


Fig. 4 Indifference Curve Map

IC1 is a typical indifference curve. Point A, B and C are return combinations of different portfoliosequally preferred by the investor. Thus, this curve represents an investor's preference for risk and return, and is drawn on a two-dimensional figure where the horizontal axis indicates



portfolio risk as measured by standard denotation (denoted by Sp) and there vertical axis indicates reward as measured by portfolio expected return (denoted by Rp), given the risk preference of an investor.

To extend the analysis further, figure illustrates on indifference curve map of a hypothetical investor. Each curved line indicates one indifference curve for the investor and represents all combination of portfolios which provide the investor a given level of desirability on risk-return space. Forexample, the investor would find portfolios A and B equally desirable, even though they have different expected returns and standard deviations, because both lie on the same indifference curve IC1' portfolioB has a higher standard deviation (28%) than portfolio A (14%) and is therefore, less desirable on that count. However, exactly offsetting this loss in desirability is the gain in desirability provided by the higher expected returns of portfolio B (25%) relative to portfolio A (15%). Therefore, all portfolio lie on a given indifference curve are equally desired by the investor given his/her preference for risk.

However, the investor would find portfolio C, with an expected return of 35% and a standard deviation of 20% preferable to both portfolios A and B. this is because portfolio C

happens to be an indifference curve IC3 which is located to the 'northwest' of IC1' Hence portfolio C has a sufficiently larger expected return relative to portfolio A to more than offset its higher standard deviation and, onthe balance, make it more desirable than portfolio. A similarly, portfolio C has a sufficiently smaller standard deviation than portfolio B to more than offset its smaller expected return of an risk averse investor and on balance, make it more desirable than portfolio B. therefore, an investor will find any portfolio on an indifference curve which is further northwest to be more desirable than any portfolio lying on a indifference curve which is not as for northwest. In other words, any portfolio lying on higher indifference curve is always preferred, given the risk preference of an investor.

Another important fallout in this context is that two indifferent curves intersect. It holds so given transitivity rule. The transitivity hypothesis implies that given the risk preference behaviour of an investor, if an investor prefers portfolio X over portfolio Y, and that portfolio Y over portfolio Z, then, certainly by this hypothesis, portfolio X will be preferred over portfolio Z. figure 6 illustrates this point further. The point of intersection is represented by P. further that all the portfolios on IC1. Similarly, all the portfolios on IC1 is on both indifference curves, therefore, all the portfolios on IC1 must be as desirable as those on IC2. But this presents a contradiction, because IC1 and IC2 are two different curves that are supposed to represent different levels of desirability. Therefore, in order to there be no contradiction, these curves cannot intersect.

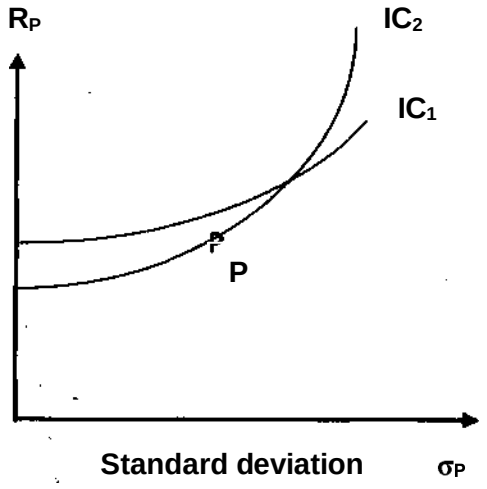


Fig. 6 Intersecting indifference curve

However, it should be noted that an investor has an infinite number of indifference curves. It implies the whenever there are two indifference curves that have been plotted on a graph, it is

possible to plot a third indifference curve that lies between them. As can be seen from figure 7, given indifference curves IC_1 and IC_2. It is possible to graph a third curve, $1C^*$, lying between them. It also implies that another indifference curve can be plotted above IC_2 and yet another below IC_1.

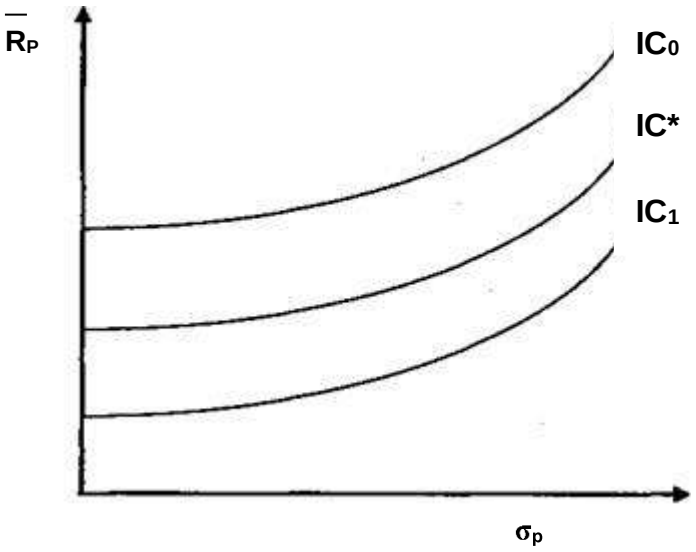


Fig. 7 plotting a third indifference curve between two others

An obvious at this stage is how does an investor determine what his or her indifference curves look like? Since each investor has a map of indifference curves that is nevertheless unique to that investor alone. Further, it involves presenting the investor with a set of hypothetical portfolios, along with their respective expected returns and standard deviations. The she or he should be asked to choose there from the most desirable one. Given the choice thus made, the shape and location of the investor's indifference curves can be estimated. This is because it is presumed that the investor would have acted as if he or she has indifference curves in making this choice, even though indifference curves would not have been explicitly used.

Thus, every investor has an indifference map representing his preferences for expected returns and standard deviations. It implies that investor should determine the expected return and standard deviation for each potential portfolio plot them on a graph and then select one portfolio that lies on the indifference curve that is further northeast.

The aforesaid discussion on portfolio choice with the help of indifference curves is based on two assumptions. First, it is assumed that investors, when given a choice between two

otherwise identical portfolios, will always choose one with the higher level of expected return. This assumption is known as no satiation and fundamentally based upon Markowitz hypothesis that investors prefer higher levels of terminal wealth than to lower levels of terminal wealth, however, it is not quite so obvious what the investor will do when having to choose between two portfolios having the same level of expected return but different levels of standard deviations. This necessitates the second assumptions. Secondly, it is assumed that investors are generally risk averse, which means that the investor will choose the portfolio with the smaller standard deviation. Needless to say that these two assumptions are reflected irrationality in the behaviour of the investors. That is why these two assumptions of nonsatiation and risk aversion cause indifference curves to be positively sloped and convex. However, the assumption of risk aversion does not imply that all investors have identical degrees of risk aversion. Some investors may be highly risk averse, whereas others may be only slightly so.

5.4 CREATING AN EQUITY PORTFOLIO

There are various aspects of investments in equity stocks their characteristics, fundamental analysis and various strategies. Finally, all such information has to be synthesized into developing in comprehensive and meaningful strategy for the management of an equity portfolio of stocks.

1. The Four Approaches

Different investors follow different approaches when they deal with investments. Four basic approaches are illustrated are illustrated below, but there could be numerous variations.

1. **The holy-cow approach.** This investor typically buys but never sells. He treats his scrips like holy cows, which are never to be said for slaughter. If you can consistently find and then confine yourself to buying only prized bulls, this holy cow approaches many pay well in the long run.

2. **The Pig-farmer approach.** The pig farmer on the other hand, knows that pigs are meant for slaughter. Similarly, an investor adopting this approach buys and sells shares as fast as pigs are grown and slaughtered. Pigs become pork and equity hard cash.

3. **The Rice-miller approach.** The rice-miller buy paddy feverishly in the market during the season, then mills hoard and sells the rice slowly over an extended period depending on

price movements. His success lies in his skill in buying and selling, and his financial capacity to hold stocks. Similarly, an investor following this approach grasps the share at the right price, takes position, holds on to it, and liquidates slowly.

4. **The Woollen trader approach.** The woollen trader buys woollens over a period of time but sells them quickly during the season. His success also lies in his skill in buying and selling, and his ability to hold stocks. An investor following this strategy buys over a period of time but sells quickly, and quits.

Choose the approach which suits you best- you can make money in all these ways. It all depends upon the kind of stocks you buy and sell. Table I suggests a course of action in each case.

Table 1

Investment Approaches and Choice of Stocks		
Investment approachThe Holy cow	Key strategy Buy and holds	Choice of stocks Growth stocks and blue Chips witha successful Track record.
The pig farmer	Buy and sell promptly	Cyclical stocks, companies With special situations like take-over, change of management etc.
The Rice miller	Buys swiftly and sell slowly	Stock which are likely to benefit byimminent, favourable government policies, like liberalization, decontrol etc.
The Woolen trader	Buy slowly and sell swiftly	Stocks in special situations like aturnaround

To succeed in portfolio management you must consciously follow a path which suits you best; otherwise you may end up with below - average returns.

For an investor in growth stocks, the most suitable investment approach, obviously, is the holy cow approach. You identify good growth stocks, buy them, and hold them for a long-term. Do not get flustered and switch strategy mid-way.

5.5 OBJECTIVES OF PORTFOLIO MANAGEMENT

The objective of portfolio management is to invest in securities in such a way that one maximizes one's returns and minimizes risks in order to achieve one's investment objectives.

A good portfolio should have multiple objectives and achieve a sound among them. Any one objective should not be given under importance at the cost of others.

Presented below is some important objectives of portfolio management.

1. Safety of the investment. The first important objective of a portfolio, no matter who owns it, is to ensure that the investment is absolutely safe. Other considerations like income, growth, etc. only come into the picture after the safety of your investment is ensured.

Investment safety or minimization of risk is one of the important objectives of portfolio management. There are many types of risks which are associated with investment in equity stocks, including super stocks. Bear in mind that there is no such thing as a zero-risk investment. Moreover, relatively low risk investments give corresponding lower returns. You can try and minimize the overall risk or bring it to an acceptable level by developing a balance arid efficient portfolio. A good portfolio of growth stocks satisfies all the objectives outlined above.

2. Stable current returns. Once investment safety is guaranteed, the portfolio should yield a steady current income. The current returns should at least match the opportunity cost of the funds ofthe investor. What we are referring to here is current income by way of interest of dividends, not capital gains.

3. Appreciation in the value of the capital. A good portfolio should appreciate in value in order to protect the investor from any erosion in purchasing power due to inflation. In order words, a balanced Portfolio must consist of certain investments which tend to appreciate in rent value after adjustment for inflation.

4. Marketability. A good portfolio consists of investment which can be marketed without difficulty. If there are too many unlisted or inactive shares in your portfolio you will face problems in encasing them, and switching from one investment to another. It is desirable to invest in companies listed on major stock exchange, which are actively traded.

5. Liquidity. The portfolio should ensure that there are enough funds available at short notice totake care of the investor's liquidity requirements. It is desirable to keep a line of credit from a bank for use in case it becomes necessary to participate in right issue, or for any other personal needs.

6. Tax Planning. Since taxation is an important variable in total planning, a good portfolio should enable its owner to enjoy a favourable tax shelter. The portfolio should be development considering not only income tax, but capital gains tax, and gift tax; as well .what a good portfolio aims atis tax planning, not tax evasion or tax avoidance.

5.6 SELF CHECK EXERCISE

1. Define Utility Theory.
2. How to create Equity Portfolio.

5.7 SUMMARY

Modern portfolio theory (MPT) is a theory on how risk-averse investors can construct portfolios to maximize expected return based on a given level of market risk. Utility theory is the foundation stone for the theory of portfolio choice. It enables an investor or financial analyst how to use and allocates financial resources among different security alternatives. The objective of portfolio management is to invest in securities in such a way that one maximizes ones's returns and minimizes risks in order to achieve one's investment objectives.

5.8 GLOSSARY

Portfolio: Portfolio means a collection or combination of financial assets (or securities) such as shares,debentures and government securities.

Investment Risk Pyramid: A portfolio strategy that allocates assets according to the relative safety and soundness of investments. The bottom of the pyramid is comprised of low-risk investments, the mid-portion is composed of growth investments and the top is speculative investments. Random**Diversification:** Also known as naive diversification, it refers to the act of randomly diversifying without regard to relevant investment characteristics such as expected return and industry classification.

Value Investing: In the case of value investing, bargains are often measured in terms of market prices that are below the estimated current economic value of tangible and intangible assets.

5.9 ANSWERS TO SELF CHECK EXERCISE

1. For answer refer to section 5.2

2. For answer refer to section 5.4

5.10 TERMINAL QUESTIONS

1. What do you mean by utility theory of portfolio choice? What are its assumptions?

2. What are the objectives of portfolio management?

5.11 SUGGESTED READINGS

- Samuels J. M, F.M. Wilkesard R.E. Brayshaw, Management of Company Finance, Chapmanand Hall, London
- Smith, Edger Lawrence, Common Stocks as Long-term Investment, New York, MacMillan.
- Sprinkel, Beryl, W., Money and Stock Prices, Homewood III, Richard S. Irwin, Inc.
- Sudhindhra Bhatt, Security Analysis and Portfolio Management, Excel Books.
- Fischer, D.E., Security Analysis and Portfolio Management, Prentice Hall,1983.
- Reilly, F.K., Investment Analysis & Portfolio Management, Drygen Press, 1985.

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CHAPTER-6

PORTFOLIO PERFORMANCE EVALUATION

Structure:-

6.0 LEARNING OBJECTIVES

After reading this chapter, you will be able to:-

- Understand the theoretical basis for portfolio planning
- Appreciate the need for planning portfolios to suit individual needs
- Apply the various techniques available for planning and allocation.

6.1 INTRODUCTION

Portfolio construction refers to allocation of funds among variety of financial assets open for investment. Portfolio theory concern itself with principles governing such allocation. The objective of this theory is to elaborate such principles in which risk can be minimized and return can be maximized.

Portfolio management is a dynamic and flexible concept and involves continues

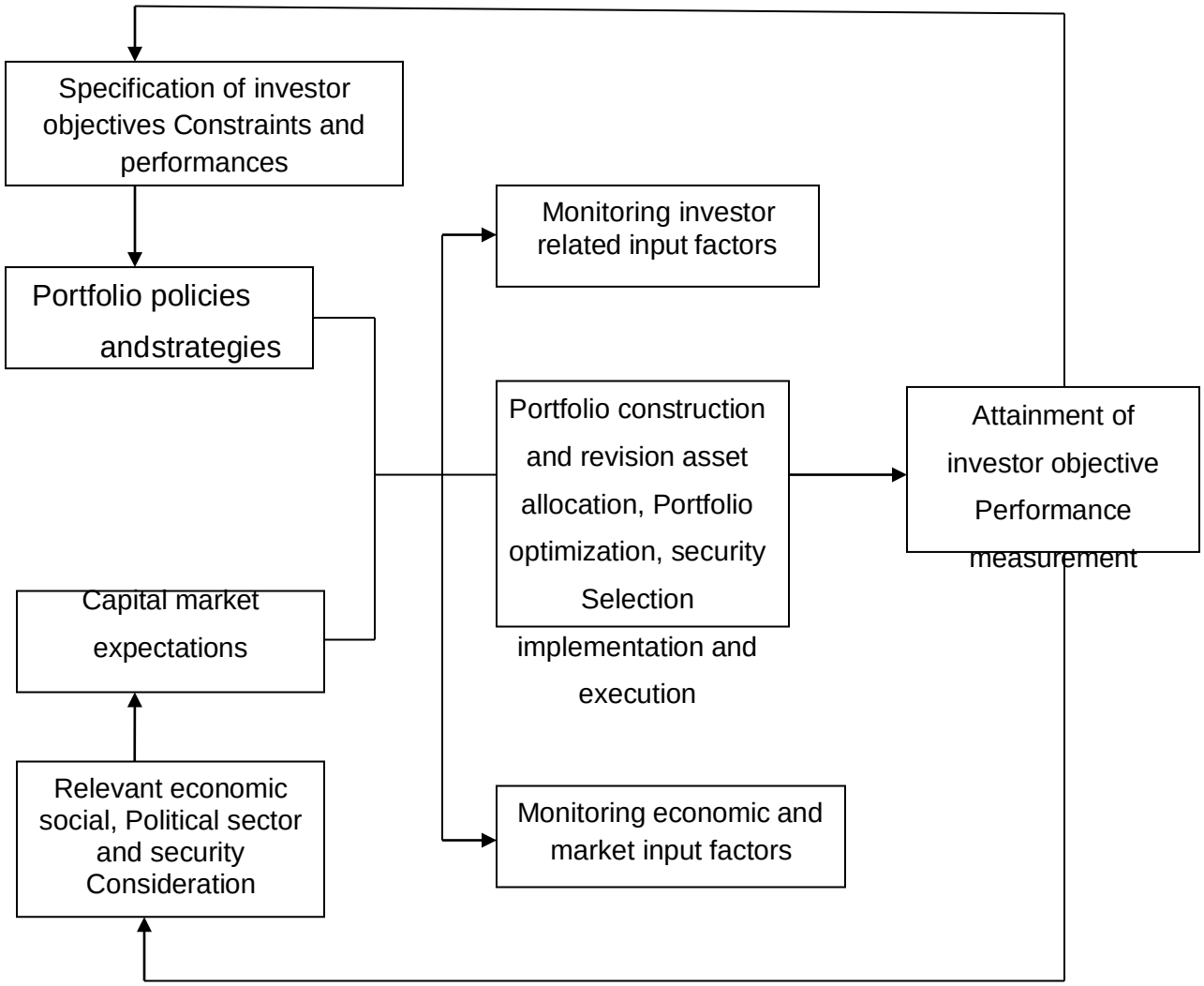
and systematic analysis, judgement and operation.

1) It involves construction of portfolio taking into account investors objectives constraint,preference for risk and return and tax liability.

2) It involves that portfolio is reviewed and adjusted from time to time in tune with the marketconditions.

3) The evaluation of portfolio performance is to be done by the manager in terms of targets set forrisk and return and changes in the portfolio are to be affected to meet the changing conditions.

STAGES IN PORTFOLIO MANAGEMENT



6.2 PERFORMANCE EVALUATION

Investors who have to pay to portfolio managers for actively management of their portfolio have right to know about the performance of portfolio. Also the manager by evaluating his own performance can identify sources of strength or weakness- Hence portfolio performance evaluation can be viewed asa feedback and control mechanism that can make the investment management process more effective. Portfolio performance is evaluated by measuring and comparing portfolio return and associated risk.

There are three major methods of assessing performance

1. Return per unit of risk
2. Differential return
3. Components of performance

The first of the risk adjusted performance measures in the type that assesses the performanceof a fund in terms per unit of risk. The technique here is to relate the absolute level of return achieved tothe level incurred. According to this method, funds that provide the highest return per unit of risk would

be judged as having provided the best performance, while those providing the lowest return per unit of risk would be judged as the poorest performers. There are two alternatives, yet similar methods of measuring return per unit of risk: (1) the reward to variability ratio developed by William Sharpe, and (2)the reward to volatility ratio developed by Jack Treynor. These two performances ratios differ only in that former considers total risks measured by standard deviation, while the letter considers only market risk as measured by P is Beta. ;

A second category of risk-adjusted performance evaluation is the type referred to as differential return measure and is developed by Michael Jensen. The underlying objective of this technique is to calculate the return that should be expected for the fund given the realized risk of the fund and comparethat with the return actually realized over that period. In making this comparison, it is assumed that the investor has a passive alternative of merely buying the market portfolio and adjusting for the appropriate level of risk by borrowing or lending at the risk-free rate.

The performance measures stated above are primarily concerned to an analysis of overall

performance of a fund. However, it is useful to develop a more refined breakdown and assess the sources or components of performance. Eugene Fama has provided an analytical framework that elaborates on the three previously state risk-adjusted methods to allow a more detailed breakdown of the performance of a fund. This is done in three ways: (1) stock selection here examine the overall performance of the fund in terms of superior or inferior stock selection and the normal return associatedwith a given level or risk; therefore,

Total excess return = Selectivity and risk

In striving to achieve above average returns, fund managers will generally have to forsake somediversification that will have its cost in terms of additional portfolio risk. Hence some added returnshould be expected to compensate for this additional diversification risk. This is done by using the capital market line to determine the return commensurate with the incurred risk as measured by the standard deviation of the return (2) Market timing the first method focused on the capability of management in generating superior performance by means of stock-selection techniques. Under this second method, fund managers can also generate superior performance better than market average,by timing the market correctly, that is, by assessing correctly the direction of the market, either bull or bear, and positioning the portfolio accordingly. Managers with a forecast of declining market can position a portfolio properly by increasing the cash percentage of the portfolio or by decreasing the betaof the equity portion of the portfolio. Conversely, a forecast of a rising market would call for reduction in the cash position or an increase in the beta of the equity portion of the portfolio. (3) Cash management analysis-Farrell used the alternative but complementary method of directly analyzing the way mutual funds varied the cash percentage of the

fund to assess the competence of funds in market timing in different environments. To assess the degree to which variations in the cash percentage around the long term average have benefited or detracted from fund performance, two indices were constructed for each fund. The first index is based on the average cash to other asset allocation experienced by the fund over the period of analysis. The second index is based on a quarter to quarter changes experienced by the fund over the period.

6.3 METHODS OF PORTFOLIO PERFORMANCE EVALUATION

Portfolio evaluation has evolved dramatically over the last two decades. The acceptance

of modern portfolio theory has changed the evaluation process from crude return calculation to rather detailed explorations of risk and return and the sources of each. The evaluation of portfolio performance is essentially concerned with comparing the return earned on some portfolio with the return earned on one or more other portfolios. It is important that the portfolios chosen for comparison are truly comparable broadly speaking, there are three widely used and universally recognized methodsof portfolio performance evaluation. These are:

1. Sharpe's Return to Variability

This model yields a single value that can be used for investment performance rankings. It assigns the highest value to portfolios that have the best risk-adjusted rate of return. The difference between an investment's expected rate of return and the risk-less rate, (Rp - Rs), is called the risk premium.

This risk premium is divided by the portfolio's standard deviation to compute the excess return per unit of risk the return to variability, as:

$$\text{Sharpe's Model} = \frac{\text{portfolio's average rate of return Minus Risk} - \text{less rate of Return}}{\text{portfolio's standard deviation of rates of return}}$$

$$= \frac{\text{risk premium}}{\text{standard deviation}}$$

Symbolically, $S = \frac{R_p - R_f}{\sigma_p}$

Where S = Sharpe's value

(r_p) = Expected average return from the portfolio,

R_f = Risk-less rate of return

σ_p = Variability in portfolio's return or standard deviation of portfolio or the risk of portfolio

P = portfolio

Graphically, the index, S measures the slope of the line emanating from the risk-less rate outward to the portfolio in question (Fig. 1). Thus, the Sharpe model summarizes the risk and return ofa portfolio in a single measure that categories the performance of the fund on a risk adjusted basis. Thelarger the value of S, the better the portfolio has performed.

E(rp)

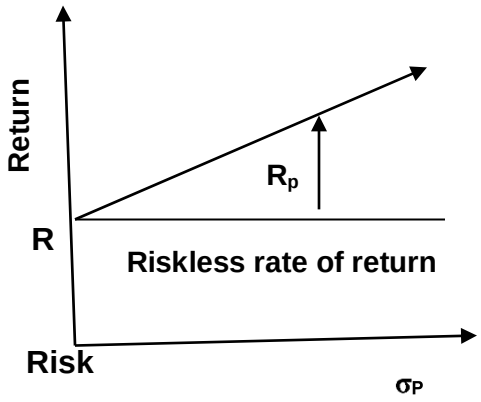


Fig. 1

Example 1.

Portfolio A = expected return

Rp = 10%

σ p = 4%

Portfolio B

Expected return, Rp = 18%

Riskless rate of return i.e. Rf = 6%

$$S_A = \frac{R_p - R_f}{\sigma_p} = \frac{10\% - 6\%}{4} = 1$$

$$S_B = \frac{18\% - 6\%}{6} = 2$$

B is better portfolio because index is higher.

Example 2. Assume that portfolio A has an average return of 18 percent with a standard deviation of 3 percent, and portfolio B has an expected average return of 33 percent with a standard deviate on 6 percent. Further assume that risk free rate of return, R = 9 percent. Then the Sharpe indexequals:

$$S_A = \frac{18\% - 9\%}{3} = \frac{9}{3} = 3$$

and for $B: S_B$ $S_B = \frac{33 - 9}{6} = \frac{24}{6} = 4$

Thus, 3 is ranked as the better portfolio because its index is higher (4>3).

2. Treynor's Return to Volatility

According to Jack L Treynor, the first step in obtaining a satisfactory performance measure is to relate the expected rate of return of a mutual fund to the rate of return of a suitable market average Thedevice for accomplishing this is characteristics line. The characteristic line contains information about both expected rate of return and risk. The slope of the line measures volatility, a steep slope meansthat the actual rate of return for the fund in question is relatively sensitive to fluctuations in the general stock market; a gentle slope indicates that the fund in question is relatively insensitive to market fluctuations. He also pointed out that investment risk in a diversified fund is the sum of responses to

(1) general market fluctuations and (b) and (2) fluctuations peculiar to the particular securities

held inthe portfolio (a). If a fund is properly diversified, the latter risk (a) tends to average out, since the securities are casually unrelated in a properly diversified portfolio (a->, with proper diversified portfolio). The former risk (b), being common to all stocks in greater or lesser degree, does not tend to average out. Therefore, if management of a portfolio attempts to maintain a constant degree of volatility, then, the slope of the characteristic line will tend to measure that volatility.

Therefore, to find the b, the mutual funds characteristic regression line below must first becalculated, as:

Where

$R_{p,t} + a_p + b_p r_{m,t} + e_{p,t}$

$r_{p,t}$ = Rate of return on portfolio p in the period t

$r_{m,t}$ = Rate of return on market index in period t

$e_{p,t}$ = Unexplained residual return for portfolio p in period t

a_p = Regression line's intercept term for portfolio p

b_p = beta coefficient for portfolio p, a measure of the portfolios undiversifiable systematic risk

For ranking of portfolios, Treynor's performance measure is defined as:

$$\text{Treynor s measure} = \frac{\text{portfolio's average rate of return} - \text{Risk-less rate of Return}}{\beta \text{ coefficient of portfolio, } P}$$

Therefore, Treynor's measure, in a sense, is the measure of portfolio's excess return per unit of portfolio's beta coefficients (b). Thus, symbolically,

$$T_p = \frac{R_p - R_s}{\beta}$$

Where T_p = Treynor's measure of portfolio performance

R_p = return of the portfolio p

R_s = riskless rate of return

β = beta coefficient or volatility of the portfolio's.

In this context, it becomes necessary to know volatility of portfolio. Volatility of the portfolio is themeasure of sensitivity or responsiveness of portfolio return under consideration to a given change in the return of market portfolio. Suppose, in a given period market portfolio has

registered a increase of 40 percent and if the return of portfolio concerned register an increase of 80 percent during the same period, then the volatility of the concerned portfolio is, 80/40 = 2.0 times the market portfolio. Hence portfolio is 2.0 times more sensitive to market movements. It is so because the volatility of market portfolio (b of market) is always taken as 1.00.

Graphically, the Treynor's measure can be depicted graphically as:

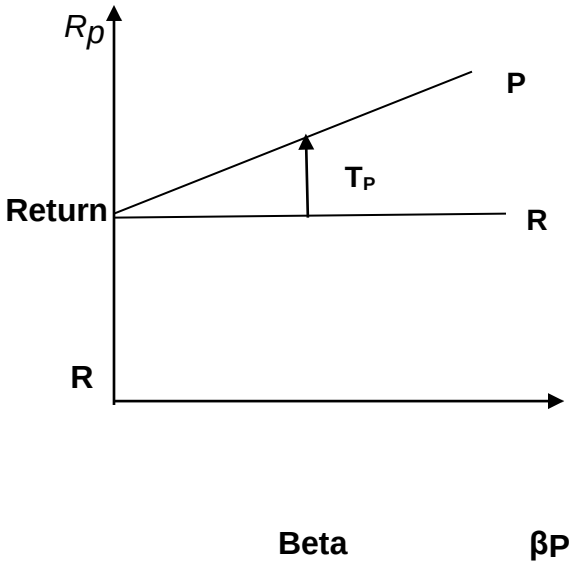


Fig. 2

Thus, the diagrammatic presentation of Treynor's, model seems to be identical with that of Sharpe's, yes, it is, except with a difference that in the latter variability (a) was taken on X-axis, whereas, in the former volatility (b) is taken. This is vital point of differentiation between the two since in Treynor's framework unsystematic risk will disappear due to proper diversification and consequently theresidual systematic risk (a) becomes sole representative of risk of portfolio whereas Sharpe's model on the other hand, measures portfolio risk by variability (s) which includes both systematic and unsystematic risk (s= a+b).

Therefore,

Portfolio risk = systematic risk + unsystematic riskOr s = a+b‘

and, due to proper diversification a = 0,

Thus,

S = b+0

S = b

S = Sharpe's measurement of portfolio risk i.e. variabilityB = Treynor's measurement of portfolio risk i.e. volatility.

Example 3.

Portfolio	return	β	R1
A	20	0.5	10
B	24	1.0	10

$$T_A = \frac{R_p - R_f}{B} = \frac{20-10}{0.5} = 20$$

$$T_B = \frac{24-10}{1} = 4$$

Portfolio A performs better

Example 4. Assume that portfolio A has average return of 15 percent with volatility of 3 percent,and the portfolio B has an average return of 18 percent with volatility of 5 percent. Further, assume that riskless rate, R = 9 percent. Then the Treynor's value of for portfolio A equals:

$$T_A = \frac{15-9}{3} = 2.0$$

and for portfolio B:

$$T_B = \frac{18-9}{5} = 1.8$$

Therefore, Traynor's index has ranked portfolio A as the better portfolio because its value is higher (2.0>1.8) despite the feet that portfolio B had a higher return (18%>15%). It is due to differencein volatility (b) of two portfolios.

3. Jensen's Differential Return

The underlying objective of this model is to calculate the return that should be expected for the fundgiven the realized risk of the portfolio, and to compare that with the return actually realized over that period. In making this comparison it is assumed that the investor has a passive alternative of buying themarket portfolio and adjusting that for the appropriate level of risk by borrowing or lending at the risk free rate. Given this assumption, the most commonly used method of determining the return that shouldhave been earned by the fund at a given level of risk is as determined by Capital Asset Prancing Model (CAPM). Thus, Jensen attempts to construct a measure of absolute performance oh a risk adjusted basis; that is, a definite standard against which performances of various funds can be measured. This standard is based on measuring the portfolio managers' predictive ability, that is, his higher than those which were expected, given the level of riskness of this portfolio.

The simplified version of Jensen's Model as based on CAPM is given below as:

$$Rp - Rf = a+b(Rm - Rf)$$

Where:

R_p = Portfolio return

R_f = Riskless rate of return

a = Y intercept that measures the forecasting ability of portfolio managerb
= Beta coefficient, a measure of systematic risk

R_m = Return of market portfolio.

It should be noted that this model of portfolio performance evaluation neither is similar to that of those developed by Sharpe and Trey nor except in respect of a, which is the measurement of forecasting ability of portfolio manager. In fact a positive a value represents that extra return accruing tothat particular portfolio is because of superior management. The zero value of a (a = 0) indicates neutral performance by management i.e. management has done just as much as the market portfolio. While the negative value (a<0) indicates inferior management performance

because management of portfolio foiled to do as much as an unmanaged portfolio or market portfolio. This situation may arise in case portfolio returns where not sufficient to offset the expenses incurred in the portfolio selection, portfolio revision, and in the trey nor models is always at the origin, whereas in Jensen's model it may be in the o igin (a = 0), above the origin (a>0), and may even below the origin when a involves negativevalue (a<0).

Thus, performance measurement is an integral part of the investment management process. In evaluating the performance, there are two major tasks: to determine whether the performance is superior or inferior and to determine whether the performance is due to sheer luck or change or due to skill. The essential ideas behind performance evaluation are to compare an actively managed portfolio's returns against the returns of an alternative benchmark portfolio. An appropriate benchmark should be relevant and feasible, and it should exhibit risk similar to that of the actively managed portfolio. The risk adjusted measures of performance have been criticized for using a market surrogate instead of the 'true' market portfolio, being unable to statistically distinguish luck or chance from skill except over very long period of time, using an appropriate risk-free rate; and relying heavily on the validity of the CAPM.

If a = 0 means neutral performance of manager i.e. same as that of market.If a > 0, superior performance over the market

If a < 0 inferior performance,

Example 5. Jensen Model

Portfolio	Return	Portfolio Beta
1	18%	1.2
2	15%	0.8
3	21%	1.5
Market	16%	1.0

Market beta -1.0

Risk-free return = 10%

1. Portfolio 1

$R_p = R_s + B(R_m - R_s)$

R_p => 10% + 1.2 (16 - 10) = 17.2%

2. R_p => 10% + 0.8 (16 - 10) = 14.8%

3. R_p => 10 + 1.5 (16 -10) = 19.0

Actual Vs. Estimated Value

1) = 18 - 17.2 = 0.8%

2) = 15 - 14.8 = 0.2%

3) = 21 - 19.0 = 2.0%

It shows that best managed portfolio is (3) portfolio and gives a return 2% higher than expected.

Graphically

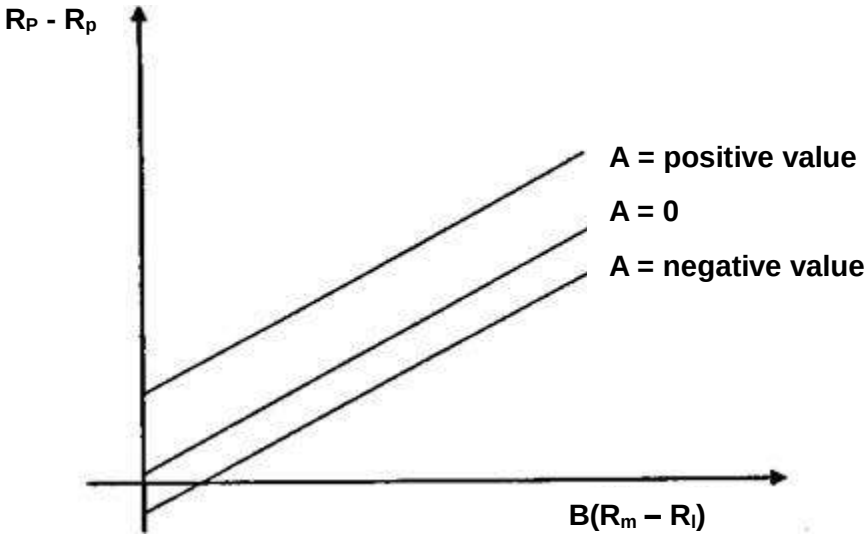


Fig. 3

6.4 SELF CHECK EXERCISE

1. What is portfolio management?
2. Discuss Sharpe's Return to Variability.
3. Discuss Jensen's Differential return.

6.5 SUMMARY

Whenever an investor employs resources, be it in the form of hiring employees for his company,establishing a charitable fund or investing money in an investment fund he will want to measure the performance of his investment. The investment manager will be bound to the investment policy and subject to a constant evaluation of his achievements. There are three major methods of assessing performance i.e., return per unit of risk, differential return and components of performance. There are three widely used and universally recognised methods of portfolio performance evaluation. These are Sharpe's return to variability, Treynor's return to volatility and Jensen's differential return.

6.6 GLOSSARY

Portfolio Construction: Portfolio construction is the process of blending together the broad assetclasses to obtain an optimum return with minimum risk.

Benchmark Portfolio: A tool for the meaningful evaluation of the performance of a portfolio manag

er.

Jensen's Measure: It is an absolute measure of performance, adjusted for risk.

The Sharpe Measure: It evaluates the portfolio manager on the basis of both rate of return anddiversification.

Portfolio Risk: Portfolio risk is simply weighted average risk of all securities in the portfolio and ismeasured by the standard deviation together with the covariance between securities.

6.7 ANSWERS TO SELF CHECK EXERCISE

1. For answer refer to section 6.1
2. For answer refer to section 6.3
3. For answer refer to section 6.3

6.8 TERMINAL QUESTIONS

1. What do you mean by portfolio management? What are the stages in portfolio management?
2. What is performance evaluation? What are the major methods of assessing

performance?

6.9 SUGGESTED READINGS

- Samuels J. M, F.M. Wilkesard R.E. Brayshaw, Management of Company Finance, Chapmanand Hall, London
- Smith, Edger Lawrence, Common Stocks as Long-term Investment, New York, MacMillan.
- Sprinkel, Beryl, W., Money and Stock Prices, Homewood III, Richard S. Irwin, Inc.
- Sudhindhra Bhatt, Security Analysis and Portfolio Management, Excel Books.
- Fischer, D.E., Security Analysis and Portfolio Management, Prentice Hall,1983.
- Reilly, F.K., Investment Analysis & Portfolio Management, Drygen Press, 1985.

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CHAPTER-7

FUNDAMENTAL ANALYSIS AND VALUATION-I

Structure:-

7.0 LEARNING OBJECTIVES

After reading this chapter, you will be able to:-

- Describe the various factors that influence the economy
- Understand the relationship between stock prices and the economy
- Describe the various factors that influence industries
- Evaluate the future prospects of an industry

7.1 INTRODUCTION

In the fundamental approach, an attempt is made to analyze various fundamental or basic factors that affect the risk-return of the securities. The effort here is to identify those securities that one perceives as mispriced in the stock market. The assumption in this case is that the 'market price' of security and the price as justified by its fundamental factors called 'intrinsic value' are different and the marketplace provides an opportunity for a discerning investor to

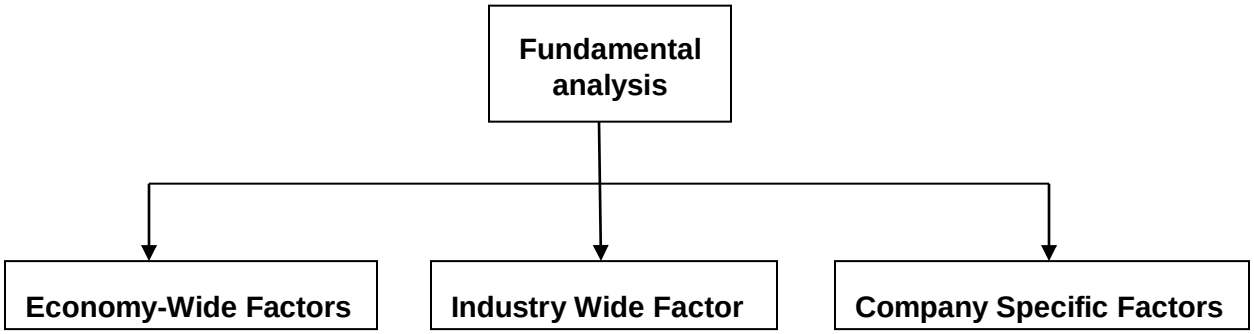
detect such discrepancy. The moment such a description is identified; a decision to invest or disinvest is made. The fundamental factors may relate to the economy or industry or company or all some of this. Thus, economy fundamentals, industry fundamentals and company fundamentals are considered while prizing the securities for takinginvestment decision.

7.2 MEANING OF FUNDAMENTAL ANALYSIS

The basic purpose of buying a security is to earn dividends and ultimately sell it at higher price. An investor, therefore, is interested in obtaining estimates of future dividends, and also the future price of the share. These in turn will depend upon the performance of the industry to which the company belongs, and the general economic situation of the country.

The multitude of factors affecting a company's profitability can be broadly classified as:

1. **Economy-wide factors**. These include the factors like growth rate of the economy, the rate of inflation, foreign exchange rates etc. which affect profitability of all companies, in general.



2. **Industry-wide factor.** These include factors, which are specific to industry to which the company belongs. For instance, the demand supply gap in the industry. The emergence of substitutes, and changes in government policies towards industry affect the company belonging to an industry.

3. **Company specific factors.** These factors are specific to a firm. The firm-specific factors like plant and machinery, the brand image of the product, and ability of the management to affect the profitability.

An investor with rational and scientific approach will therefore be interested in analyzing the influences of the expected performance of the company, industry and the economy as a whole on share prices, even before taking the investment decision. Such analysis is called fundamental analysis. This analysis is based on the premise that share prices are determined by a number of fundamental factors relating to the economy, industry and the company. Based on these fundamental factors, each share is assumed to have an economic value or intrinsic value. The purpose of fundamental analysis is to evaluate the present and future earning capacity of a share based on the economy, the industry and company fundamentals and decide the intrinsic value of a share.

The intrinsic value determined by fundamental analysis is compared with the prevailing market price to arrive at an investment decision. If market price is more than intrinsic value, the share is considered to be overpriced and a "Sell" decision is recommended. On the other hand if intrinsic value is less than market price the share is considered to be underpriced and "Buy Decision" is recommended. The fundamental analytical frame work is called Economy- industry Company Analysis frame work (EIC frame work).

In the present chapter we discuss the analysis of economy wide factors. Industry factors and company factors.

7.3 ECONOMY-WIDE FACTORS

The performance of the company depends on the performance of the economy. We shall illustrate how to prospects of a company are influenced by larger economy-wide factors. Suppose, for instance, we are examining the possibility of investing in share of Cement Company. It is true that if the economy is growing fast, the demand for cement in general is expected to grow fast. Besides the cement companies, the firms in other industry will also do well. On the other hand, if the economy is passing through recession, the performance of the cement company will be generally bad.

The investors are concerned with those variables in the economy which affect the performancesof company in which they intend to invest. A study of these economy variables will give some idea as to the potential future performance of the company. We therefore shall look at some of the key economicvariables that an investor would have to track down as a part of fundamental analysis.

Growth rate of National Income & Related Measures:

The rate of growth of national economy is an important variable to be considered by an investor.We often hear of Gross Domestic Product (GDP), Gross National Product (GNP) and Net National Product (NNP). These terms vary slightly between themselves. But, they all measure the total income or total economic output of the whole country. The precise conceptual differences between them are not important in the present context but, for most purposes, what is important is the role of growth of theeconomy. The growth rate in any of these measures is good enough to reflect the growth of the economy, because growth rates of all of them are close to each other. The estimates of the GNP, NNP and GDP and their growth rates are made available by the government from time to time. Theestimates of growth rate of the economy would be a good pointer to the prospects of the individual sectors and hence to the returns that the investor can expect from investing in shares. The profitability of the companies are expected to the attractive when the economy grows faster, and the returns to investment in share in turn are expected to be good.

Growth Rate of Industrial Sector

The growth of industrial sector is an important contributor to the growth of national income. The performance and growth of the industry is measured through an index number called index of industrial Production The Industrial growth rate is further disaggregated into growth rates of different sectors like electricity, basic goods, consumer goods and so on the trends in such rates broadly point to the performances of the different industrial sectors to which a specific company of investor's interest belongs.

Inflation

Inflation prevailing in the economy has considerable impact on the performance of the companies high rates of inflation upsets business plans; result in high input costs and hence reduction in profit margins. On the other hand, the inflation erodes purchasing power of buyers and results in reduction in demand for goods. The demand for consumer goods will particularly be affected adversely.The firms in these industries therefore make continuous assessment about inflation rates likely to prevail so that they could tune pricing, distribution and promotion policies to the anticipated impact of inflation on their product demand.

Inflation is measured by a suitable price index number. The wholesale price index (WPI),

number is generally used for this purpose. This index number is available on a weekly basis from Central Statistical Organization (CSO) and Reserve Bank of India (RBI). The fundamental analyst should evaluate the prevailing and likely future trends in inflation and their probable impact on the company's performance. However it should be noted that the economists argue that moderate rate if inflation is good and is necessary for industrial growth, as it is a good motivator for higher production, without introducing any serious imbalance between demand and supply in the economy. High inflation rate, say2-digit rate is however associated with dangerous consequences.

Interest Rates

Interest rates reflect the cost and availability of credit to the companies operating in the economy. The interest rate, and the volume as well as direction of the credit supply, in the economy is influenced by monetary policy of the Reserve Bank of India. If the cheap money policy is pursued, the interest rates are likely to be lower and larger volume of money supply is expected to be there in the economy.

A lower rate of interest implies lower costs of financing the company's operations and assures higher profitability. Higher, the rate of interest, higher will be the costs of manufacturing and sale, which is expected to lead lower profitability to the company. The fundamental analyst therefore, has to examine the trends in money supply, interest rates and monetary policy and their impact on an individual company's performance.

Foreign. Exchange Rate

If a company is major exporter or importer its performance and profitability are likely to be affected considerably by the exchange rate of rupee against other currencies. A depreciation of rupee vis-à-vis U.S. dollar, a major internationally accepted currency, will make Indian products more competitive, pricewise in the foreign markets, thereby stimulating exports from India. However it will make imports more expensive and a company which depends heavily on imports might find that devaluation of rupee has affected its profitability adversely.

The exchange rate or rupee is adversely affected by deficit balance of trade, balance of payment deficit and foreign exchange reserves position. The excess of imports over exports is called deficit balance of trade. To this we add balances on "invisibles" like net tourism receipts and interest payments etc. and get the balance on current account. We then add the balance of

payment deficit. Each of these reflects the strength of rupee on external account. If these deficits increase there is high chance that the rupee will depreciate against foreign currencies. Another important indicator is foreign exchange reserves. The balance of payment deficit leads to a decline in these reserves. The size of theforeign exchanges reserves is a measure of strength of rupee on external account. A large foreign exchanges reserve is a measure of strength of rupee on external account. Large foreign exchanges reserves help to increase the value of rupee against other currencies.

Government Budget

The government budget provides detailed information on each of government spending and revenues. The deficit is essentially the excess of government spending on revenues. Budget deficit though often incurred for creating infrastructural facilities in the economy tends to create inflationary pressure. Due to this there is a strong public opinion against the government's creation of deficit withoutexpanding the revenue.

The government spending generates substantial demand for goods and services produced by such industries. For example, if the government makes a large allocation in its budget for malaria eradication and control program, then prospects of industry engaged, in manufacture of mala-thion-a chemical used for mosquitoes' control-would improve. The prospect or cement industry is influenced by the government expenditure, on construction of bridges, dams and similar infrastructure projects. The government expenditure is also great stimulant of the economy by creating employment and generating effective demand. In view of the significance of government expenditure and deficit on the economy, aninvestor has to evaluate these carefully to assure their impact on his investment.

Savings and Investment

The capital market is a channel through which the savings of households are made available to corporate for investment. Therefore the trends in saving and investment are significant in studying their impact on capital market. A rising trend in investment points to the fact, that economy is on upswings with additional employment and income generation. Under such simulation, the share prices are likelyto go up, particularly due to demand for this type of financial assets. Further, a part of the rising savingsof the people will find their way to the stocks investment, creating demand for stock, which will in turn push up share prices. Moreover, the

pattern of distribution of savings over the various assets like bank deposits, bullion, stocks etc. will give an idea of-relative preference of the investor to various types of assets.

Infrastructure

The availability of infrastructure facilities like power, transportation and communication system, affect the performance of the companies. Inadequate and inefficient infrastructure leads to lower productivity, wastage, delays and higher cost of production. An investor should, therefore, assess the status of infrastructure facilities available in the economy and their impact on a company. Further, the likely trends in infrastructure development having bearing on a specific company or industry must be identified and its impact evaluated.

Economic and Political Stability

A stable political environment is necessary for steady and balanced growth. The stable but long term economic policies are needed for industrial growth. Such stable policies can be maintained only when stable political system exists and economic and political factors are well linked. A stable government will have a clear-cut long term economic policies, which will be conductive to goodperformance of the economy and industry. An investment analyst cannot afford to lose sight of this crucial factor and its impact on investment decision.

Monsoon

Indian economy is essentially an Agrarian economy. The agriculture accounts for 65% of occupations and 32% of GDP of the country. Agriculture has strong forward and backward linkages to industries like fertilizer, cotton textiles, sugar, and vanaspati and pesticides. Their performance depends heavily on agricultural performance which in turn depends, among other things on monsoons. Moreover, the improved performance of agriculture results in appreciable demand for goods and services by it. The research studies have pointed out that about 55% to 60% of demand for most consume? goods comes from rural sector. Thus the assessment of prospects of monsoon is attached with "significant" tag by an investor in stocks.

Meteorological forecasts of whether the monsoon will be good or bad are available in May. The monsoon lash in Kerala coast first, in early June and advances gradually to northwards. Such advancesare reported in T.V and newspapers. Tentative assessments of adequacy of monsoons are available in July and August and a final picture emerges by end of September. Adequacy of monsoon involves a number of parameters like distribution of rainfalls

over space and time. The rains should occur uniformly in all districts where agriculture belts are situated and should occur at certain crucial points of agriculture cycle.

ECONOMIC FORECASTING

Economic analysis is the first step in fundamental analysis and it starts with an analysis of historical performance of the economy. But investment is future oriented activity. The investor is more interested in expected future performance of the economy and its various segments. For this purpose, forecasting the future direction of the economy and major macro-economic variables becomes necessary. Hence economic forecasting becomes a key activity in economic analysis. The main theme in economic forecasting is to forecast the national income. The GNP is one of measures of National Income. An investor would be particularly interested in forecasting the GNP and its various componentsthat he is analyzing.

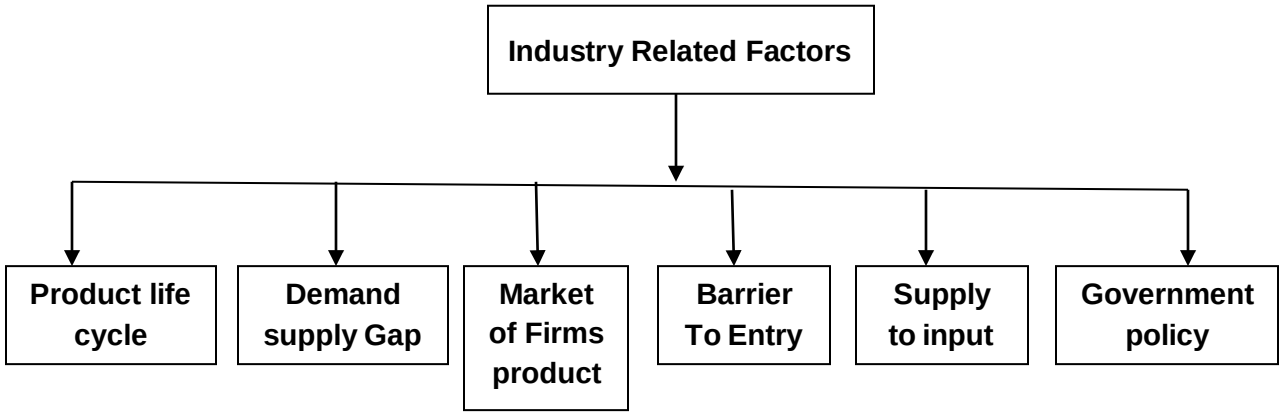
Economic forecasting is generally carried out for short period (up to 1 year) or medium period (1 to 3 periods) or for long period (3 to 5 years). But an investor is more concerned about short-term economic forecasts for period ranging from a quarter to one year. Some of the techniques of such economic forecasting are Anticipatory Survey. Barometric of leading indicator approach, econometric model building or sectoral analysis.

7.4 INDUSTRY ANALYSIS

A company belongs to an industry. An industry is generally described as a group of companies manufacturing and supplying similar products, which serve the need of common set of buyers. The industry classification is nothing but he product wise classification of the firms. Thus all companies who manufacture cement belong to cement industry. It is not unusual to find a company which belongs to more than one industry, because it manufactures more than one product. Yet, practically every company can be characterized as belongings to an industry.

The performance of a company would be influenced by the fortunes of industry to which it belongs. Not all industries may perform consistently with performance of the economy as a whole the economy in growing. Similarly recession does not mean that all industries will show a recession ofsame order. There is a need therefore for examining specific factors, on which performance of the industry depends.

Such industry related factors are:



i. Product life cycle

ii. Demand-supply gap

iii. Market for firm's product

iv. Barrier to entry

v. Supply of input

vi. Government policy towards the industry

PRODUCT LIFE CYCLE

The marketing experts believe that each product has a life cycle. They have identified 4 phases of the product life cycle- introduction stage, growth stage, maturity stage and stagnation and decline stage.

1. **Introduction Stage.** This is first stage of the cycle of any product. The product and its technology are possibly new, whenever a new product is introduced. During this stage the product has to penetrate into market. For this purpose sizeable amount of promotion efforts and expenditure have to be incurred. The response of sales of product may not be large, but may bethat clues of promising future are seen. In this stage profits may be low or at times negative. Thus for the investors who want to have quick returns the shares of such companies may not be attractive. Bu the genius investors who wish to get long-run returns will find such companies andindustries attractive.

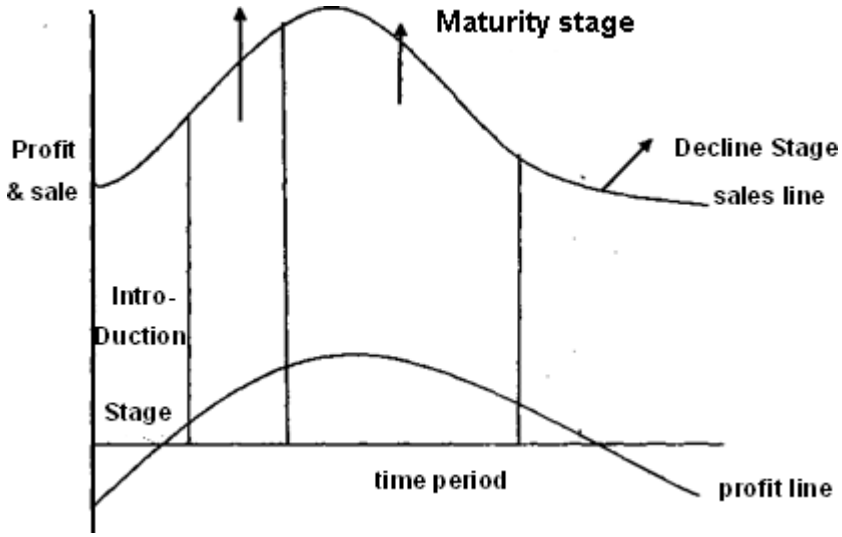
2. **Growth Stage.** Once the industry has established itself it passes through the stage of

growth. The companies in this stage of industry become stronger. The product demand goes onexpending. Each company, finds a market for itself and price charged and profits become attractive for investment purposes. The investors can get high return with law risk in this stage. The demand for goods of the industry exceeds the supply. The companies earn increasing profits and pay attractive dividends to the holders of the share.

3. **Maturity.** During this phase, the growth of the industry slackens. In other words, further rate of growth of sales of industry's product appears to be decelerating. The slowdown of sales growth is because the product has achieved acceptance by most potential buyers. Profits stabilize or decline because of increased competition. The transition of the industry from expansion to maturity stages is often slow. An investor should as far as possible dispose of his holdings in an industry which begins to pass from growth stage to maturity stage, because this stage will soon be followed by decline stage. However a company which faces this stage of maturity may make some technological break-through and introduce new product. Hence, an investor in a company has to monitor the industry's development continuously and diligently. Such technological changes may make a specific company's future performance even more attractive.

4. **Decline Stage.** After crossing the maturity phase the industry may stagnate for a very short period and decline will begin. This occurs when product of the industry is no longer in demand. New technology and new products have come to the market. The customers have changed theirpreference and habits. The company which still lives under this stage will be boasting of yester years and will soon be forced to down the shutters. An investor is unlikely to get any return in this stage. Hence, he should get out of such industries before the onset of the decline stage.

Growth stage



An analysis of the product life cycle has important implications for an investor. It gives him aninsight into the apparent merits of investment in a given industry at any time. As industry is usually associated with low profitability in introduction stage, medium but steady profitability in maturity stageand negative profitability in decline stage.

DEMAND SUPPLY GAP

The demand for goods generally changes steadily whereas the change in capacity for the production of goods tends to be lumpy (i.e. change by substantial quantity at irregular interval). As a result of this industry passes through alternative period of under supply and over supply of capacitiesas different times. Excess capacity tends to reduce profitability of an industry through the decline in the unit price realization. On the contrary inadequate supply (Excess Demand over supply) tends toimprove the profitability through higher price realization. The gap between demand-supply of a product is a fair indicator of short term and long term profitability of the firm in the industry. Thus, as part of the industry analysis, an investor has to analysis demand-supply gap.

COMPETITIVE CONDITIONS IN THE INDUSTRY

The competitive conditions prevailing in the industry is a significant factor to be considered in determining the current and future profitability of the firm in the industry.

The competitive factors operating in an industry are higher to entry,

i. Bargaining power of buyers,

ii. Bargaining power of suppliers,

iii. Threat of substitutes and

iv. The rivalry among competitions.

An industry with high profitability attracts new firms. As new entrants come to industry, the industry's capacity grows, hence leading to price depression for products and associated reduction in profit margins. On the other hand, if there are barriers to entry, the new firms will not easily enter the industry. Such barriers to entry may be due to product differentiation, absolute cost advantage, large scale operation resulting in saving in costs, high level of investment required to set up new capacity andintense advertisement made by one firm and creation of a brand image and loyalty. An industry which iswell protected from the inroads of new firms would be ideal for investment.

The bargaining power of the buyer is an important factor affecting the competition in the industry. The consumer goods market is widely spread. There are numerous customers and segments. Hence, there is very little scope for consumers to together wield any power to influence prices and profitability, through concerted efforts. On the other hand, the auto ancillary industry supplying most of its output to a few automobile manufactures (buyers) in entirely at the mercy of large buyers. The number of segments in market is another significant factor. If number of segment of market to which thefirm caters is large, survival may not be difficult, because when demand may be bad in some segments,it may be good in other segments.

The threat of new substitute the competition in the industry. New investments keep taking place and new better products get introduced. The new substitutes will compete with existing products and finally may replace the existing ones. The prospects of such an industry facing threat of substitutes cannot be considered to be goods.

The competition may be dependent also on the supplier's bargaining power. If one or a new strong suppliers increase the prices of raw material, the cost of production will go up and profitability of the buyer firms will shrink and its competitive advantage will be eroded.

Further, when supply is in excess of demand and there are many firms in industry, the competition among the firms in the industry will be high. This will lead to price cuts and increase in advertisement and promotional costs of all firms to maintain their relative market share. In suchsituation, the profitability gets eroded.

INPUT SUPPLY

The continuous availability of inputs at reasonable price is an important factor is determining its healthy performance. Some industries may not have difficulty in getting major raw material as they may be indigenously available. For example, bottling gas industry and salt industry have plenty of inputs. Butin case of some other industries, there may be inadequate availability and erratic supply besides high price fluctuations. In case of India's synthetic yarn industry, which depends on a couple of domestic manufacture and imports, find themselves often in fix due to high prices and erratic supply. Industry analysis must take into account the availability of raw material and its impact on industry prospects.

GOVERNMENT POLICY

The attitude of the government towards and industry is an important determinant of its prospects. The government may assist and encourage some industries through favorable policies and legislations. Some other industries may not find favour with the government. The government may impose different kinds of legal hurdles and controls such as price and distribution controls, on such industries. A prospective investor should therefore consider the attitude of the government towards the industry being analyzed.

The analyst must evaluate all the above factors before making an investment decision. If the analysis of above factors indicates that the industry has favorable future prospects, the funds may be committed to shares of such companies in industry.

CHAPTER-8

FUNDAMENTAL ANALYSIS AND VALUATION-II

8.0 LEARNING OBJECTIVES

After reading this chapter, you will be able to:-

- Understand the various factors that contribute to a company's strategy and weakness.

8.1 INTRODUCTION

Company analysis is a process carried out by investors to evaluate securities, collecting info related to the company's profile, products and services as well as profitability. It is also referred as 'fundamental analysis.' A company analysis incorporates basic info about the company, like the mission statement and apparition and the goals and values. During the process of company analysis, an investor also considers the company's history, focusing on events which have contributed in shaping the company. A company analysis also looks at the goods and services offered by the company. If the company is involved in manufacturing activities, the analysis examines the products that the company produces and also analyzes the demand and quality

of these products. Conversely, if it is a service company, the investor studies the services offered.

8.2 COMPANY ANALYSIS

The company analysis is the last leg in the analysis of Economy- Industry- Company (EIC) framework of fundamental analysis. The economy analysis provides an investor a broad outline of the prospects of growth in the economy. The industry analysis helps the investor to select the industry in which investment would be rewarding. The investor now has to decide in which of the companies belonging to chosen industries, he should invest he requires the company analysis.

The company analysis has to be made in three different parts:

1. Study of the financial information and assess the financial health of the company.
2. Sizing up the present situation and prospects. This requires an analysis of the present businessof the company and its future prospects.
3. Evaluation of management.

8.3 STUDY OF FINANCIAL INFORMATION

The financial statements of the company can be used to understand and evaluate the financial performance and health of the company. Ratio analysis helps and investor to determine the financial strength and weakness of the company. Such ratio analysis can be made for a company over several past years, and trends can be understood. Also one can compute ratios and compare with other firmsin the same industry over a specific period.

Different ratios measure different aspects of company's health and performances. Such ratios are grouped below, depending on main purpose for which they are used.

1) Liquidity Ratios. This measure indicates the company's ability to fulfill its short term obligationsand reflect short term financial strength of liquidity.

The commonly used liquidity ratios are:

a) $$\text{Current ratio} = \frac{\text{current assets}}{\text{current liabilities}}$$

A higher current ratio is preferable, as it would enable the company to meet its short term liabilities even if value of current assets declines.

b) $$\text{Quick Ratio} = \frac{\text{current assets} - \text{inventory} - \text{period expenses}}{\text{current liabilities}}$$

This is more rigorous measure as those items which are less liquid are deducted from the numerator of the ratio.

2) Leverage Ratios. The leverage ratios are also known as capital structure ratios and solvency ratios. They measure the company's ability to meet its long-term debt obligations. They reflect company's long * term solvency.

The commonly used leverage, ratios are as follows:

a) $$\text{Debt} - \text{equity Ratio} = \frac{\text{long} - \text{term Debt}}{\text{shareholder's equity}}$$

b) $$\text{Debt to total Asset ratio} = \frac{\text{total Debt}}{\text{total Asset}}$$

c) $$\text{Proprietary Ratio} = \frac{\text{shareholder's equity}}{\text{total Asset}}$$

d) $$\text{Interest coverage Ratio} = \frac{\text{earnings before interest \& taxes (EBIT)}}{\text{interest}}$$

The first three ratios stated above indicates relative contribution of shareholders (owners) and creditors/lenders in financing the company's assets. These ratios give an idea as to the safety margin available to the long term creditors. Higher the margin better it is. The last ratio called interest coverageratio measures the ability of the company to meet its interest payments arising from the debt. Higherthis ratio better is the general health and performance of the company.

3) Profitability Ratios: the profitability of company can be measured by the profitability ratios. These ratios can be calculated by relating the profits either to sales, or to investment, or

to equity shares.

Some of the profitability ratios are as follows:

a) $$\text{Gross profit ratio} = \frac{\text{gross profit}}{\text{sales}} \times 100$$

$$\text{Gross profit ratio} = \frac{\text{sales} - \text{costs of good sold}}{\text{sales}} \times 100$$

b) $$\text{Operating profit ratio} = \frac{\text{earnings before interest \& tax (EBIT)}}{\text{sales}} \times 100$$

c) $$\text{Net profit ratio} = \frac{\text{earnings after tax (EAT)}}{\text{sales}} \times 100$$

d) $$\text{Return on investment} = \frac{\text{earning after tax (EAT)}}{\text{total assets}}$$

e) $$\text{Return on equity} = \frac{\text{earnings after tax (EAT)}}{\text{shareholder's equity}}$$

4) Activity or efficiency ratios. These ratios measure the efficiency of management of assets of the company. They reflect the efficiency at which the assets of the company. They reflect the efficiency at which. They-reflect the efficiency at which the assets are employed often they are called as turnover ratios:

Important activity ratios are follows:

a) $$\text{current asset turnover ratio} = \frac{\text{sales}}{\text{current assets}}$$

This indicates how fast current assets are turned over in a year. Higher ratio implies that current assets are used more efficiently.

b) $$\text{Fixed assets turnover ratio} = \frac{\text{sales}}{\text{fixed assets}}$$

Higher this ratio, greater is the utilization of a given fixed assets of the company. It is also called fixed asset coverage ratio.

c) $$\text{Inventory turnover ratio} = \frac{\text{sales}}{\text{average inventory}}$$

This reflects how efficiently inventory is managed. In general, faster the turnover of inventory greater is the contribution to profits of the company.

d) $$\text{Debtor turnover ratio} = \frac{\text{sales}}{\text{average debtor}}$$

This ratio shows how good the receivable management in the company is. If this ratio is high it means bills are converted into cash faster, thus enabling the company to have higher sales and profits with a given amount of cash or working funds.

5) Valuation Ratio. These ratios are most relevant for valuation of company's securities.They are as follows

a) $$\text{Earnings per share}(\text{EPS}) = \frac{\text{earning (i.e. profit) after use}}{\text{number of outstanding equity shares}}$$

b) $$\text{Dividend pay - out ratio} = \frac{\text{dividend per share}(\text{DPS})}{\text{earnings per share}(\text{EPS})}$$

c) $$\text{Dividend per share}(\text{DPS}) = \frac{\text{dividend payment ratio}(\text{EAT})}{\text{number of outstanding shares}}$$

d) $$\text{Book value per share} = \frac{\text{net worth}}{\text{number of outstanding equity shares}}$$

Where, networth = assets - liabilities.

The ratio of book value per share is often seen as a measure of intrinsic value of a share. Generally, we find a share being quoted a certain number of times of its book value (say usually from 5 to 10 times). But, it is not always necessarily right to take this ratio as indicative of intrinsic

value of shares as market quoted price is often reflecting the future earning potential of the share, which maynot have any relation with the assets of the company. Moreover, the book value of share is based on historical cost of the assets of the firm.

e) $$\text{Yield Ratio} = \frac{\text{dividend} + \text{price share}}{\text{initial price}}$$

f) $$\text{Price / earnings ratio } (P/E \text{ Ratio}) = \frac{\text{market price per share}}{\text{earning per share}}$$

g) $$\text{Earning yield} = \frac{\text{earning per share}(\text{EPS})}{\text{market price per share}}$$

h) $$\text{Dividend yield} = \frac{\text{dividend per share}(\text{DPS})}{\text{market price per share}}$$

i) $$\text{Retention ratio} = \frac{\text{retained} + \text{earnings}}{\text{profit After Tax}}$$

j) $$\text{Return on equity} = \frac{\text{Profit After Tax}}{\text{Net worth}}$$

k) $$\text{Price volatility} = \frac{\text{market high in the year} - \text{market low in the year}}{\text{average market price in the year}}$$

From an analysis of past performance, as judged by the ratio analysis, the analyst has to forecast the future prospects of the company. The investment decision would depend on such forecasts. The impacts of some key measures are shown below in the tabular form as favourable or unfavourable. Such an analysis needs to be made by the analyst for wide range of ratios.

8.4 KEY MEASURES AND THEIR IMPACTS

Areas of impact	Favorable Factors	Unfavorable Factors
On Earnings Levels	a. High Book Value Per Share b. High Earning Per Share c. High Return on Equity	a. Low Book Value Per Share b. Low Earning Per Share c. Low Return on Equity
On Growth Rate	a. High growth Rate inEarnings Per Share	a. Low growth Rate in EarningsPer Share b. Low Retention Ratio

	b. High Retention Ratioc. HighReturn on Equity	c. Low Return on Equity
On Risk Exposure	a. Low Debt. Equity Ratio b. Low Variability of EarningsPer Share c. Low Price volatility	a. High Debt: Equity Ratio b. High Variability of EarningsPer Share c. High Price volatility index

8.5 ANALYSIS OF BUSINESS OF THE COMPANY

Analysis of financial data must be supplemented by an appraisal of the company's business. This is mostly in quantitative terms. The variables and issues which are likely to affect the future prospects of the company must be examined.

In this context analyst must ask a series of questions in the relevant areas of investigation.

1. **Company's market share.** What is the market share of the company? To which segments of the market the company caters? Does it export?
2. **Product portfolio.** What are relatives' shares of various products in the portfolio of business of the company? What are the prospects of these goods? How competitive is the position of the company in these products? What are the overall prospects for the company?
3. **Marketing and distribution.** What is the company's image in the market place? How loyal are the customers? How is the distribution network-is it widespread, old and well established?
4. **Procedure Capacity of the firm.** What is the productive or installed capacity of the firm? Is it fully utilized? Are these plans of expansion of production capacity? Are there any modernizationplans?
5. **Order Position.** How is the order position of the company? How many months or years production capacity it represents?
6. **Availability and cost of inputs.** Is the company well placed with respect to the

availability of basic raw material, power fuel and other inputs? Are they available at reasonable rates? What are the relative cost advantages and disadvantages in respect of the inputs? Are the supplies monopolists?

7. **Regulating Framework.** Are there any government regulations on the business that the company conducts? Is there licensing requirement? Are there price controls? Are there stringentenvironment norms or regulations? In export encouraged? Are there certain supportive policesof the government to the business?

If answer of most of these question are favorable the business of the company appears to be prima facie, attractive and hence the company has a promising prospects.

8.6 EVALUATION OF MANAGEMENT

All said and done, the management of the company is an important input contributing to the failure or success of the company. It is therefore, desirable to assess the quality and competence of management. Many financial analyst are of the opinion that management need not be considered as animportant factor, as quality of management is reflected in growth of sales profits earned returned on equity and similar performance measures. The Management experts on the other hand argue that suchresults like profit after tax, sales growth and return on equity are to be considered separately and management has to be viewed independently. Peter Drucker for instance observes that, the performance of business today is largely a result of the performance or lack of it, of earlier managementof year past, Good management means doing a good job in preparing today's business for the future. Thus it is important to examine how the present management is giving shape to the company's future.

Thus the analyst should ask the question like:

- ✓ What is the caliber, motivation dynamism and commitment of the top management to thecompany 'growth and development.
- ✓ Does the management have any specific mission, objective pans and time bound feasibleprogrammes?
- ✓ What emphasis is given to research and development?
- ✓ How are the management planning and control systems pursued by the company?
- ✓ is the management investor-friendly and is committed to maximization of value of the

firm?

The answers to this kind of question are hard to come by. Nevertheless and investor or analyst has to gather some ideas in respect of the above by referring to published material, reading annual reports including Director's Reports and attending annual general body meeting.

8.7 SELF CHECK EXERCISE

1. Define fundamental analysis.
2. Describe economic forecasting.
3. Explain Industry analysis.
4. Discuss Company analysis.

8.8 SUMMARY

A commonly advocated procedure for fundamental analysis involves a 3-step analysis: macro- economic analysis, industry analysis, and company analysis. The analysis of economy, industry and company fundamentals is the main ingredient of the fundamental approach. There are two broad classes of macroeconomic policies, viz. demand side policies and supply side policies. After conductinganalysis of the economy and identifying the direction, it is likely to take in the short intermediate and long term; the analyst must look into various sectors of the economy in terms of various industries. An industry is a homogenous group of companies. The company analysis is the last leg in the analysis of Economy-Industry- company framework of fundamental analysis. The economy analysis provides an investor a broad outline of the prospects of growth in the economy. The industry analysis helps the investor to select the industry in which investment would be rewarding and in company analysis investor would decide in which of the companies he should invest.

8.9 GLOSSARY

Erratic Events: It refers to the unpredictable sales caused by unforeseen events like strikes, riots,Notes war scares, floods, and other disturbances.

Growth Industry: This is an industry that is expected to grow consistently and its growth may exceedthe average growth of the economy.

Cyclical Industry: In this category of the industry, the firms included are those that move

closely withthe rate of industrial growth of the economy and fluctuate cyclically as the economy fluctuates.

Net Asset Value: Net asset value (NAV) is a term used to describe the value of an entity's assets lessthe value of its liabilities.

8.10 ANSWERS TO SELF CHECK EXERCISE

1. For answer refer to section 8.2
2. For answer refer to section 8.3
3. For answer refer to section 8.4
4. For answer refer to section 8.1, 8.2

8.11 TERMINAL QUESTIONS

1. Why should a security analyst carry out industry analysis?
2. Why does portfolio manager do the industry analysis?
3. What is the need of company analysis? Do we need the company analysis?

8.12 SUGGESTED READINGS

- Samuels J. M, F.M. Wilkesard R.E. Brayshaw, Management of Company Finance, Chapmanand Hall, London
- Smith, Edger Lawrence, Common Stocks as Long-term Investment, New York, MacMillan.
- Sprinkel, Beryl, W., Money and Stock Prices, Homewood III, Richard S. Irwin, Inc.
- Sudhindhra Bhatt, Security Analysis and Portfolio Management, Excel Books.
- Fischer, D.E., Security Analysis and Portfolio Management, Prentice Hall,1983.
- Reilly, F.K., Investment Analysis & Portfolio Management, Drygen Press, 1985.

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CHAPTER-9
TECHNICAL ANALYSIS-I

Structure:-

9.0 LEARNING OBJECTIVES

After reading this chapter, you will be able to:-

- Describe the assumption of technical analysis

9.1 INTRODUCTION

Fundamental analysis and technical analysis are two main approaches to security analysis. Technical analysis is frequently used as a supplement to fundamental analysis rather than as asubstitute to it. Fundamental analysis forecasts stock prices on the basis of economic, industry and company analysis. The stock value is judged with the help of a risk return framework based upon earning power and economic environment. However, according to technical analysis, the price of stock depends on demand and supply in the market place. It has little correlation with the intrinsic value. All financial data and market information of a given stock is already reflected in its market price. Technical analysts have developed tools and techniques to study of markets only. Technical analysts study the technical characteristics which may be expected at mayor market turning points and their objective assessment. The previous turning

points are studied with a view to develop some characteristics that would help in identification of major market tops and bottoms. Human reactions are, by and large consistent in similar though not identical reaction; with his various tools, the technician attempts to correctly catch changes in trend and take advantage of them.

"Technical analysis is directed towards predicting the price of a security. The price at which a buyer and seller settle a. deal is considered to be the one precise figure which synthesizes, weighs andfinally expresses all factors, rational and irrational quantifiable and non-quantifiable and is the only figure that counts". Thus, the technical analysis provides a simplified and comprehensive picture ofwhat is happening to the price of a security. Like a shadow or reflection it shows the broad outline of thewhole situation and it actually works in practice.

9.2 ASSUMPTIONS OF TECHNICAL ANALYSIS

There are some basic assumptions underlying the technical analysis. These assumptions are discussed as follows:

1. The market value of a security is solely determined by the interaction of demand and supply factors operating in the market.
2. The demand and supply factors of a security are surrounded by numerous factors; these factorsare both rational as well as irrational.
3. The security prices move in trends or waves which can be both upward or downward dependingupon the sentiments, psychology and emotions of operators or traders.
4. The present trends are influenced by the past trends and the projection of future trends is possible by an analysis of past price trends.
5. Expect minor variations, stock prices tend to move in trends which continue to persist for an appreciable length of time.
6. Changes in trends in stock prices are caused whenever there is a shift in the demand and supply factors.
7. Shifts in demand and supply, no matter when and why they occur, can be detected through charts prepared specially to show market action.
8. Some chart trends tend to repeat themselves. Patterns which are projected by charts record price movements and these patterns are used by technical analysis for making

forecast about the future patterns.

9.3 TECHNICAL VS FUNDAMENTAL ANALYSIS

The major differences between the technical and fundamental analysis are as follows:

I. Technical analysis tries to predict short term price movements whereas fundamental analysis tries to establish long term values.

II. The focus of technical analysis is mainly or internal market data, particularly price and volume data whereas the focus of fundamental analysis is on the factors relating to the economy, industry and the company.

III. Speculators who want to make quick money mostly use results of technical analysis whereas investors who invest on long term basis use the results of fundamental analysis.

IV. Fundamental analysis involves completion and analysis of huge amount of data and is therefore, complex, time consuming and tedious in nature. On the other hand, technical analysisis a simple and quick method on forecasting behavior of stock prices.

V. According to the technical analyst, their method is for superior than the fundamental analysis, because fundamental analysis is based on financial statements which themselves are plagued by certain deficiencies like subjectivity, inadequate disclosure etc.

VI. Fundamental analysis is a longer term approach. Even if an analyst identifies an under period security, market may take time to bid its price up. Technical analyst feels that their own techniques and charts are quicker and superior to fundamental analysis.

Thus, technical and fundamental analysis provide exactly opposite approaches to valuation. Butin practice, generally, a judicious combination of both these approaches is used to arrive at better results.

These two approaches are not used as substitutes but as complementary to each other.

9.4 ADVANTAGES OF TECHNICAL ANALYSIS

- **Objective and Rule based**

Technical analysis offers an objective and rule-based approach to investing in assets.

This means you can follow a tried-and-tested checklist to manage your risks before hitting the buy button. Plus, it provides a bunch of statistical parameters for evaluation, not just profit and loss.

- **Visual Representation**

  Technical analysis involves mapping out the charts for assets. These charts show the journey an asset has taken and point out interesting spots. This makes it easier to spot trends and even recurring patterns from the past. By knowing how the market reacted to these patterns, you can make better decisions when similar patterns pop up again.

- **Accessibility**

  The cool thing is that many tools used by technical analysts are easily accessible and often free or inexpensive. Plus, knowledge about this craft is getting easier and more available. Like this blog ;)

- **Flexible**

  Another neat feature of technical analysis is that it's versatile and fits different markets like stocks, forex, commodities, and cryptocurrencies. It works in various places like the US, Japan, and India and across different timeframes like hourly, daily, weekly, and monthly. So, it's like a universal toolkit for analysing markets

9.5 LIMITATIONS OF TECHNICAL ANALYSIS

- **False signals**

  One of the most annoying things for technical analysts is dealing with signals that turn out to be false breakouts. Sometimes, this happens because the system is too sensitive, or the price movements are all over the place; it’s like trying to catch a slippery fish. Dealing with false signals isn't easy. A more cautious approach might wait a long time before confirming a breakout, missing out on potential gains. A smarter way to handle it is by deploying a weight-of-evidence approach. When you see multiple things like indicators and oscillators pointing in the same direction, it's more likely that the breakout is for real.

- **Inefficiency in less liquid markets**

  Another limitation when it comes to technical analysis is that it might not work as well in markets that have liquidity problems. Why? Because the prices in these markets can be

all over the place and hard to predict. Sometimes, big players in the market can make it look like there's a lot of demand for something when there really isn't.

9.6 MYTHS OF TECHNICAL ANALYSIS

1. Technical Analysis is only for Intraday Trading

This is the most common myth about technical analysis that technical analysis is only appropriate for intraday traders or short-term traders. Technical Analysis existed way before computers were common and many successful investors have openly accepted the use of technical analysis for long term investments. Technical analysis is used by all types of traders and investors on all time frames from a 1-minute chart to a monthly chart.

2. Only Retail Traders use Technical Analysis

Retail traders do use technical analysis for their trade's decision, but it is also widely used by investment banks and hedge funds. Investment banks and Hedge funds have a dedicated team that uses technical analysis for trading. Algo Trading & High-frequency trading has a great amount of trading volume on stock exchanges across the globe which is heavily dependent on technical analysis.

3. Low success Rate

You can look for interviews of all the successful traders who have vast experience and deep knowledge. You will find one thing common about them that they all relied on technical analysis and a lot of them owe their success to technical analysis. There exist a list of investors and traders who have created their fortune with the help of technical analysis.

4. Technical Analysis is Easy

The internet is full of courses based on technical analysis that promises a high return. Most of them have not placed a single order in the stock market or forex market based on technical analysis but selling courses based on a combination of Indicators. Technical analysts need deep learning, complete knowledge, good money management skills to succeed in the market. Technical analysis is only one tool and there are other aspects associated with it.

5. Technical Analysis accurately predicts the price

Inexperienced traders predict the market with exact price points but experienced traders predict the market with the price range and avoid price quoting as points. One must be aware that technical analysis provides the range for predictions and not the exact numbers. Profits are generated by traders and investors who use good risk to reward ratio.

6. Technical Analysis is profitable with a higher winning rate:

This is the most common myth and it must be busted as technical analysis is more about the high risk to reward ration than the winning rate. Assume Naveen makes 4 winning trades out of 10 while Saurav makes 7 winning trades out of 10. Who is more successful? Most people might say Saurav but to know who is more successful then we need more information. One can be more profitable after having less winning rate if that person is going for a good risk to reward ratio. If Saurav makes Rs 10 on his win but losses Rs 10 on his loss, then he ends up with a profit of Rs 40. If Naveen makes Rs 30 on his win and losses Rs 10 on his loss, then he ends up with a profit of Rs 60. Naveen is better off, even with fewer wins.

CHAPTER-10
TECHNICAL ANALYSIS-II

10.0 LEARNING OBJECTIVES

After reading this chapter, you will be able to:-

- Describe the various tools of technical analysis.
- Plot technical charts using software available
- Identify trends and patterns and indicators in charts
- Understand stock market news reports
- Interpret technical signals and decides whether to use them or not

10.1 INTRODUCTION

Technical analysis in simple terms means the study of Candlestick Patterns, Chart Patterns, Support & Resistance, Demand & Supply Psychology, and various other indicators. Prediction of stock Market accurately is a difficult task, but technical analysis helps a lot in making it easier to accurately predict the market to a certain extent.

Technical Analysis also helps in understanding the sentiments of the market which is based on human psychology. With the help of Technical Analysis, one can predict the future of the market without going through the fundamental factors of equity, currency, or commodity.

10.2 TOOLS AND TECHNIQUES OF TECHNICAL ANALYSIS

There are numerous tools and techniques for doing technical analysis. Basically this analysis is done from the following four important points of view:

1. **Price:** whenever there is change in prices of securities, it is reflected in the changes in investor attitude and demand and supply of securities.
2. **Time:** the degree of movement in price is a function of time. The longer it takes for a reversal in trend, greater will be the price change that follows.
3. **Volume:** the intensity of price changes is reflected in the volume of transactions that accompany by a small change in transactions, it implies that the change is not strong enough.
4. **Width:** the quality of price change is measured by determining whether a change in trend spreads across most sectors and industries or is concentrated in few securities only. Study ofthe width of the market indicates the extent to which price changes have taken place in the market in accordance with a certain overall trends.

In terms of the above dimensions various tools and techniques of technical analysis are discussed as follow:

10.2.1 DOW THEORY

The Dow Theory, originally proposed by Charles Dow in 1900 is one of the oldest technical methods still widely followed. The basic principles of technical analysis originate from this theory.

According to Charles Dow "The market is always considered as having three movements, all going at the same time. The first is the narrow movement from day to day. The second is the short swing, running from two weeks to a month or more and third is the main movement, covering at least four years in its duration".

The theory advocates that stock behavior is 90% psychological and 10% logical. It is

mood of the crowd which determines the way in which prices move and the move can be gauged by analyzing the price and volume of transactions.

The Dow Theory only describes the direction of market trends and does not attempts to forecastfuture movements or estimate either the duration or the size of such market trends. The theory uses thebehavior of the stock follow the underlying market trend, most of the times. Therefore, the postulates of the theory were farmed with reference to market indices, specifically constructed to measure market trends.

Basic tenets of Dow Theory: the basic tenets of Dow Theory are few and simple and are as follows:

1. The average (index numbers) discounts everything except acts of god, because they reflect the combined market activities of thousands of investors and brokers. Thus, the aggregate judgement of all stock market participants regarding both the current and potential changes in the demand- supply relationships of stocks, is reflected in the share prices.
2. The 'market' meaning the price of shares in general, swings in trends which may be primary, secondary and minor. Primary movements which last from a year to several years, represent the major market trends it can be either a rising (bull) trend or a falling (bear) trend. Movements in the direction of primary trend are interrupted at intervals by secondary swings in the opposite direction. The secondary trends usually last from several weeks to several months in length. This trend acts as a restraining force on the primary trend trending to correct deviations from its general boundaries. The minor trends are day to day fluctuation in the market. These have little analytical value because of their short duration and variations in amplitude.
3. So long as each successive price advance reaches a higher level than the one before it and each secondary reaction or price decline, stop at a higher level than the previous one, the primary trend is up. This is called a "bull market".
4. When each intermediate decline carries prices to successively lower levels and each intervening advance fails to bring them back up to the top level of the preceding advance, the primary trend is down and that is called 'bear market'.
5. The secondary trends are the intermediate declines or corrections which occur in bull

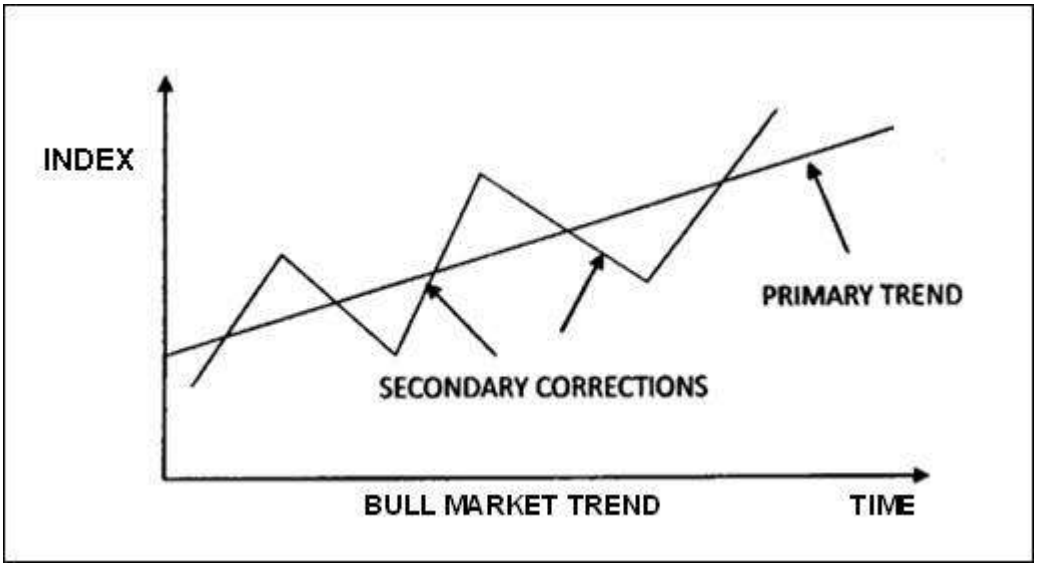
market and the intermediate advances or recoveries which occur in bear markets or recoveries which occur in bear markets. Normally, these last from three weeks to as many months and generally retrace from 1/3rd to 2/3rd of the gain or loss in prices recorded in the previous swing, in the primary direction.

6. The minor trends are the brief fluctuations lasting usually for six days but rarely for three weeks. These are meaningless but go to make up secondary trend. In theory, this is the only trend that can be manipulated.

7. At times a line can substitute for the secondary trend. A line in Dow Theory is a sidewise movement which lasts for two or three weeks, may before as many months and in the course of its formation, prices fluctuate within a range of 5% or less of their mean figures.

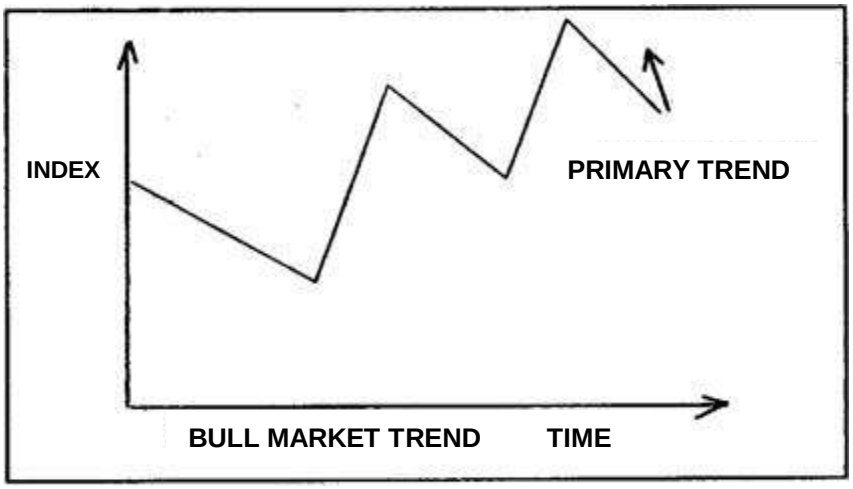
8. A trend should be assumed to continue in effect until such time as its reversal has been definitely signalled. The end of a bull market is signaled when a secondary reaction of decline carries prices lower than the level recorded during the earlier reaction and the subsequent advance fails to carry prices above the top level of the preceding recovery. The end of a bear market is signaled when an intermediate recovery carries prices to a level higher than the one registered in the previous advance and the subsequent decline halts above the level recorded inthe earlier reaction.

The following figure gives an example of a bull market trend**.**



This figure shows a bull market interrupted by reactions. The following figure shows a bear

market trend.



This figures shows a bear market interrupted by recoveries.

Dow Theory's Shortcomings: the Dow Theory is widely applied by technical analysis and has stood the test of time. However, the theory has been criticized on the following grounds:

1. The Dow Theory provides a single of change in the trend, often too late. The end of a bull market is signaled only when the nearest intermediate button is penetrated by more than 3% of the level and the subsequent advance fails to carry prices on the index above the earlier top. Itis estimated that the theory confirms a reversal in trend often 20 to 25% after a peak or trough has occurred. But then there is no other way of forecasting that the change of trend has taken place at the top and it is better to be late than to be wrong.
2. The Dow Theory depends on interpretation and is subject to all the hazards of human ability to interpret. Experience has shown that the theory is usually more nearly right and the faults lies with the persons interpreting it.

10.2.2 CHARTING

Charting is the basic tool in technical analysis, which provides visual assistance in defecting changing pattern of price behavior. The technical analysis is sometimes called the Chartist because of the importance of this tool. The Chartist believe that stock prices move in fairly persistent trends. There is an inbuilt inertia, the price movement continues along a certain path (up, down or sideways) until it meets an opposing force due to demand-supply changes. Chartists also believe that generally volume and trend go hand in hand. When a major uptrend

begins, the volume of trading increases and also the price and vice versa.

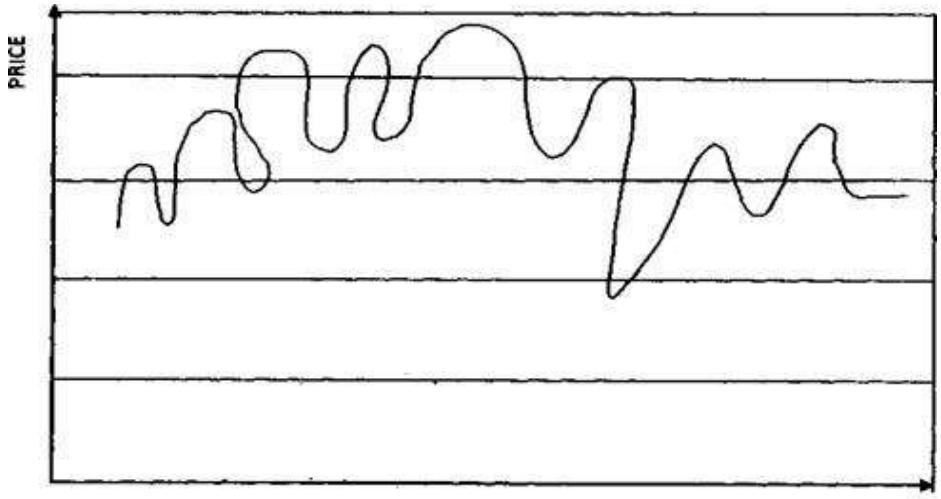
The essence of Chartism is the belief that share prices trace out patterns over time. These are areflection of investor behavior and it can be assumed that history tends to repeat itself in the stock market. A certain pattern of activity that in the past produced certain results is likely to give rise to the same outcome should it reappear in the future. The various types of commonly used charts are:

a) Line chart

b) Bar chart

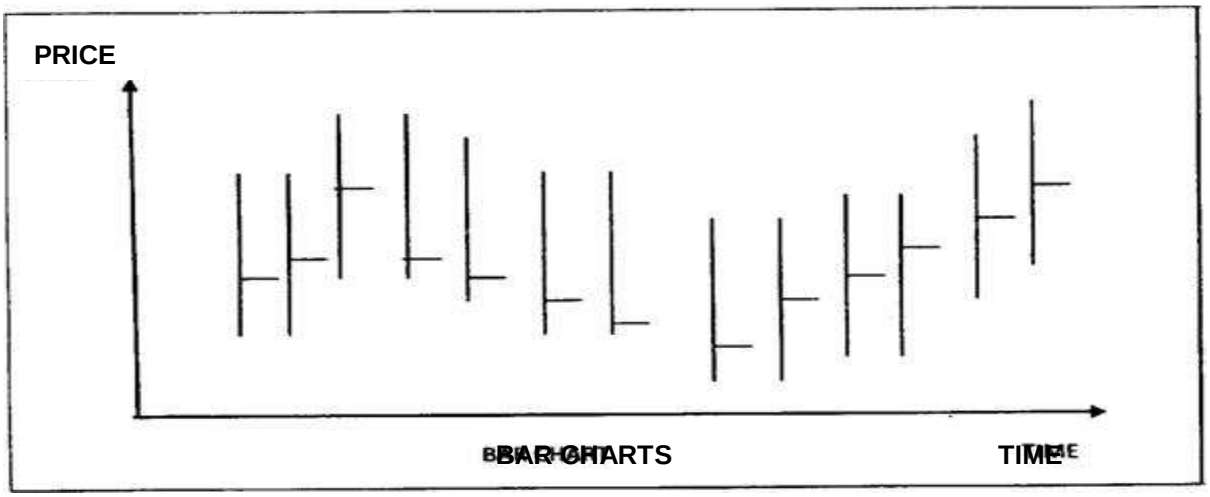
c) Point and figure chart

a) Line charts: the simplest form of chart is a line chart. Line charts are simple graphs drawn by plotting the closing price of the stock on a given day and connecting the points thus plotted over a period of time. Line charts take no notice of the highs and lows of stock prices for each period. The following figure presents a typical line chart.



LINE CHARTS

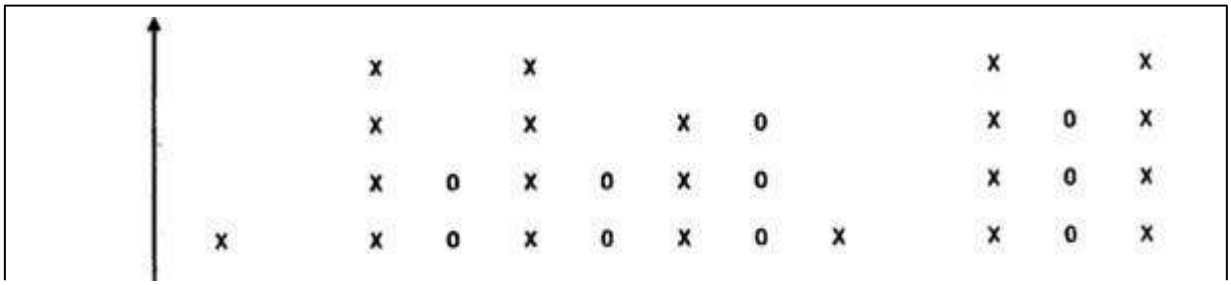
b) Bar charts: it is a simple charting technique. In this chart, prices are indicted on the vertical axisand the time on horizontal axis. The market or price movement for a given session (usually a day) is represented on one line. The vertical part of the line shows the high and the



low prices at which the stock traded or the market moved. A short horizontal tick on the vertical line indicates the price or level at which the stock or market closed. The following figure shows a bar chart:

c) Point and figure Chart (PFC): though the point figure chart is not as commonly used as the other two charts, it differs from the others in concept and construction, in PFC there is no time scaleand only price movements are plotted. As a share price rises, a vertical column of crosses is plotted. When it fells, a circle is plotted in the next column and this is contained downward while continues to fell. When it rises again, a new vertical line of crosses is plotted in the next column and so on. A point and figures chart that changes column on every price reversal is cumbersome and many show a reversal only for price changes of three units or more (a unit of plot mat be a price change of say one rupee). The following figure shows a point and figure chart:

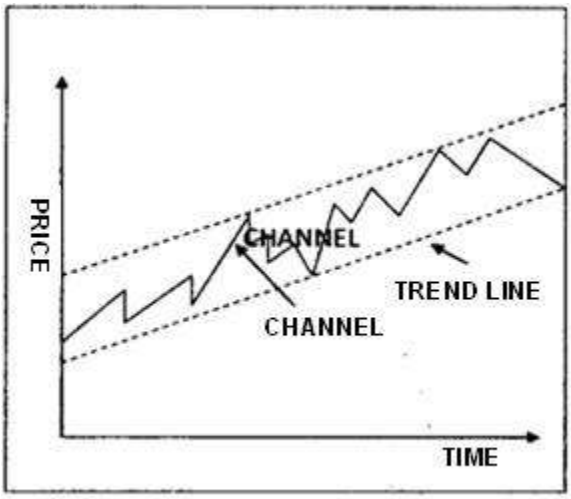
PRICE



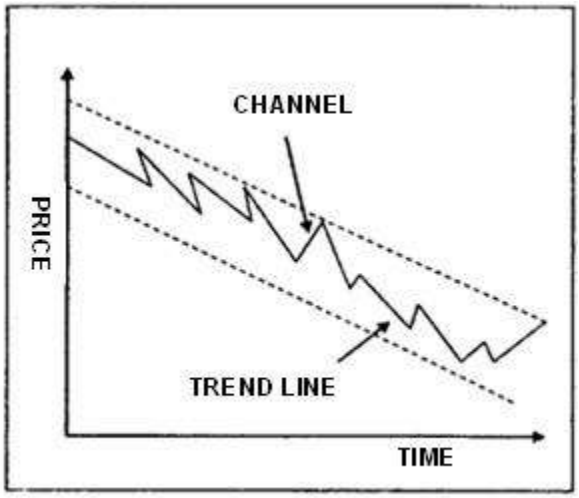
POINT AND FIGURE CHART **TIME**

10.2.1 TRENDS

A trend can be defined as the direction in which the market is moving. Up trend is the upward movement and downtrend is the downward movement of stock prices or of the market as measured by an average or index over a period of time, usually longer than six months. Trend



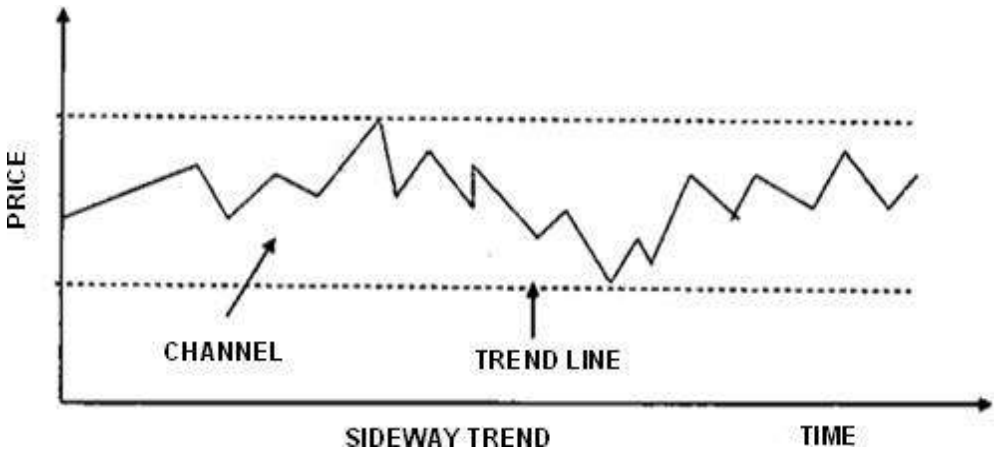
UPWARD TREND LINE



UPWARD TREND LINE

lines are lines that are drawn to identify such trends and extend them into the future. These lines typically connect the peaks of advances and bottoms of declines. Sometimes, an intermediate trend that extends horizontally is seen. If the succession of peaks and troughs occurs at increasingly higher prices, then the market is clearly up trend. This trend is bullish indicating a good time to buy securities. If the peaks and troughs occur at successively lower prices. The market is in down trend which signals to the time to sell securities. The upward and downward trends are shown in the following figures.

A sideway trend is characterized by stock prices trading in a range where successive peaks occur at the same level and successive troughs occur at the same level and successive troughs occur at the same level. The two levels create parallel trend lines. During this time the investor should be extra careful and wait for more definite indicators of the future market movement. The following figureshows the sideway trend.



Trend lines encompass advances and declines by joining successive tops and bottoms. Sometimes, it is useful to trap trends by drawing trend lines on both the sides of an upward or downward trend. These parallel lines drawn to encompass trends from both the sides are called channels.

10.2.4 MOVING AVERAGE ANALYSIS

The statistical method of moving averages is also used by the technical analysis for forecasting the prices of shares. While trends in share prices can be studied for possible patterns, sometimes it may so happen that the prices appear to move rather haphazardly and be very volatile. Moving averageanalysis can help under such circumstances. A moving average is a smoothed presentation of underlying historical data. It is a summary measure of price movement which reduces the distortions to a minimum by evening out the fluctuations in share prices. The underlying trend in prices is clearly disclosed when moving averages are used.

To construct a moving average the time span of average has to be first determined. A 10 day moving average measures the average over the previous 10 trading days, a 20 day moving average measures the average values over the previous 20 days and so on. Regardless of the time periodused, each day a new observation is included in the calculation and the oldest is dropped, so a constant number of points are always being averaged. The moving averages are worked out in respect of securities studied and depicted on a graph. Whenever the moving average price line cuts the actual price line of the security or of the market, index from the bottom it is a signal for the investors to sell the shares. Conversely, when the moving average price line cuts the actual price line from above, it is the right time to buy shares.

The moving average analysis is quite a useful method in finding out the trends in security

pries when it is based on long term approach. However, a point of caution is in order. Moving average analysis always invariably provide signal to buy or sell, after the trend reversal has begun. These are neither lead indicators nor juncture points for change in trends. The moving averages should therefore, be used only with other indicators, otherwise these may provide true but mathematically inaccurate information.

The technical analysis can use three types of moving averages-simple weighted or exponential.

10.2.5 ADVANCE DECLINE THEORY

The advance decline theory takes into consideration the total number of securities traded called the width of the market. The greater the number of securities traded compared to the number of securities listed, greater will be the width of the market. This theory takes into consideration the total number of issues traded during a session and compares the number of stocks whose prices advanced with those whose prices declined. The basic idea behind all this is to determine what the majority of stocks are going. The daily net difference between the number of shares whose prices have advanced in a stock exchange and the number of those whose prices have declined is calculated. The net difference is added to next day's difference and so on to form a continuous cumulative index. The indexis plotted in a line form on the graph and compared with the index of that stock exchange. The key signals occur when there is divergence between the two, when they diverge, the advance-decline line will show the truer direction of the market because the index of the stock exchange cannot move contrary to the market as a whole, at least not for long.

For example, suppose in Bombay stock exchange, 1600 securities were traded on a particular day. Of the total securities traded 1000 advanced in price, 400 declined and 200 were unchanged. Using the data, the technical analysis will calculate the percentage of the advance or the decline by subtracting the number of declining stocks from the number of advancing stocks and then dividing the difference by the total number of securities traded.

$$\left(\frac{+1000-400}{1600}\right)=\frac{+600}{1600}=37.5\%$$

Continued positive and high percentages indicate negative percentages indicate a

technically weak market.

Advance-decline theory focuses on the width of the market instead of selected securities. This theory has been widely used as the basis for developing more complex technical measures andtheories about the market movement.

10.2.6 NEW HIGHS AND NEW LOWS

A supplementary measure to the width of the market is the high-low differential or index. A risingmarket is accompanied by a healthy number of new highs. A graph of new highs can be plotted to be read along with a market index. If net new highs trace a series of declining peaks while the index continues to rise, a reversal in imminent. Similarly a graph of net new lows can be expected to signalthe end of a bear market, when it does not confirm the new trough reached by the market index. This is because a declining number of stocks reaching new lows implies that large number of stocks resisting the downtrend in the market index and thus, signifies the end of a bear market.

This method can be used to know the trend of the market and plan the investment strategy accordingly.

10.2.7 SHORT SELLING THEORY

Short selling is viewed as a sentiment indicator by the technical analysis. Short selling refers to selling shares that are not owned. Investors sell short when the expect the market price of a security to decline. They hope to purchase the security at a later date below the selling price and reap a profit. Theshort sellers eventually cover their positions resulting in an increase in the potential demand for the security. Therefore, rising short sales foretell future demand for the security and thus, increments in future price. Large outstanding short interest is, therefore, considered to be a long term bullish indicator. Small or moderate amounts of short interest are considered to have little potential impact on astock's price. Technical analysis consider the short interest ratio to be a more useful measure of the market's potential movement.

$$\text{Short Interest Ratio} = \frac{\text{Short Interest Position}}{\text{Average Daily Trading Volume}}$$

This ratio indicates how many days of trading it will take to cover total short interest. The ratio does not represent a hard and fast indicator of a bullish or bearish sentiment, but there are some rule ofthumb norms against which the ratio is compared. Generally, a short interest ratio is considered to be high when it is greater than 2. This is a bullish indicator because there are a large number of investorsin the market who will have to buy back the shares that were sold short.

Short sales cannot be an exact indicator and is only general in essence. The technical analysts also believe that it is a sophisticated technique and it is difficult for an average investor to understand it.

10.2.8 REVERSAL EFFECT

Reversal effect is a tendency for poorly performing stocks of one time period i.e. a week or a month to perform well in the subsequent time period and vice versa. This effect can be used by the investors in planning their investment strategy of maximizing the returns. The strategy should be to buy stocks that have recently done poorly and sell shares that have done very well.

10.2.9 RELATIVE STRENGTH

The empirical evidence shows that certain securities perform better than other securities in a given market environment and this behavior remains constant overtime. Relative strength is the technical name given to such securities by the technical analysis because these securities have stability and are able to withstand both are the depression and peak periods. Investors should invest in such securities, because these have constant strength in the market. The relative strength analysis may be applied to individual securities or to whole industries or portfolios consisting of stocks and bonds. The relative strength can be calculated by:

i. Measuring the rate of return of securities

ii. Classifying securities

iii. Finding out the high average return of securities

iv. Using the technique of ratio analysis to find out the strength of an individual security.

Technical analysis measure relative strength as an indication for finding out the return of securities. They have observed that those securities displaying greatest relative strength in good markets (bull) also show the greatest weakness in bad market (bear). These securities will rise and fall faster than the market. Technical analysis explains relative strength as a relationship

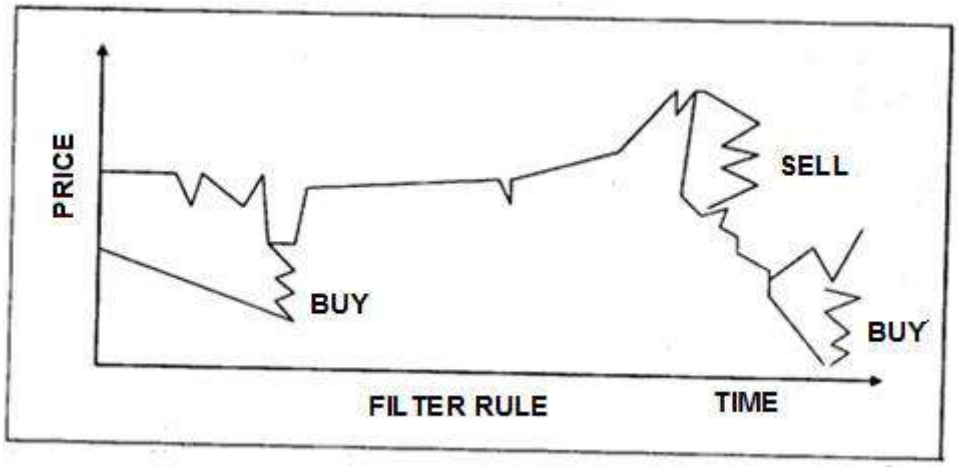
between risk and return of a security following the trends in the economy. After preparing charts from different securities over a length of time, the technician would select certain securities which showed relative strength to bethe most promising investment opportunities.

10.2.10 CREDIT BALANCE THEORY

The technical analysts predict that when cash balances build up with the brokers, it represents high potential for the market advancing and vice versa when investors sell their securities, they receive credit balances in their accounts at their brokerage houses. At that time they have two choices-either totake their money or to leave it in the account. The reason for leaving the money in the account will befor investment in the near future, it is believed that a rise in these cash balances represents large reservoirs of potential buying power. The investors leave their money with the brokers only when they anticipate a fall in security prices and thus, buying opportunity. On the other hand, a drop in credit balance suggests that prices of securities will go up in future and investors will not like to buy.

10.2.11 THE FILTER RULES

The filter rules many a times, defined the mechanical trading schemes. Filters are minor price changes arising from random factors. If the price of a security moves up at least X% from



a low point, it should be bought and held until its price moves down at least X% from a subsequent high, at whichtime it could be sold. The security is not repurchased until it moves up again at least X% from the subsequent low point. The following figure illustrates the filter rule.

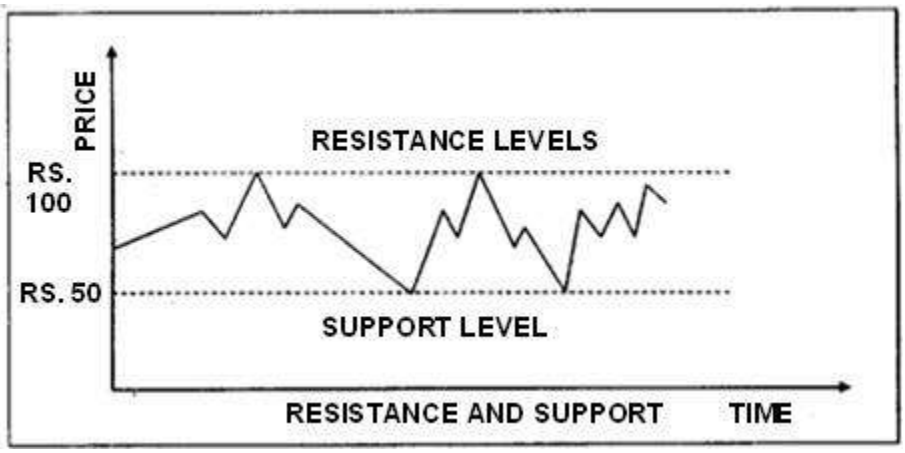
The major problem with this technique is deciding on the size of the filter. If x is small, it will result in larger number of transactions and therefore larger transaction costs. If x is large, much of the price movement has taken place before the investor acts. So called "Hatch System"

is basically a 10% filter. In general, these rules can be effectively used if the transactions costs are very low. Since these rules can be easily mechanized, they are widely used for computerized trading.

10.2.12 RESISTANCE AND SUPPORT LEVELS

The peak price of the stock is called the resistance area. Resistance level is the price level to which the stock market rises and then falls from repeatedly. This occurs during an uptrend or a sidewaytrend. It is a price level to which the market advances repeatedly but cannot break through. At this level selling increases which cause the price fell.

Support level shows the previous low price of the stock. It is a price level to which a stock or market price fells or bottom out repeatedly and then bounce up again. Demand for the stock increases as the price approaches a support level. The buying pressure or the demand supports



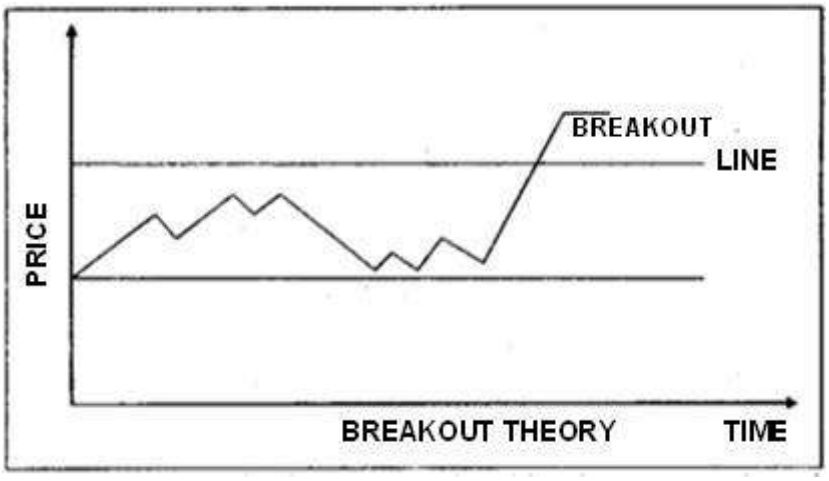
the price preventing it from going lower.

The figure shows that if the share price persistently fails to rise above a certain level this is known as a resistance level. This perhaps because at this price people who purchased previously, but then saw the share prices fell, took the opportunity to sell at the price they previously paid. Likewise, a support level is a price at which buyers constantly seem to some forward to prevent the share pricesdropping any further.

The support and resistance levels are important tools in confirming a reversal, in forecasting the course of prices, and in making appropriate price moves.

10.2.13 BREAKOUT THEORY

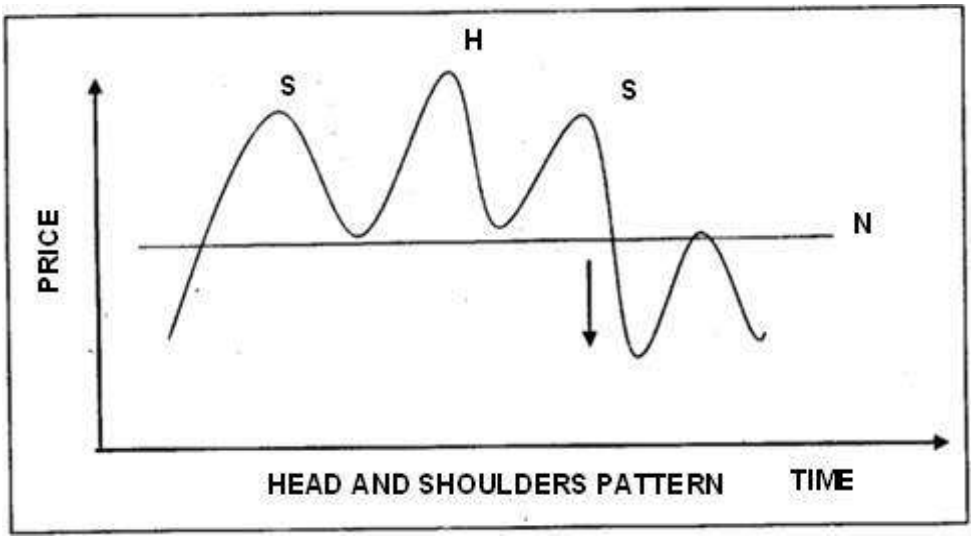
Break out is also "confirmation". This is indicated by drawing a line, which is a period of consolidation, when the share prices move sideways within a range of about 5% of the share price. Eventually a break out will occur and it is often suggested that the longer the period of



consolidation,the greater will be extent of ultimate rise or fall.

10.2.14 HEAD AND SHOULDERS PATTERN

The Head and Shoulders pattern is by far the most reliable and widely used of all reversal patterns. This pattern indicates a reversal of an uptrend. This pattern occurs at the end of a bull market and is characterized by two smaller advances flanking a higher advance just as the head lies in between two shoulders. A typical head and shoulder formation is shown in the following figure:



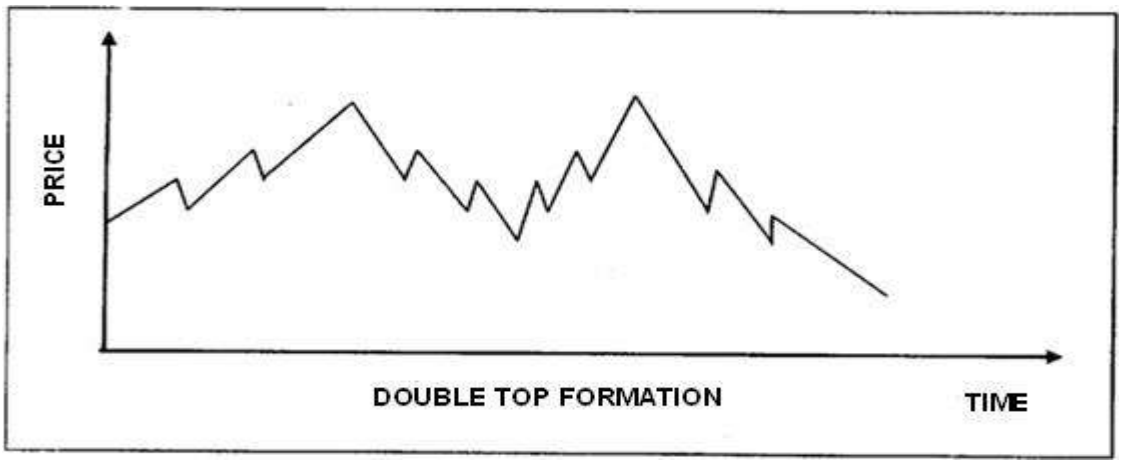
In reality, the shoulders are not always symmetrical. This does not in any way alter the signals provided by the pattern. The important requirement is that the shoulders should be at lower levels than the head. The left shoulder is seen during the time when there is a lull in the trading market

followed by heavy purchases. The quiet time in trading called lull is such to raise the price by pushing to a new peak. The head faces with the time when there are heavy purchases in the market that it raises it and then it fells back to indicates that it is far below the top of the left shoulder. The right shoulder indicated that the price raises moderately by the activity in the price raises moderately by the activity in the market but it does not rise in such a manner that it reaches higher than the top of the head while it is reaching is top, it begins to fell again and decline is indicated. The formation is easily discernible once the right shoulder is formed. The line that joins the points from where the final advance begins and ends is called the neckline. A trend reversal almost always occurs when the neckline is penetrated by the price line.

The head and shoulders pattern may be formed over short period of a Tew weeks or take even years to emerge. This pattern is the most reliable indicator of the onset of a bear market. The method also provides scope for measuring the extent of fall in prices. The prices are expected to decline after the penetration of the neckline by the price line, at least as much as the distance between the head andthe neckline.

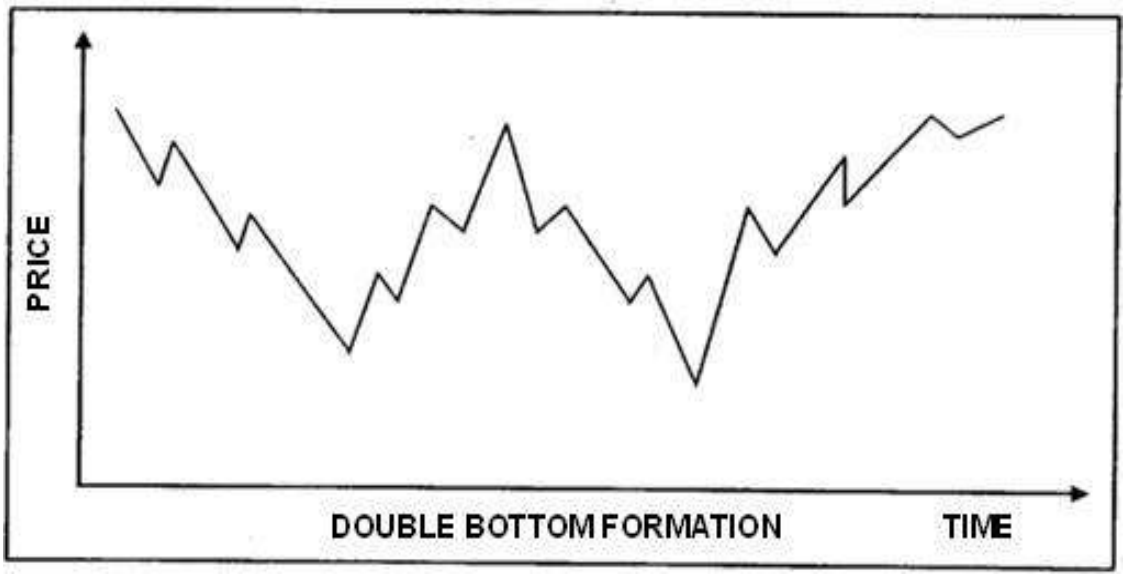
10.2.15 DOUBLE TOP FORMATION

The double top occurs as an uptrend is about to reverse itself. A double top is formed when prices reach the previous high and react immediately, the two highs reached being almost at the same level. Two peaks at comparable heights are seen, with a reaction forming a valley in between them.The prices breakout into a bearish phase, once they penetrate the neckline drawn across the bottom of the intervening reaction. The measuring implication is similar as for the head and shoulder formation. If the price line falls below the neckline by a distance equal to the distance between the peak and the trough the indication is to sell. Volume is found to be distinctly low at the second top. The following figure shows the double top formation:



10.2.16 DOUBLE BOTTOM FORMATION

A double pattern is just the reverse of a double top and occurs at the end of a downtrend in prices. In the double bottom, the second decline is supported by substantially more volume, indicating the price about to rise. The following figure shows the double bottom formation.



Sometimes, the tops and bottoms are not found exactly at equal levels, but still these provide valid reversal signals. Sometimes the patterns extend to triple tops or triple bottoms. It must be remembered that longer it takes for the second top (bottom) to appear and deeper the intervening valley (peak) more reliable will be the reversal:

10.2.17 ODD-LOT TRADING

Small investors who often buy in odd lots (no tradable lot) are known as odd lotters. Odd lotsare generally groups of less than 100 shares. The odd-lot theory suggests that it is important to find out information about odd lots because such investments are not made by professional investors. This theory reflects the views of common man on daily basis. For finding out the daily record of lots, information must be gathered about the number of shares purchased every day, the number of shares sold every day and also the number of shares which are sold short. By charting out the ratio of odd purchases to odd sales. It is possible to find out the direction of prices because it indicates the buying activity of the common man. If the odd purchases are less than the odd sales, then there is a positive purchase otherwise there can be negative purchase also. The technical analysts emphasis that a fall in the market price is reflected if the net purchases made by the common man are positive. If the net purchases are

negative then it reflects that the bear markets are at a close. Similarly, an increasing ratio of odd lot short sales to total odd sales suggests increasing bearishness. The theory has been opposed by the odd lotters because according to them they buy low and sell high and make profits, which is contrary to the theory.

10.2.18 MUTUAL FUND ACTIVITY

The mutual funds always keep ready cash and take advantage of favorable market conditions and/ or to provide for redemption of shares by holders. Mutual fund cash is expressed as a percentage of net assets on a daily, monthly or annual basis. A low cash ratio indicates a reasonably fully invested position, with the implication that not much reserve buying power is remaining in the hands of the mutual fund. Low ratios are frequently associated with market heights. At market troughs the cash ratio would be high. Such a buildup of cash reserves is an indication of potential purchasing power that can be injected into the market to push it upward.

10.2.19 CONFIDENCE INDEX

Securities market can be analyzed through a calculation of confidence index. The confidence index is supposed to reveal how willing the investors are to take chance in the market. Confidenceindex is the ratio of high grade bond yields to low grade bond yields. When investors grow more confident about the economy, they shift their holdings from high grade to low grade bonds in order to obtain higher yields. High grade bonds are higher in equity but do not yield high returns. Low grade bonds while risky will offer a higher yield. When the investor makes the change from high grade to low grade bonds the prices of low grade bonds rise. This lowers their yield relative to high grade bonds and increases the confidence index.

The confidence index has an upper limit of unity; since the yields on high quality bonds will never rise above the yields on similar low quality bonds. In the period of economic boom when investors grow optimistic and their risk aversion diminishes, the yields difference between high and low quality bonds narrows and the confidence index rises. A rising confidence index is interpreted by technical analysis as an indication that institutional investors are optimistic/ an upturn in confidence index foretells rising optimism and rising prices in the stock market.

Contrary to the rising index, a fell in the confidence index represents the feet that low grade bond yields are rising fester or felling more slowly than high grade yields. Thus movement

is supposed to reflect increasing risk aversion by institutional investors who foresee an economic downturn and rising bankruptcies and defaults/ empirical evidence shows that confidence index is not always positively correlated with the stock market. Although it gives some indications and signals about the stock market trend, yet the signals which are formed by it show errors. However, according to technical analysis, signals always show some errors and complete accuracy can never be predicted.

10.2.20 TRADING VOLUME INDICATORS

Most of the technical analysis believes that volume changes are always a prerequisite to a pricechange. Historical data analysis of price and volume movements indicates that in a normal market, the price rise is accompanied by an expanding volume. During bull market, volume increases with price advance and decrease with price declines. In a major downward price trend, the reverse will hold true. Further, volume generally fells in advance of major decline in the stock price averages and rises sharply during market bottoms. These indications are to be studied carefully before a final decision is taken on the state of the market, whether bullish or bearish, the phase the uptrend or downtrend and look for buy and sell signals at the start of the reversal trends.

Volume is a function of the demand for and supply of stocks and can signal turning points for the market as well as for individual stocks, in the short run, on a day today basis, the demand and supply for each scrip is based on a host of fundamental, technical and other factors.

10.2.21 FIBONACCI NUMBERS

The technical analyses use a number of techniques in predicting the resistance and support levels of the stock market and individual scrips. One of the set of numbers they often use are "Fibonacci numbers". Leonardo Fibonacci, a renowned medieval mathematician identified a sequence of numbers while studying the reproductive behavior of rabbits. The sequence was named after him. The Fibonacci sequence of number is as follows:

1,1, 2, 3, 5, 8, 13, 21, 34, 55,89, 144, 233....

After the initial pair of one, each succeeding number is simply the sum of the previous two

e.g. 2+3 =

53+5 =

8 5+8-

13

8 +13 = 21 and so on

Another feature of these numbers is that after the first few numbers, the ratio of each Fibonacci number to its successor is 0.618 e.g. .

21/34 = 0.618

34/55 = = 0.618

55/89 = = 0.618

89/144 = = 0.618 and so on.

Likewise, Fibonacci number of its predecessor is = 0.618 e.g.

34/55 = = 0.618

55/89 = = 0.618

89/144 = = 0.618

144/89 = = 0.618 and so on.

The advocates of Fibonacci numbers use the ratio 0.382 and = 0.618 to compute the retracement level of the stock movement. For instance, a stock that fells from Rs.100 to Rs.70 (a 30% drop) will encounter resistance to further advances after it recoups 38.2% of its loss (i.e. it rises to Rs.81.46) some technical analysis keep close watch on the resistance and support levels as predicted by the Fibonacci ratios.

10.2.22 COPPOCK INDICATOR

The Coppock indicator is based on wave theory predicting long term changes in investment sentiment and sudden changes cannot be accurately predicted. The indicator may be regarded as a general measure of underlying investor confidence. The Coppock's indicator is calculated as follows:

i. Take this month's average share price index and subtract the index for the same month twelve months ago. Multiply the result by ten.

ii. Repeat this arithmetic for last month and multiply the result by nine. Repeat this sequence for a total often months, multiplying each successive result by eight, seven, six, and so

on down to one.

iii. Add up all the figures calculated in steps (1) and (2). The result may be positive or negative. Divide the result by ten. The figure so obtained is the coppock indicator for this month.

An average indicator value of zero is taken as the base line. If the coppock value is above zero, a bull market exists, while a figure below zero indicates the existence of a bear market. The start of a bull market is predicted when the points plotted below zero first start to become less bad. Thus, if the figures of January, February, march and April was -100, -110, -112 and -110, then April would give the first indication of a new bull market.

10.2.23 BLOCK UPTICK DOWNTICK RATIO

Trading in the equity market has become dominated by institutional investors who tend to trade in large blocks. It is possible to determine the price change that accompanied a particular block transaction. If it is above the prior price, it is an uptick and if it is below^ it is downtick. It is assumed thatthe price change indicates whether the transaction was initiated b a buyer (in which case you would expect an uptick) or a seller (in which case you would expect a downtick). This line of reasoning led to the development of the uptick-downtick ratio as indicator of institutional investor sentiment. The ratio has generally fluctuated in the range of 70 (a bearish sentiment) to about 130 (a bullish sentiment).

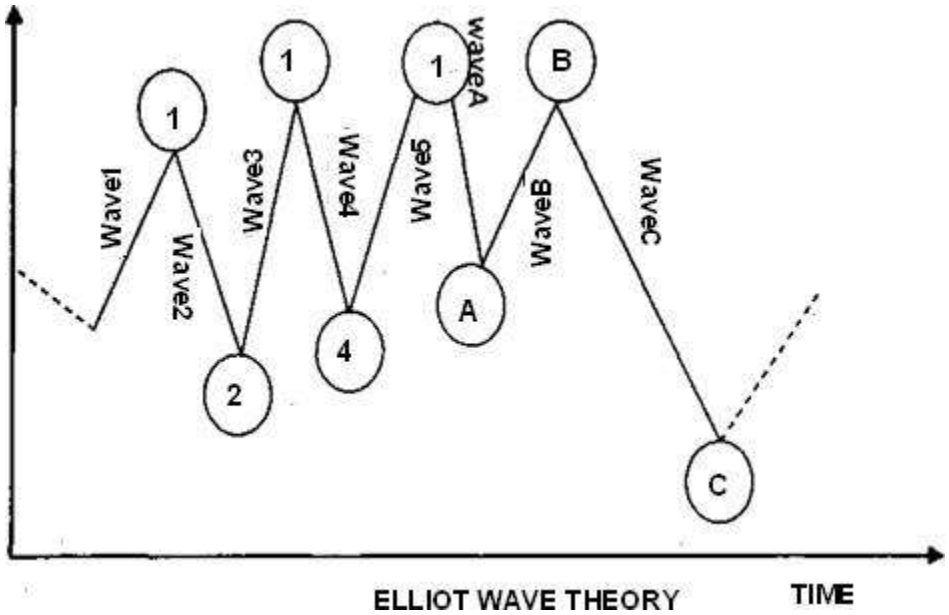
10.2.24 ELLIOT WAVE THEORY TIME Wave5 1 1 1 2 4 A B C C

Elliot wave theory was established in the 1936s by R.N. Elliot and later popularized by Hamilton Bolton. This theory attempts to develop a rational for a long term pattern in the stock price movements. This theory is difficult to grasp and somewhat intimidating. The principle behind the theory is actually relatively simple.

In its most basic form the theory states that the stock market follows a repetitive rhythm of waves. A wave is a movement of the market price from one change in the direction to the next change in the direction. The waves are the result of buying and selling impulses emerging from the demandand supply pressures on the market. If the demand exceeds the supply, there is pressure of overboughtposition in the market leading to rising trend in the prices. On the other hand, if the supply exceeds demand, there is an oversold position in the market leading to a downward trend in the prices. Depending on the pressure of the oversold and overbought

position, the waves are generated in the prices.

The stock market, generally, follows a repetitive rhythm of a five wave advance followed by a three wave decline. If we count the waves, we find that one complete circle has eight waves, five upand three down. In the advancing portion of the cycle, the waves are numbered as shown in the following figure:



Waves 1, 3 and 5 are rising waves these are also called impulse waves. Wave z and y move against the uptrend. Waves 2 and 4 correct waves 1 and 3 and are thus called corrective waves. After the five waves numbered advance has been completed, a three wave correction binges, identified by waves A and B and C.

This theory has been accepted as one of the important tools of technical analysis for the investor and trader to decide on the timing of investment and for developing important market strategies. However the wave theory has two basic limitations: It is difficult to identify the turning point in each stage.

i. Investors cannot distinguish between a major and minor five stage movement because therhythm as well as the count numbers of waves may not be consistent.

10.2.25 OSCILLIATORS (RATE OF CHANGE)

The rate of change index is a widely used tool of technical analysis to measure the momentum of price changes. Oscillators refer to the velocity of price change reflecting the market momentum which is measured by the rate of change of prices. The rate of change may

be over a very short period (i.e. 5 to 10 days) or a longer period (i.e. 3 to 6 months). Most of the oscillators move in the same direction either positive or negative, depending on the trends of the market. An overbought market is reflected by a positive reading and a oversold market is respected by a negative reading. The shape of the oscillator when plotted on the graph will depend on the period for which it is calculated. Oscillatorwill have a smoother curve, if it is for a long period, but if it is compiled on a daily basis, it will be widely fluctuating.

By properly reading the graph, the investors can make use of oscillators for making their investment decisions. As a general rule, if the oscillator reaches the extreme lower end, it is advisableto buy, but if it reaches the extreme upper end, it is advisable to sell. The crossing of the zero line can be taken as an indication of buy and sell decisions. The market is said to be overbought when the oscillator is at the upper extreme, thus it is advisable to sell. On the other hand, if the oscillator is at the lower extreme, the market is oversold and it is advisable to buy. A study of oscillator is very useful to confirm the conclusion arrived at by the trend analysis and the use of charts.

10.2.26 STOCHASTICS

Stochastic is a price-velocity technique. It is based on the theory that as price increase, closing prices have a tendency to be nearer to the peaks reached during the period. Similarly when prices fell, closing prices have a tendency to be nearer to the troughs reached during that period. George C. Laire had developed the stochastic technique. Thus technique is based on a single formula:

$$\%K = \frac{C\text{-}L}{H\text{-}L} \times 100$$

Where %K = Stochastic

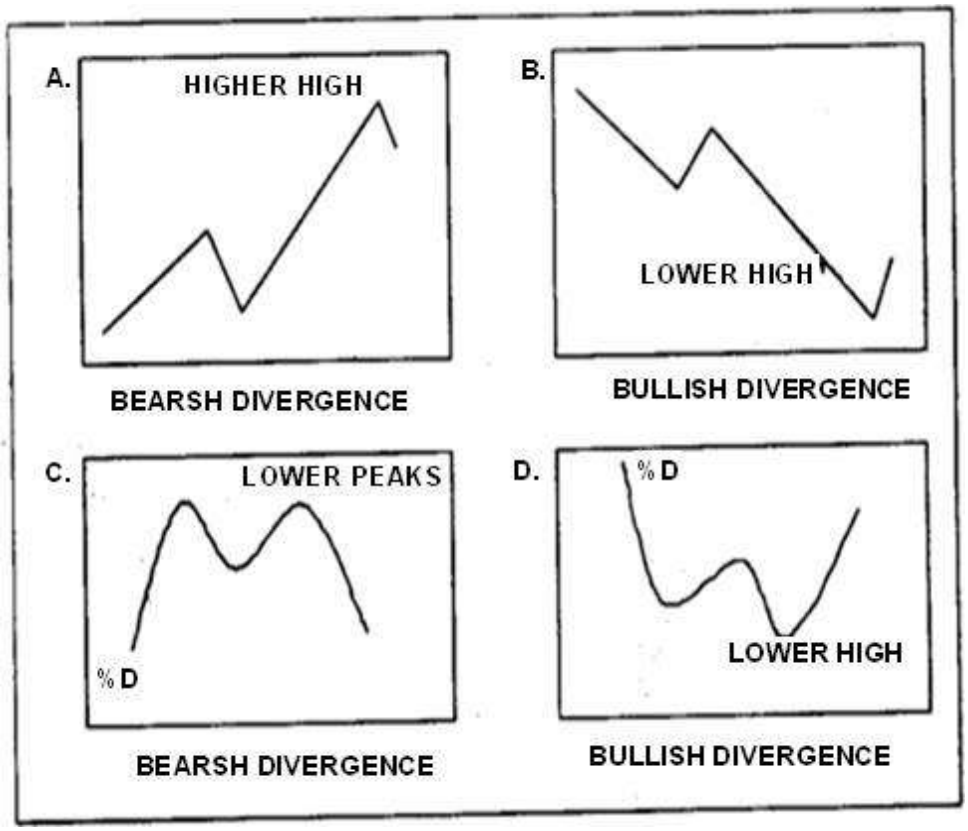
C = Latest closing price

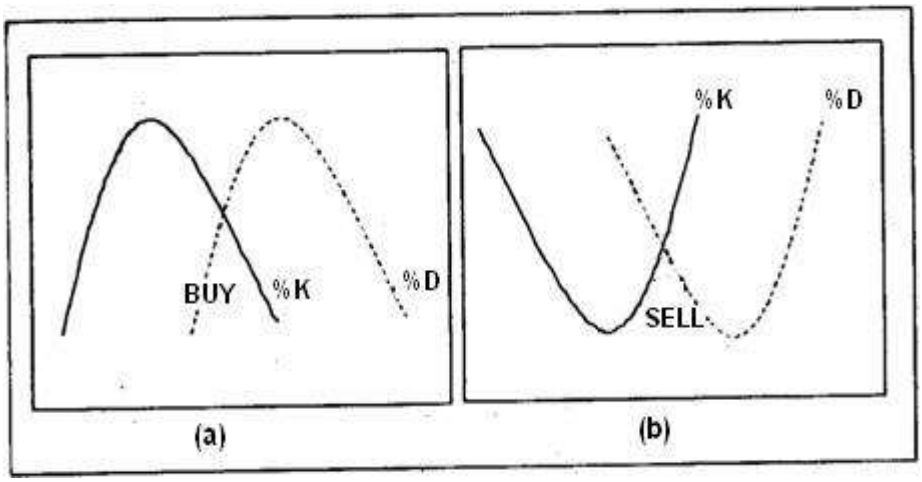
L = Low price during the last N periods H = High price during the last N periods

N can be any number of periods % K is then smoothened to derive % D by using the

simple moving average technique. For interpreting stochastic, divergence analysis is used.

1. A bearish divergence occurs when the security's price makes a high then corrects moving lower and subsequently reaches a higher high. At the same time, corresponding dealers of the % D line make a high followed by a lower high.





The above figures clarify the principle method of interpreting stochastics.

2. A bullish divergence occurs when the security's prise makes a low, then corrects moving

higher and subsequently reaches a lower low. At the same time corresponding bottoms of the %D line makes a low followed by a higher bottom-

In the final analysis, in bearish divergence, a sell signal occurs when %K line move below %0 line. In a bullish divergence a high signal occurs when %K line moves above the %D line. Sometimes %K line touches 0% or 100%. This only suggests great weakness or great strength of the scrip.

10.3 EVALUATION OF TECHNICAL ANALYSIS

Critics have pointed out that technical analysis is not by itself, the road to be richer. Despite assertions by technical analysis, the technical analysis is an art. Like any other art, its successful use requires talent, experience intuition and above all commonsense. This tool must be used along with fundamental analysis, only then it can convert the modest profits to good profit. There are some inherent limitations of technical analysis as follows:

1. Technical analysis is based on the past and historical data. Unexpected future events are not taken into consideration by it.
2. To earn more profit, the technical analysts have to cleverer and luckier tan others. In a stock market, profits are always realized at the expense of others who are trying to earn profits at theirterms.
3. False signals can always occur in the stock markets. If the technical analysis acts without confirmation, they would make mistakes and would suffer unnecessary expenses and losses.

Technical analysts have been in existence for quite a long period of time now and they are unlikely to disappear. For doing their work in a better way they require improved quantitative methods coupled with improved behavioral research.

10.4 SELF CHECK EXERCISE

1. Discus the assumptions of Technical Analysis.
2. Explain Dow Theory.
3. Explain Charting.
4. Describe Short selling theory.

10.5 SUMMARY

The term technical analysis is used to mean a fairly wide range of techniques; all based on the concept that past information on prices and trading volume of stocks gives the enlightened investor a picture of what lies ahead. It attempts to explain and forecast changes in security prices by studying only the market data rather than information about a company or its prospects, as is done by fundamental analyst. Fundamentalists make their decisions on quality, value and depending on their specific investment goals, the yield or growth potential of the security. Technical analysts use three basic types of charts. These are Line Charts, Bar Charts, Point and Figure Charts

10.6 GLOSSARY

Confidence Index: It is the ratio of a group of lower-grade bonds to a group of higher-grade bonds.

Indicators: Indicators are calculations based on the price and the volume of a security that measuresuch things as money flow, trends, volatility and momentum.

Odd Lots: Stock transactions of less than, close to 100 shares.

Trend line: A charting technique that adds a line to a chart to represent the trend in the market or astock.

10.7 ANSWERS TO SELF CHECK EXERCISE

1. For answer refer to section 9.2
2. For answer refer to section 10.2.1
3. For answer refer to section 10.2.2
4. For answer refer to section 10.2.7

10.8 TERMINAL QUESTIONS

1. What is technical analysis? Describe the assumptions of technical analysis.
2. Distinguish between technical and fundamental analysis.
3. What are tools and techniques of technical analysis? Describe in brief.

10.9 SUGGESTED READINGS

- Samuels J. M, F.M. Wilkesard R.E. Brayshaw, Management of Company Finance, Chapmanand Hall, London
- Smith, Edger Lawrence, Common Stocks as Long-term Investment, New York, MacMillan.
- Sprinkel, Beryl, W., Money and Stock Prices, Homewood III, Richard S. Irwin, Inc.
- Sudhindhra Bhatt, Security Analysis and Portfolio Management, Excel Books.
- Fischer, D.E., Security Analysis and Portfolio Management, Prentice Hall,1983.
- Reilly, F.K., Investment Analysis & Portfolio Management, Drygen Press, 1985.

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CHAPTER-11

MARKET EFFICIENCY

Structure:-

11.0 LEARNING OBJECTIVES

After reading this chapter, you will be able to:-

- Understand the concept of market efficiency
- List the factors that contribute to an efficient market
- Describe briefly the tests for each of the forms for the efficient market hypothesis
- Discuss the evidence related to the EMH
- Discuss the implications of the EMH for investors.

11.1 INTRODUCTION

Before taking any investment decisions, every investor has to use some technique for valuating the securities. Two different approaches in use for investment decision making, already discussed inthe previous chapters, are fundamental analysis and technical analysis. The fundamentalists use the intrinsic value of securities for identifying the securities to be purchased or sold. The technical analysts believed in the past behavior of the prices. However, in real life, investment decision making is not guided by a single tool-fundamental or technical, but other quantitative factors requiring a lot ofpersonal judgment. Thus, in this chapter we study a third theoretical approach. The Random Walk Theory, where the price of securities is determined by the independent market forces, which absorb all the information efficiently.

In a theoretical sense, markets are considered to be efficient if there is a free flow of information and the information is observed quickly by the market. Market efficiency signifies: how quickly and accurately does relevant information has its effect on the security prices. In an efficient market, all the known information is immediately discounted by all the investors and reflected in the security prices in the market. No single investor has an information edge over the others as everyone knows all possible to know information simultaneously. Moreover, every investor the information similarly and behaves rationally. A few important definitions of market efficiencies are as follows:

According to James Lorie: "Efficiency..... means the ability of the capital market to function, so that prices of securities react rapidly to new information. Such efficiency will produce prices that are appropriate in terms of current knowledge and investor will be less likely to make unwise investments"

According to E.F.Fama: "efficient market is defined as the market where there is large number of rational profit maximizes actively competing with each predict even the market value of individual securities t information is almost freely available to all participants"

In an efficient market scenario, all instruments in the market will be correctly priced all the available information is perfectly understood and absorbed by all the investors, present as well as prospective. No excess profits are possible in this scenario. A security's price will be a good estimate ofits investment value where investment value is the present value of security's future prospects as estimated by well informed and capable analysts. Any substantial disparity between price and value would reflect market inefficiency. Alert analysts would seek to take advantage of this inefficiency, immediately. Underpriced securities will be purchased creating

pressure for price decline due toincreased supply to sell. Thus, in a perfectly efficient market, analysts immediately compete away any chance of earning abnormal profits. For the capital market efficiency theory to operate, the following assumptions are made:

1. Information must be free and quick to flow so that all the investors can react to the newinformation.
2. Transactions costs such as sales commission, and bottlenecks are not there.
3. Taxes have no noticeable impact on investment policy.
4. Every investor can borrow or lend at the same rate.
5. Investors must be rational and behave in a cost effective competitive manner. They should beable to recognize efficient assets and invest in those assets which have highest returns.
6. Market prices are efficient and not sticky and absorb the market information quickly and themarket responds to new technology, new trends, changes in tastes etc. Efficiently and quickly.

In the efficient markets, the forces of demand and supply move freely and in an independentand random manner. This concept of randomness has led to the theory of random walk in thedetermination of prices. Random Walk Theory is a special case of the efficient market theory.

11.2 RANDOM WALK THEORY

The basis of Random Walk Theory is that the market information is immediately and fully spreadso that all the investors have full knowledge of the information. As per this theory, changes in stock prices are independent of each other. The prices of today are independent of the past trends. The priceof each day is different it may be higher or lower than the previous price or many be unchanged. The present price is randomly determined and is influenced only by the information. This theory has been empirically tested and the analysts have also found an explanation for the efficiency of the markets. As the equilibrium price of the security is determined by demand and supply forces based on available information, this equilibrium rice will immediately change as fresh information becomes available. Based on the fresh information, a new equilibrium prices will be reached which is totally independent of the past price. The random

walk theory totally contradicts the technical analysis which believes that presents prices are based on the past trends and the history of trends repeats itself.

The Random Walk Theory in its absolute form has the following assumptions:

1. There is a perfectly competitive market in its absolute operating in an efficient manner in orderto equate the actual stock price with its present discounted value.
2. Market is supreme and no individual investor or group can influence it.
3. All investors have the same information and nobody has superior knowledge so that theprevailing market price reflects the stocks present value.
4. Stock prices discount all the information quickly. If there is any deviation from the equilibriumprice, it is quickly corrected and the equilibrium price is restored.
5. A price change occurs in the value of stock only because of information relating to fundamentalswhich affect the company or the stock markets. In such a case the equilibrium level itself shifts.
6. The prices move in an independent fashion without undue pressures or manipulation.
7. The instant adjustment in prices is recognition of the fact that all available information is reflected in the stock prices.
8. Institutional investors or major fund managers have to follow the market and cannot influence it.
9. Future change in prices will only be as a result of some other new piece of information which was not available earlier.
10. The changes in the stock prices show independent behaviour and are dependent on the new pieces of information that are received but within themselves are independent of each other. Whenever new piece of information is received in the stock market, it independently receivesthis new information and this is independent and separate of all other pieces of information.

This rapid shift to a new equilibrium level whenever new information is received is the Random Walk Theory.

11.3 EFFICIENT MARKET HYPOTHESIS

The random Walk Theory is based on efficient market Hypothesis (EMH) EMH says that successive absolute short run price changes are independent. The hypothesis is based on the assumption that the all the securities markets are efficient. To have efficient markets, it is essential that both internal and external efficiency must be there:

Internal efficiency: internal efficiency refers to the markets where the transactions costs arelow transitions move at a very high speed. Investor has no control over this type of efficiency.

External efficiency: markets are considered to be externally efficient if they absorb all the information in an unbiased manner. In such market, the new information is immediately reflected in the security prices. The price adjusts to the new information only when the investors are rational and markets are efficient.

E.F. Fama has provided that the efficiency of markets depends on the extent of absorption of information, the time taken for absorption and the type of information absorbed. The absorption of information by the markets is of different degrees. Fama has given three classifications of efficiency, explained as follows:

1. **Weak form:** the weak form of the market is the oldest statement. This form of market holds that current prices of stocks fully reflects all historical information, thus, past data cannot be used to predict future prices.

In the words of Adam Smith "prices have no memory, and yesterday has nothing to do with tomorrow".

This form assets that any attempts to predict prices based on historical information is totallyfutile as future changes are independent of past price changes. The weak form contradicts the technicalanalysis, which states that prices move in a predictable manner and historical price movements can help to forecast future trends.

The weak form of efficiency holds good in any market, since even the critics of EMH admit that prices adjust to the information ultimately. Empirical evidence has shown that as past prices are alreadyabsorbed by the market, the prices move in an independent fashion. Both EMH in its weak form' and random Walk Theory postulate that analyzing the past does not improve the forecasting ability of stock prices and new information and prices that result from them cannot be predicted.

2. Semi-strong form: The semi-strong form of EMH postulates that markets absorb quickly and efficiently all the publicly available information, as well as the information regarding historical prices. As prices adjust to the information quickly and accurately, abnormal/superior profits cannot be earned on aconsistent basis. The empirical evidence supports the convention that the public reacts quickly to the new information, but there has been some evidence that market does not always digest the new information correctly. The inefficiency in the market mechanism absorbing the data is found to be corrected over a period of time, as the investors take time to analyse and conclude the effect of any public information.

The semi-strong form is not empirically well supported but in many foreign markets the semi- strong form is found to be applicable and markets quickly absorbs all published information. The revolution in information communication technology has made the application of semi-strong form possible in developed countries.

3. Strong form: The strong forms of EMH represent the most extreme case of market efficiency possible. According to the strong form, the prices of securities fully reflect all available information both public and private. If this form is true, prices reflect the information that is available to the select groups like the management, financiers, stock exchange officials etc. Thus, according to this form, no information that is available be it public or inside can be used to consistently earn superior investment returns. This implies that not even security analysis and portfolio managers, who have access to information more quickly than the general public are able to use this information to earn superior returns. Studies made in developed countries have shown that strong form of efficient market does not exist there also. Investors have not shown consistently higher returns even with all the information available to them. It was also found that average investor could do better by picking up securities in a random fashion.

In the strong from, two basic conditions are there 1. Successive price changes or returns are independent and 2. The successive price changes or return changes are identically distributed. The strong form theory is not, merely based on price or return levels as such but in changes between successive levels.

11.4 TESTING TECHNIQUES OF EMH

EMH states that successive absolute price changes are independent in the short run subject to the assumption that market comprises of rational investors. However, in really,

investors are not alwaysrational. For selecting the securities they consider a number of other factors also in addition to risk and return. It is very difficult if not impossible to segregate the fractional influences of these factors. In the stock market, particularly in the Indian stock market, sentiments play a major role in price behavior the counters.

There are reversal techniques for testing the EMH. The techniques can be direct or indirect. Direct tests asses the Success of specific investment strategies or trading rules. Indirect tests are statistical tests of prices or returns. EMH can also be tested by some scientific methodology or simply by looking at evidences various testing techniques as relating to weak, semi strong and strong form areexplained as follows.

11.4.1 TESTS OF WEAK FORMS

In the weak form of market no investor can use any past information to earn abnormal profits. The weak form takes into consideration only the average change of today's prices and states that they are independent of all prior prices. The weak form enjoys a fair degree of chance to hold good even in adeveloping market like ours. The evidence supporting the random walk behavior also supports the EMHand states that the large price changes are followed by larger price changes but they do not change in any direction which can be predicted. This observation in a way contradicts the random walk behavior but it does not violate the weak form. Different tests used for weak forms of EMH are as follows:

1. **Earlier researches:** in 1900, research was first conducted by bachelor. He had developed a theory for the behavior of commodity prices. His analysis showed that the commodity prices followed a random walk. Further research was done by cowls in 1934, Jones in 1937 and Kendall in 1953. These researches also supported that the security prices went round a random walk. All this research was based purely on economic series data. Statically properties of data were analyzed and evidence of efficient market in its weak form was provided. Research was then conducted by Roberts and Osborne in 1959. Robert's research is called stimulation test. He took the Dow Jones's industrial average and compared it with a variable generated by a random walk mechanism. He conducted that this mechanism showed patterns which were very similar to the movement of stock prices. He alsoconducted that a series of cumulative random numbers closely resembled actual stock price series and that the changes in the random numbers principles series as expected do not exhibit pattern as it exhibits in the case of stock price changes.

According to Osborn's research, the price changes are independent of the price changes in the previous period.

2. **Serial correlation test:** one method of testing for randomness in stock price changes is to measure their correlations. A number of researchers like Fame, Fischer, and Jensen etc. In the USA and many experts in India have conducted tests for serial correlation of the price changes. In this test, acertain number of stocks are selected. For a particular period the changes in the prices of these stocks are selected. For a particular period the changes in the-prices of these stocks are observed. Then in another period, for the same stocks, the changes in the stock prices are noted. For these changes, correlation analysis is conducted/ if the correlations are closed to zero, the price changes are said to beserially independent. Thus, if the coefficient of correlations is zero or close to zero, it can be concluded that the prices move in a random fashion and are not dependent on past prices.

3. **Runs test:** another test for measuring relationship between successive price changes is the runs test. In this test, the sample is tested for randomness of order. The dictionary meaning of run is a sequence by different occurrences or by none at all. A run is thus a consecutive sequence of price changes of the same sign. Unlike correlation tests, run test ignored the absolute value of numbers inthe series and took into research only the positive and negative signs. The run tests are made by counting the number of consecutive signs or runs in the same direction. Under the hypothesis of independence of successive price changes, the distribution of the total number of runs is approximatelynormal. For testing the randomness of stock prices, we take a series of stock prices. Starting with the first price each price change is denoted by a +, -, or zero sign. Plus sign indicates that the price under consideration has increased as compared to the preceding price, negative price indicates that the price has decreased as compared to the preceding price and zero sign indicates that the price has not changed as compared to the preceding price. In case the sign has changed from a plus to minus orfrom a minus to a plus, a new run is counted to have begun. In this test, the actual number of runs(R) iscompared with the expected number of runs of all types and if the actual number of runs are not significantly different from the expected number of runs, then the price changes are considered to be

independent or random. Run tests were conducted by Fama, Hagerman and Richmond, Black and Scholls, Granger and Morgenstern etc. For detecting significant relationships between prices of securities.

4. Filter test: critics were of the view that the correlation test were not of good measure as these were extremely narrow to prove the complex nature of the stock price behavior. The filter test was donefirst by Alexander in 1961 to find out if any abnormal returns could be earned using past price data. This rule was further tested by Fama in 1965 and Fama & blume in 1970. In this test, filters are fixed at some percentage change and price movements are observed. Some trading strategies run of these filter levels on the premise that once movement called resistance or support levels, the stock price will move in the same direction.

This rule works in the following manner, let us assume a 5%, filter rule, suppose a stock has been decreasing in price, when the stock price increases to decline and increases 5% above its low point, this triggers a buy signal. If the stock has been increasing in price and then begins to decline, once the price has declined 5% from its previous peak, a sell signal is triggered. Several studies have examined this type of trading strategy. Utilizing filter which ranged from as small as ½ to 1% to as large as 50%. The results showed that larger filter did not work well but the smaller ones worked better as they were more sensitive to the market changes. These studies also found out, after adjusting for trading costs (commissions) all such filter rules produced results that were below normal. In every case a strategy of simply 'buying and holding' a well diversified portfolio outperformed the filter rules.

The results of using filter tests turn out to be that stock prices do not have momentum from which one can make returns in excess of those warranted by the level of risk assumed. The test by Rao(1988) shows that the returns under buy and hold strategy are higher than that under strategy without considering the trading costs.

11.4.2 TESTES OF THE SEMI-STRONG FORM

The semi-strong form states current prices instantaneously reflected all publicly available information such as quarterly reports, changes in accounting information, dividends, splits etc. The test of this form examines how quickly and accurately the stock returns get revised upwards or downwards as a result of release of some information. Different studies conducted for testing the semi-strong form or markets are as follows:

1. **Market reaction test:** In 1969, Fama, Fisher, Jensen and Roll tested the speed of the market's reaction to a firm's announcement of a stock split and the accompanying information with respect to a change in dividend policy. They concluded that the market was efficient with respect to its reaction to information on the stock split and also was efficient to reacting to the information contents of stock split vis-à-vis changes in the dividend policy. The stock split information brought in market reaction just before the split announcement. During this period, the investors could achieve abnormal returns on the basis of this information. But the average cumulative abnormal return which was going higher just before the announcement stopped increasing or decreasing in any significant manner in the following period once the split announcement was made.

2. **Earnings impact:** r. Ball and P. Brown examined the effect of annual earnings announcements.They classified firms into groups based on whether their earnings increased or decreased relative tothe average corporate earnings. They found that before the earnings announcement stocks associated with increased earnings provided positive abnormal returns and the stocks associated with decreased earnings provided negative abnormal returns. Both groups' generated normal returns after the earnings were released, thus, providing support for the semi-strong form of EMH.In a study by Obaidullah in 1991, both positive and negative unexpected earnings were found tomove up and down respectively in equal measure with no significant post release drift, thus, indicating quick adjustment of returns to earnings information.

3. **Secondary offering impact:** in 1972, M.S. Scholls conducted a study to observe the reaction of security prices to the offer of secondary stock issues. The study showed that the price of security decreases when the issuer was a company which indicated to the market that such an offer contained some bad news. But secondary offerings by banks and insurance companies were not viewed in a negative manner and the security prices did not fall significantly. The study proved that the price behavior of secondary issues lent support with the market just to a new piece of information in an unbiased manner and almost immediately.

4. **Block trade impact:** in 1972 only Kraus and Stoll conducted a research study to examine the effects of large block trades on the behavior of security prices. The study showed that there was a temporary effect on share price which was associated with the block trade. There was no price behavior which could be predicted after the day on which the block trade occurred. This was constant with the semi-strong from the EMH.

5. **Bonus impact:** even though the bonus issue never brings any additional value to investors. Yetit does influence the expectations regarding future. As a result, the adjustment which starts well before such announcement is less than accurate as against 'one to one' adjustment with the bonus ratio. The cumulative average abnormal return after the zero date (the date on which price sensitive information isreleased) does not drift significantly, indicating fairly quick price adjustment. However, there has been asignificant upward drift before the zero date which means the market has anticipated the event. This is Considered to be an indication of efficiency of the market.

11.4.3 TESTS OF THE STRONG FORM

In the strong form of EMH, all the information, public as well as private is known to the investors and hence a particular investor cannot reap abnormal profit using this information. Thus, all the information is fully reflected in the security prices. This is the most extreme form of EMH. Most of the research work has indicated that EMH in the strong form does not hold good. Different tests of the strong form are as follows:

1. **Trading by stock exchange officials:** top officials of the stock exchanges have access to all the information on the overbought or oversold position. If private information is of no use, it should not be possible for them to make profits using the information. Studies carried out in USA on the profits made by such experts who have access to such information have showed that experts consistently make abnormal profits. All this indicated that strong form of EMH does not hold.

2. **Trading by mutual fund managers:** mutual fund managers are supposed to be experts in investment decision making and are able to get that information which is not accessible to the common man. Mutual fund managers should thus be in a position to earn consistent abnormal profits. The performance of mutual fund had been tested by friend in 1972, Sharpe in 1966 and by Jensen in 1969. The studies showed that the mutual funds were not better in performance than an individual investor who purchases the same securities with the same risk. Mutual funds should constantly be able to earn an extra ordinary return but empirical evidence does not indicate this.

The studies done by Barua and Verma in 1991 and Obaidullah and Ganshan in the same year show that mutual funds do provide abnormal returns thus contradicting the near strong form

of EMH.

11.5 RANDOM WALK MODEL TECHNICAL ANALYSIS AND FUNDAMENTAL ANALYSIS

The random walk theory is inconsistent with the technical analyst's point of view in determining the behavior of stock prices. The technical analyst claims that history repeats itself and by studying the past behavior of security prices, future prices can be predicted. Random walk hypothesis does not agree with this line of reasoning. It states that successive price changes are independent not based on any past or future data.

The random walk hypothesis supports and to some extent believes in fundamental analysis. In semi-strong form, random walk theory states that fundamental analysis which is superior in nature will definitely lead to superior profits. It believes that in the short run, changes in information help the superior analyst who has the capability of obtaining inside information to outperform other investorswho follow the 'buy and hold' strategy. Random walk theory speaks only of the phenomenon of shortrun price change independence; it says nothing about trends in the long run or how price levels are determined.

In a random market, the analyst should perform the following functions for making superior analysis of the firm:

i. To determine the risk and return characteristics of each security. In the hope of coming across situations where his expectations differ significantly from those of the market as a whole.

ii. To construct an adequate portfolio by combining the risk return characteristics of securities.

iii. To hold the portfolio for a considerable length of time and to continuously evaluate the securitiesheld in it.

iv. To revise the portfolio, if need be, after consistent evaluation.

The random walk theory may be in contradiction of technical analysis; still some research has been conducted on the analysis of stock behavior through technical analysis.

11.6 THE SIX LESSONS OF MARKET EFFICIENCY

Economic all over the world are in agreement that capital markets functions sufficiently well so that opportunities for easy profits are very rare. Therefore, whenever we come across an instance where the market prices apparently don't make sense, we should not throw the efficient

markethypothesis onto the economics garbage heap. Rather we should think carefully above whether there is some missing ingredient which our theories have ignored. The financial managers should, thus, assume that security prices are fair and it is very difficult to outguess the market. Six lessons of market efficiency (given by Brealey and myers) which every finance manages should learn are as discussed below:

Lesson 1: Markets Have No Memory

According to the weak form of the efficient market hypothesis the sequence of past price changes does not contain any information about price changes. Economics agree with the hypothesis when they emphasis that markets have no memory. Sometimes, financial managers don't seem to believe this statement. They generally have the following misconceptions e.g.:

i. After an abnormal price rise, equity financing should be restored to rather than debt financing.

ii. After a fall in prices, equity stock should not be issued.

But in reality, the market has no memory and the cycles that financial managers seem to rely ondo not exist. Therefore, the idea to catch the market while it is high or to want a rebound in prices does not hold any relevance.

Sometimes the financial managers may have some inside information indicating the overpricing or underpricing of firm's stock. Supposing, there is favourable inside information which the market does not know the stock price can rise sharply if the news is revealed. Therefore, if the company sold shares at the current price, it would be offering a bargain to new investors at the expense of present investors.

Naturally, the managers are reluctant to sell new shares when they have favourable inside information. But in reality, such information has nothing to do with the history of the stock price. The firm's stock could be selling at half its price of a year ago and yet there could be special information suggesting that it is still grossly overvalued or it may be undervalued at twice last year's price.

Lesson 2: trust market prices

Price can be trusted in an efficient market because they impound all available information about the value of each security. It implies that in an efficient market, investors cannot achieve

superior rates of return consistently. To do that, one not only needs to know more than anybody else rather he needs to know more than everybody else. Every financial manager must be aware of ti is message particularlywhile managing the firm's exchange rate policy or for its purchase and sales of debt. Any overconfidence on the part of the financial manager will endanger the firms' consistent financial policy. The company's assets may also be directly affected by management's faith in its investment Skills.

Example: the management of a company thinks that the stock of another company which it is planning to purchase is undervalued. Approximately 50% chances may be that the hindsight may turn out to be true and the stock may actually be undervalued. But 50% chance is that it may actually be overvalued. Therefore, the purchasing company is playing a fair game except for the cost of acquisition.

Financial managers sometimes take large gambles because they believe that they can predict the direction of interest rates, stock prices or exchanger rates and sometimes their management encourages them to speculate. Such speculation does not always result in losses because in an efficient market, there is always a 50:50 probability of winning or losing. But according to lesson 2, investors would better trust market prices rather than incur large risks in the greed for higher profits.

3. Lesson 3: Read The Entrails

Since the prices impound all the available information an investor should learn to read the entrails as the security prices can tell a lot about the future. The market's assessment of the company's securities can provide important-information about the company's prospects. Therefore if a company is offering a much higher yield on its bonds than the average, it can be assumed that the company is in financial trouble.

Example: if the investors are confident that the interest rates are going to rise over the next year, they will prefer to wait before they make long term investments. Any company who wants to borrow long term money today will have to offer the inducement of a higher rate of interest. In other words the long term rate of interest will have to be than the one year rate. Thus, in an efficient market, the difference between the price of any short term and long term contracts always say something abouthow participant expect prices to move.

4. Lesson 4: there are no financial illusions

There are no financial illustrations mean efficient markets, investors are selfishly concerned withthe firm's cash flows and the portfolio of those cash flows to which they are entitled. However, there areoccasions when the managers seem to assume, that investors suffer from financial illusions.

Example: some companies considerably manipulate the earnings exported to the stock holders.This is done by window dressing or 'creative accounting'. Creative accounting means choosing accounting methods that stabilize and increase reported earnings. Managers go to this trouble becausethey assume that stockholders take the figures at face value. One way of affecting the reported earnings is through the method of costing of the goods taken out of inventory. Companies can choose between two methods LIFO method and FIFO method. The choice between these two methods will affect the reported earnings and the tax payments. In times of inflation, earnings calculated under FIFO would be higher than those calculated under LIFO. The income tax authorities insist that the same method that is used to report to shareholders also be used to calculate the firm's taxes. Therefore, the lower tax payments from LIFO method also bring lower apparent earnings.

However, the shareholders are under no financial illusion. They look behind the figures and focus on the amount of the tax savings. If markets are efficient, investors would welcome a change to LIFO accounting even though it reduces earnings. Research has concluded that this is exactly what happens so that the shift to LIFO accounting is associated with an abnormal rise in the stock prices.

5. Lesson 5: Do It Yourself Alternative

In an efficient market, the investors always have an alternative of "do it yourself". They will not pay others for what they can do equally well themselves. Many of the controversies in corporate financing centre on how will individuals can replicate corporate financial decisions.

Examples: a company wanted to merge with another company. The reason given by thefinance manager for this merger was that it would produce a more diversified and hence more stable firm. The investors of the company however have different idea. They argued that if they could hold the stocks of both companies why they should thank the companies for diversifying. It is much easier and cheaper for the individual investors to diversify than it is for the firm.

Another controversy arises when the company considers whether to issue debt or equity. If the firm issues debt it can create financial leverage. As a result, the equity will become more risky but with a higher expected return. But shareholders can obtain financial leverage by borrowing on their own account instead of the company issuing debt. The question before the financial manager is therefore, to decide whether the company can issue debt more cheaply than the individual shareholders.

6. Lesson 6: Seen One Stock, Seen Them All

Lesson 6 implies that investors are likely to regard different stocks as much close substitutes for each other. Investors do not buy a stock for its unique qualities; they buy it because it offers the prospect of a fair return for its risk. This means that stocks are like very similar brands of coffee almost perfect substitutes. The demand for a company's stock is highly elastic. Nobody will like to hold the stock if its prospective return is too low relative to its risk. If the reverse is true, everybody will like to buy the stock. Elastic demand does not imply that stock prices never change when a larger sale or purchase occurs, it does imply that you can sell large blocks of stock at cost to the market price as long as you can convince other investors that you have no private information.

Example: an investor wants to sell a large block of stock, since the demand is elastic; he needs only to cut the offering price slightly to sell the stock. In reality, when he comes to sell the stocks other inventors may suspect that the wants to get rid of it because he knows something which the others don't. Therefore, they will revise their assessment of the stock's value downward. Demand is still elastic, but the whole demand curve moves down. Thus, there is a wide spread agreement that you can sell large quantities of stock at close to the market price as long as other investors do not assume that you have some inside private information.

11.7 SELF CHECK EXERCISE

1. Discuss the assumptions of capital market efficiency.
2. Explain efficient market hypothesis.
3. Describe the tests of semi strong forms of EHM.

11.8 SUMMARY

An efficient capital market is one in which security prices adjust rapidly to the arrival of

new information and, therefore, the current prices of securities reflect all information about the security. Fama divided the overall efficient market hypothesis (EMH) and the empirical tests of the hypothesis into three sub-hypotheses depending on the information set involved: (1) weak-form EMH, (2) semi- strong-form EMH, and (3) strong-form EMH. A simple test for strong form efficiency is based upon pricechanges close to an event. A market portfolio is a portfolio consisting of a weighted sum of every asset in the market, with weights in the proportions that they exist in the market (with the necessaryassumption that these assets are infinitely divisible). Weak-Form and the Random Walk holds that present stock market prices reflect all known information with respect to past stock prices, trends, and volumes.

11.9 GLOSSARY

Efficiency: It means the ability of the capital market to function, so that prices of securities react rapidlyto new information.

Efficient Capital Market: An efficient capital market is one in which security prices adjust rapidly to the arrival of new information and, therefore, the current prices of securities reflect all information about the security.

Market Portfolio: Market portfolio is a theoretical portfolio in which every available type of asset is included at a level proportional to its market value.

Market Value of an Investment: The market value of an investment is described as its current price onthe market.

Internal Efficiency: Internal efficiency refers to the markets where the transactions costs are low transitions move at a very high speed. Investor has no control over this type of efficiency.

11.10 ANSWERS TO SELF CHECK EXERCISE

1. For answer refer to section 11.1
2. For answer refer to section 11.3
3. For answer refer to section 11.4(2)

11.11 TERMINAL QUESTIONS

1. What do you mean by Capital market efficiency? Explain its assumptions.
2. Describe briefly the tests for each of the forms for the efficient market hypothesis.

3. Discuss the implications of the EHM for investors.

11.12 SUGGESTED READINGS

- Samuels J. M, F.M. Wilkesard R.E. Brayshaw, Management of Company Finance, Chapmanand Hall, London
- Smith, Edger Lawrence, Common Stocks as Long-term Investment, New York, MacMillan.
- Sprinkel, Beryl, W., Money and Stock Prices, Homewood III, Richard S. Irwin, Inc.
- Sudhindhra Bhatt, Security Analysis and Portfolio Management, Excel Books.
- Fischer, D.E., Security Analysis and Portfolio Management, Prentice Hall, 1983.
- Reilly, F.K., Investment Analysis & Portfolio Management, Drygen Press, 1985.

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CHAPTER-12

MARKET MODEL

Structure:-

12.0 LEARNING OBJECTIVES

After reading this chapter, you will be able to:-

- Understand how portfolio risk and return are calculated
- Calculate portfolio risk using the market model

12.1 INTRODUCTION

The optimal portfolio concept falls under the modern portfolio theory. The theory assumes that investors fanatically try to minimize risk while striving for the highest return possible. The theory states that investors will act rationally, always making decisions aimed at maximizing their return for their acceptable level of risk. Harry Markowitz used the optimal portfolio in 1952, and

it shows us that it is possible for different portfolios to have varying levels of risk and return. Each investor must decide how much risk they can handle and then allocate (or diversify) their portfolio according to this decision.

12.2 MARKOWITZ RISK-RETURN OPTIMIZATION

Dr. Harry Markowitz is credited with developing the first modern portfolio analysis model since the basic elements of modem portfolio theory emanate from a series of propositions concerning rationalinvestor behaviour set forth by Markowitz, then of the Rand Corporation, in 1952, and later in a more complete monograph sponsored by the Cowles Foundation. It was this work that has attracted everyone's perspective regarding portfolio management. Markowitz used mathematical programming and statistical analysis in order to arrange for the optimum allocation of assets within portfolio. To reachthis objective, Markowitz generated portfolios within a reward-risk context. In other words, he considered the variance in the expected returns from investments and their relationship to each other inconstructing portfolios. In so directing the focus, Markowitz, and others following the same reasoning, recognized the function of portfolio management as one of composition, and not individual security selection - as it is more commonly practiced. Decisions as to individual security additions to and deletions from an existing portfolio are then predicated on the effect such a manoeuvre has on the delicate diversification balance. In essence, Markowitz's model is a theoretical framework for the analysis of risk return choices. Decisions are based on the concept of efficient portfolios.

Assumptions:

The Markowitz model is based on several assumptions regarding investor behaviour.

1. Investors consider each investment alternative as being represented by a probability distributionof expected returns over some holding period.
2. Investors maximize one period's expected utility and progress along the utility curve, whichdemonstrates diminishing marginal utility of wealth.
3. Individuals estimate risk on the basis of the variability of expected returns.
4. Investors base decisions solely on expected returns and variance (or standard deviation) ofreturns only.
5. For a given risk level, investors prefer high returns to lower returns. Similarly, for a given

level ofexpected return, investor prefer less risk to more risk.

12.3 SINGLE INDEX MODEL

Single index model known as Sharp Index Model is an improvement over Markowitz model. He simplified the Markowitz model by establishing the relationship of each security with a market index as measure by single index model.

In place of $\frac{N(N-1)}{2}$ covariance's required for the Markowitz model, Sharpe model would require only 'N' measures of Beta coefficient.

The basic notion underlying single index model is that all stocks are affected by movement in stock market.

When market moves up (i.e. in Boom period Or boolish trend)	→	Price of most shares tend to rise
When market goes down (in depression period i.e. bearish trend)		The prices of most shares tend to decline

This is a basic reason why security returns might be correlated and there is co-movement between securities i.e. it is because of common response of each security to market changes.

This co-movement of stock with market index can be studied in the form of linear regression analysis where return on individual security (Ri) can be taken as dependent variable and return or market index i.e. Rm can be taken as independent variable.

In other words, return of individual security is assumed to be dependent on market indexand can be expressed as

Ri = ai + Bm + ei

ai = is the risk less rate of return

Rm = is the market return or return on market index.

Bi = is the constant that measure expected change in Ri due to change in Rmei = is the error term representing residual return.

This equation divides the return into two components:

1. Return due to market
2. Return independent of market

B1 = beta measures how sensitive a stock return is to the return on market index. It states howthe return of security will change due to change in market return.

e.g.: if beta is 2 and market returns increases by 10%, then return on security is exposed toincrease by 20%.

If market return decreases by 10%, the return on security decreases by 20%.If B >1, higher response to market

If B = 1, neutral response to market If B < 1, negative response to market

a, = It indicates risk less rate of return i.e. what the return of security would be If market return iszero.

e.g. if alpha of security is 2%, it means security will earn 2% return even when market return iszero.

Also, if alpha of security is (-5%) it means, security will earn 5% less at all levels of market return.

Hence, positive serve as a bonus return and negative alpha represents penalty to investor,

e_i = is the unexpected return resulting from influences not identified by the moel. Hence it is known as residual or random return. It may take any value, but when observation re large, it will average out to zero.

12.4 MEASURING SECURITY RETURN AND RISK UNDER SINGLE INDEX MODEL

Risk:

In single index model, risk is measured with variance. It consists of two parts.

a) Market related risk i.e. undiversifiable risk or systematic risk.

b) Specific risk i.e. risk related to specific security Total risk = Market risk + Specific risk

$$\sigma\frac{2}{1} = \beta\frac{2}{1}\sigma^2 m + \sigma^2 ei$$

$\sigma\frac{2}{1}$ = variance of individual security

$\sigma\frac{2}{1}m$ = variance of market index return

$\sigma^2 ei$ = variance of residual return of individual security

β^1 = beta coefficient of individual security.

The market related component of risk is systematic risk and cannot be diversified and reduced.The specific risk is unsystematic risk and can reduced through diversification

For e.g. if estimated value of $Bi^2 = 2$

$\sigma^2 m = 120$ and $\sigma^2 i = 400$

$\sigma^2 i = \beta_i^2 \sigma^2 m + \sigma^2 ei$

= 2 x 120 + 400

= 240 + 400=640

Return:

The expected return of an individual security can be expressed as

$$\overline{R}_i = \alpha_i + \beta\overline{R}_m$$

The return on security is also combination of two components

1. A specific return component represented by alpha of security.
2. A market related return component represented by B_1.

For e.g. α = 3 and β_i =2 Rm =15%

$\overline{R}_i = \alpha_i + \beta i\overline{R}_m$

= 3 + 2(15) = 33 %

12.5 MEASURING PORTFOLIO RETURN AND RISK UNDER SINGLE INDEX MODEL

Portfolio analysis and selection requires

a) The expected portfolio return

b) The risk

For all possible portfolio that can be constructed with given set of security. This return and riskcan be calculated with single index model.

According to this model, the expected return of portfolio may be taken as portfolio alpha plusportfolio beta times expected market return hence.

$$\overline{R}_p = \alpha_p + \beta_{pm}\overline{Rm}$$

The portfolio alpha is weighted average of specific returns of individual securities. Hence:

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

w_i = proportion of investment in individual security,

α_i = specific return on individual security.

The portfolio beta is weighted average of beta coefficient of individual securities.

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

Where

w_i = proportion of investment in individual security

β_i = beta co-efficient of individual security.

In simple words, expected return of portfolio is sum of weighted average of specific return and weighted average of market related returns of individual.

Risk

The risk of portfolio is measured as the variance of portfolio returns. The risk of portfolio is simply; weighted average of market related risk of individual security plus weighted average of specific risk of individual securities in the portfolio.

Total risk - weighted average of market related risk + weighted average of specific risk.Hence, portfolio risk may be expressed as:

$$\alpha^2 P = \beta^2 P \sigma^2 m + \sum_{i=l}^{n} w_l \frac{2}{1} \sigma^2 ei$$

Where $\beta^2 p \sigma^2 M$ - represent market related risk i.e. systematic risk

$\sum_{i=l}^{n} w_i \frac{2}{1} \sigma^2 e^1 i$ represent weighted average of variances of residual returns of individual security.

When portfolio is large, a residual or unsystematic risk approaches zero and portfolio risk becomes equal

12.6 MULTI INDEX MODEL

Single index model is based on the fact that stock move together only because of common movement with the market. In practical life, there are certain other factors or variables affecting securityand hence their co-movement such as:

1. Inflation
2. Economic growth(real)
3. Interest rates
4. Exchange rates etc.

Multi index model attempts to identify and incorporate these non-market or extra factors that cause the securities to move together.

These extra-market factors are set of economic factors that account for common movement in stock prices beyond that accounted for market index itself.

Hence multi index model augments single index model, by incorporating these extra market factors as additional independent variables.

$$R_i = \alpha_i + \beta_m R_m + \beta_i R_i + \beta_2 R_2 + \beta_3 R_3 + e_i$$

The model says that return of Individual security is a function of four factors: The General market factor Rm

1. Three extra market factors

i. R1 ii. R2 iii. R3

Beta coefficient measures>the sensitivity of the stock return of these factors.

α= indicates the risk less rate of return

e, = The residual term

A multi index model is an alternative to single index model. It is more complex as compared to single index and requires more data for its application but both these models have helped to make portfolio analysis more practical and simplified.

12.7 SELF CHECK EXERCISE

1. Discus the assumptions of Markowitz model.
2. Explain single index model.

12.8 SUMMARY

The application of Markowitz's model requires estimation of large number of co-variances. And without having estimates of co-variances, one cannot compute the variance of portfolio returns. This makes the task of delineating efficient set extremely difficult. William Sharpe's single-index model' simplifies the task to a great extent .Some other portfolio selection models that seem to hold great promises to practical applications are also looked at here. One such model is the multi-index model

12.9 GLOSSARY

Beta: The beta (β) of a stock or portfolio is a number describing the relation of its returns with that of the financial market as a whole.

Efficient Frontier: A line created from the risk-reward graph, comprised of optimal portfolios.

Portfolio Manager: The person or persons responsible for investing a mutual, exchange-traded or closed-end fund's assets, implementing its investment strategy and managing the day-to-day portfolio trading.

Market Portfolio: Market portfolio is a theoretical portfolio in which every available type of asset is included at a level proportional to its market value.

12.10 ANSWERS TO SELF CHECK EXERCISE

1. For answer refer to section 12.2

2. For answer refer to section 12.3

12.11 TERMINAL QUESTIONS

13.1 Discuss how portfolio risk and return are calculated?

13.2 How security return and risk under single index model is calculated?

12.12 SUGGESTED READINGS

- Samuels J. M, F.M. Wilkesard R.E. Brayshaw, Management of Company Finance, Chapmanand Hall, London
- Smith, Edger Lawrence, Common Stocks as Long-term Investment, New York, MacMillan.
- Sprinkel, Beryl, W., Money and Stock Prices, Homewood III, Richard S. Irwin, Inc.
- Sudhindhra Bhatt, Security Analysis and Portfolio Management, Excel Books.
- Fischer, D.E., Security Analysis and Portfolio Management, Prentice Hall, 1983.
- Reilly, F.K., Investment Analysis & Portfolio Management, Drygen Press, 1985.

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CHAPTER-13

CAPITAL MARKET THEORY

Structure:-

13.0 LEARNING OBJECTIVES

After reading this chapter, you will be able to:-

- Describe how assets should be priced in capital market
- Explain the assumptions of the capital market theory
- Describe the problems associated with the empirical testing of arbitrage pricing theory
- Discuss the expected return of all assets and portfolios of assets in the economy.

13.1 INTRODUCTION

In portfolio selection, not only returns but risks are also to be considered as in the case of single investments. In aggregation of risk two and two does not always make it four as suggested

by Markowitz in his portfolio model. This model was mechanically so complex that it could not be practically adopted either by practitioners or by academicians. As a result the capital asset pricing model was developed. The risks in a portfolio of asset will not be the total of risks of individual investments; it can be more or less than the total. The objective of every investor, however, is to minimize the risk for a given return and capital market theory deals with this subject.

13.2 CAPITAL MARKET THEORY

Capital market theory is an extension of the portfolio theory of Markowitz. Markowitz used mathematical programming and statically analysis in order to arrange for the optimum allocation of assets within portfolio. To reach this objective he generated portfolios with a reward-risk perspective. In essence, his model is a theoretical framework for the analysis of risk return preferences of an investoror analyst. Thus, the portfolio theory explains how rational investors should build efficient portfolios based on their risk return preferences. Capital market theory incorporates a relationship, explaining how assets should be priced in capital market. The investments market is a very complex market. Any model or theory which deals with pricing of assets, must remove these complexities. A few of asset market complexities are commissions, taxes, short selling rules, margin requirements etc.

Any capital asset pricing model must assume away these complexities as these have only a small effect on the investor's behavior. The capital market theory is thus, based on the following assumptions:

13.3 ASSUMPTIONS OF CAPITAL MARKET THEORY

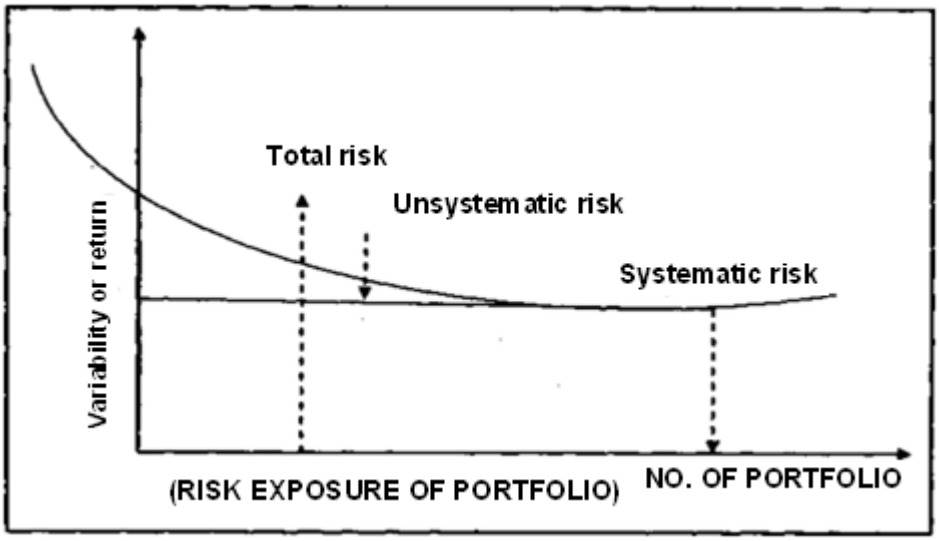
1. Investors base their portfolio investment decisions on security, its expected return and standard deviation criteria.
2. The capital assets are infinitely divisible. The investors may borrow and/or lend without limit in infinitely divisible units regardless of the size of their wealth.
3. Investors have identical expectations about future outcomes over a one period time horizon. As stated earlier, these outcomes are expected returns, the variance of the returns, and the correlation matrix representing the correlation structure between all pairs of stocks.

4. Capital markets are in equilibrium.
5. There is perfect competition in the market. No individual investor can affect the price of the stock by his buying or selling action and investors in total determine prices by their actions.
6. There are no transactions costs i.e. cost of buying or selling any asset. To include transaction costs in the mechanism adds a great deal of complexities. Whether it is worthwhile introducing this complexity depends on the importance of transaction costs to investors 'decisions'. These costs are probably of minor importance.
7. Personal income tax is assumed to be nil.
8. Investors are risk averse and maximize expected utility of wealth.
9. Investors can resort to short selling of shares without any limit.
10. Investors can borrow/lend the desired amount at risk free rate of interest.
11. All the assets are marketable. All assets including human capital can be sold and bought in the market.

It is clear after going through the above mentioned assumptions do not hold good in the real world and are untenable.

13.6 CAPITAL ASSET PRICING MODEL (CAPM)

William F. Sharpe developed the capital asset pricing model (CAPM). He emphasized that the risk factor in portfolio theory is a combination of two risks i.e. systematic risk and unsystematic risk. Thesystematic risk attached to each of the security is the same irrespective of any number of securities in the portfolio. The total risk of portfolio is reduced with increase in the number of stocks, as a result of decrease in the unsystematic risk distributed over number of stocks in the portfolio. This is shown in thefollowing figure:



(RISK EXPOSURE OF PORTFOLIO)

A risk averse investor prefers to invest in risk free securities. A small investor having few securities in his portfolio has greater risk. To reduce the unsystematic risk, he must build up a while diversified portfolio of securities. A diversified and balanced portfolio of all securities will bring an investor's risk in the stock market as w whole.

Sharpe assets in CAPM that risky portfolios do not pay more than the safe one. The systematic risk of two portfolios remains the same. To the rational investors, it makes no difference that the stocks in one portfolio are individually riskier than other stocks because successive stock price changes are identically distributed, independent of random variables. An individual is assumed to rank alternatives inhis order of preference. However, due to operating constraints e.g. limited finance he can avail only some of the alternatives. As such an individual chooses among the logically possible in the highest on his ranking. In other words an individual acts in a way in which he can maximize the return on his investment under conditions of risk and uncertainty.

Thus, the CAPM is a linear relationship in which the required rate of return K from an asset is determined by that asset's systematic risk. The CAPM is represented mathematically by the following equations:

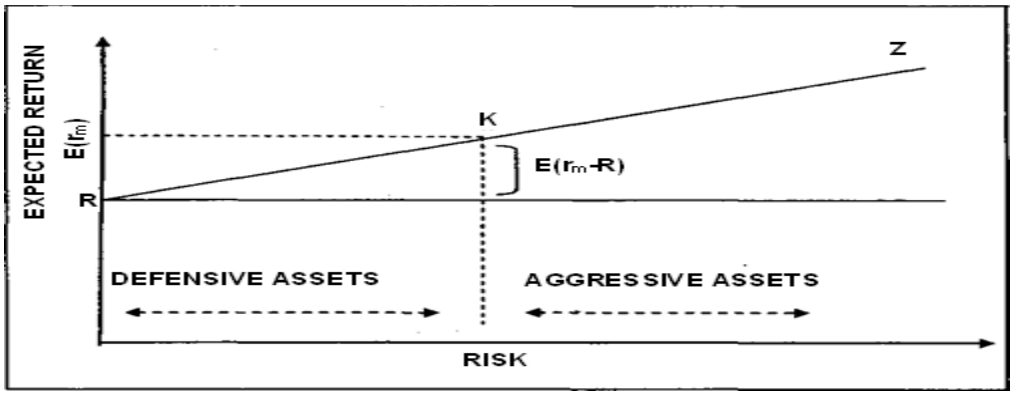
$K_{„} = R + [E(r_m) - R)b_n$

Where b_n = independent variable representing the systematic risk of the nth risk.

K = dependent variable measuring the required rate of return.

The CAPM interests the vertical axis at the risk less rate R, the quantity $E(r_m)$ - R is the slope of the CAPM.

Capital Asset Pricing Model is represented by a CAPM line drawn on risk-return space. The CAPM relates a required rate of return to each level of systematic risk. The following figure portrays it graphically.



Point K represents the market portfolio and point R the risk less rate of return. Line RKZ represents the preferred investment strategies, showing alternative combinations of risk and return obtainable by combining the market portfolio with borrowing or lending. The CAPM suggests a required rate of return that is made up of two separate components:

i. The CAPM's intercept R represents the point of time. This component of the nth assets requiredrate of return compensates the investor for delaying consumption in order to invest.

ii. The slope of the CAPM, $E(r_m)$ - R, the second component is the market price of the risk. The market price of risk is multiplying by nth assets systematic risk coefficient. The product of this multiplication determines the appropriate risk premium i.e. additional return. That should be

added to the risk less rate to find the asset's required rate of return. This risk premium induces investors to take risk.

13.5 CAPITAL MARKET LINE (CML)

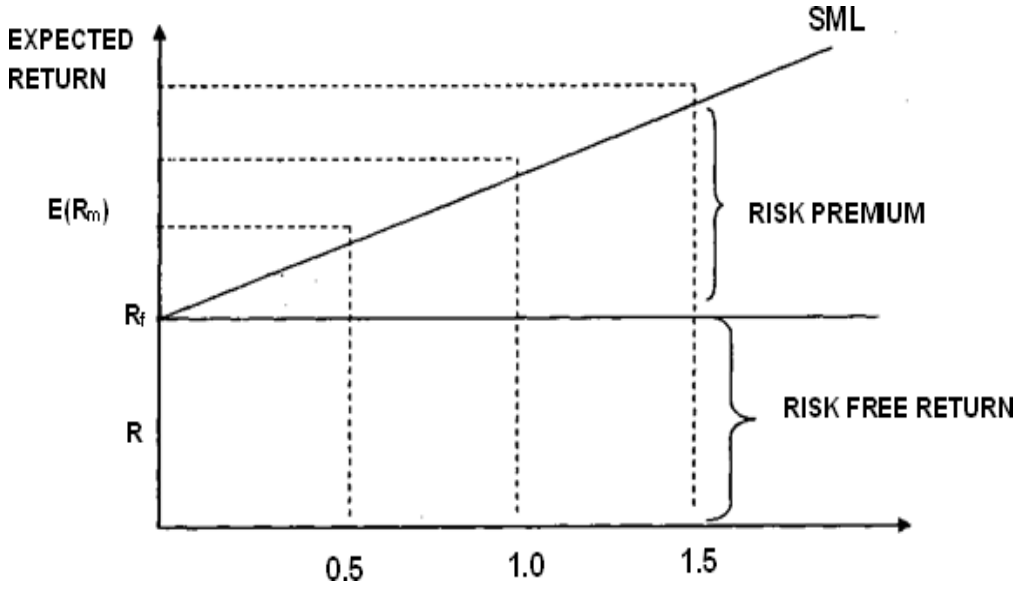
The capital market line (CML) defines the relationship between total risk and expected return forportfolios consisting of the risk free asset and the market portfolio. If all the investors hold the same risky portfolio, then the equilibrium it must be the market portfolio. CML generates

a line on which efficient portfolios can lie. Those which are not efficient will however lie below the line. It is worth mentioning here that CAPM risk return relationship is separate and distinct from risk return relationship of individual securities as represented by CML An individual security's expected return and systematic risk statistics should lie on the CAPM but below the CML. In contrast the risk less end (R) statistics ofall portfolios, even the inefficient ones should plot on the CAPM. The CML will never include all points, if efficient portfolios, inefficient portfolios and individual securities are placed together on one graph. The individual assets and the inefficient portfolios should plot as points below the CML because their total includes diversifiable risk.

13.6 SECURITY MARKET LINE (SML)

Security market line describes the expected return of all assets and portfolios of assets in the economy. As discussed earlier, the risk of any stock can be divided into systematic risk and unsystematic risk. Beta (b) is the index of systematic risks. In case of portfolios involving complete diversification, where the unsystematic risk tends to zero, there is only systematic risk measured by beta. Thus, the dimensions of the security which concern us are expected return and beta. The expected return on any asset or portfolio, whether it is efficient or not can be determined by SML by focusing on beta of securities. The higher the beta for any security the higher must be its equilibriumreturn.

Further the relationship between beta and expected return is linear. The SML expresses the basic theme of the CAPM i.e. expected rate of return increases linearly with risk, as measured by beta. It can be drawn as follows:



Security Market Line

The SML is an upward sloping straight line with an intercept at the risk free return securities andpasses through the market portfolio. The upward slope of the line indicates that greater expected returns accompany higher levels of Beta. In equilibrium each security or portfolio lies on the SML.

The above figure shows that the return expected from portfolio or investment is a combinationof risk free return plus risk premium. An investor will come forward to take risk only if the return on investment also includes risk premium.

Thus the expected return on a portfolio E(RJ consists of the following: R_f = risk free premium (i)

$R_m - R_f$ = risk premium (ii)

R_m = expected total return (1 + 2)

The CAPM has shown the risk and return relationship of a portfolio in the following formula: $E(R1) = Rf+B1(Rm-Rf)$

Where $E(R_t)$ = expected rate of return on any individual security or portfolio of securities. R_f = Risk free rate of return

R_m = Expected rate of return on market portfolio

B, = Market sensitivity index of individual security or portfolio of securities.

Illustration

Sunrise holding Ltd. An investment company has invested in equity shares of a blue chip company. Its Risk free return (R_f) = 9%

Expected total return (R_m) =16%

Market sensitivity index (B.) = .8%

Calculate the expected rate of return on the investment made in the security.

Solution $E(R,) = R_f + B,(R_m - R,)$

$= 9 + 0.8(16-9)$

$= 9 + 0.8(7)$

= 9 + 5.6 =

14.6%

SML validates the claim that systematic risk is the only important ingredient in determining expected returns and that non-systematic risk plays no role. In other words, the investor gets rewarded for bearing systematic risk. It is not total variance of returns that affects expected returns but only that part of variance in return that cannot be diversified away. If investors can eliminate all non-systematic risk through diversification, there is no reason they should not be rewarded in terms of higher return for bearing it.

13.7 THE ASSET PRICING IMPLICATIONS OF CAPM

i. The CAPM has asset pricing implications because it sells what required rate of return should be used to find the present value of an asset with any particular level of systematic risk (beta). In equilibrium, every asset's expected return and systematic risk coefficient should plot as onepoint on the CAPM. If the assets expected rate of return is different from its required rate of return, that asset is either underpriced or overpriced. This implication is useful only if the beta coefficients are stable overtime. However, in reality, the betas of assets do change with the passage of time as the assets earning power changes. The job of security analyst is, thus, tofind the assets with dis-equilibrium prices, because it will be profitable to buy underpriced assetsand sell short the overpriced assets.

ii. With the help of CAPM, every investor can analyze the securities and determine the composition of his portfolio. Since, there is a complete agreement among investors on the estimates of expected return, variance and covariance and risk free rate, efficient set of portfolioshould be the same for all the investors. Since all the investors face the same efficient set, the only reason they choose different portfolios curve is the locus of all possible portfolios that provide the investor with the same level of expected utility. Expected utility will increase as one moves from lower indifference curve, any point on the curve gives the same utility. Such curves are positively sloped and convex for risk averters, concave for risk seekers and horizontal forrisk neutral investors.

Thus, different investors will choose different preference towards risk and return. It implies that each investor will spread his funds, among risky securities in the same relative proportion adding risk free borrowing or lending in order to achieve a personally

preference overall combination of risk and return. This feature of CAPM is often referred to as separation theorem,

iii. Another important' implication is that no security can in equilibrium have a tangency to touch, either axis on risk return space. If an investor has zero proportion in such securities, the pricesof these would eventually fall, thereby causing the expected returns of these securities to rise until the resulting tangency portfolio has a non-zero proportion associated with it. Ultimately everything will be balanced out. When all the price adjustments stop, the market will be brought into equilibrium, subject to the following conditions:

a) Each investor will like to hold a certain positive amount of each risky security.

b) The current market price of each security will be fixed at a level where the number of sharesdemanded equals the number of shares outstanding.

c) The risk free rate will be fixed at a level where the total amount of borrowings will be equal tothe total amount of money lent.

As a result, in equilibrium the proportion of the tangency portfolio will correspond to the proportion of the market portfolio. The market portfolio is a portfolio consisting of all the securities where the proportion invested in each security corresponds to its relative market value.

Where the,

$$\text{Relative market} = \frac{\text{aggregate market value of the security}}{\text{sum of aggregate market values of all the securities}}$$

Value of security

The market portfolio plays a very important role in the CAPM because efficient set consists of an investment in the market portfolio coupled with a desired amount of either free borrowing or lending. Tangency portfolio is commonly referred to as the market portfolio.

(v) For any individual investor, security prices and returns are fixed, whereas the quantities held can be altered. For the market as a whole, however, these quantities are fixed (at least in the short run) and prices are variable. As in any competitive market, equilibrium requires the

adjustment of each security's price till there is consistency between the quantity desired and quantity variable. Therefore, is but reasonable and logical that historical returns on securities should be examined to determine whether or not securities should be examined to determine whether or not securities have been priced in equilibrium as suggested by the CAPM.

13.8 LIMITATIONS OF CAPM:

Though the CAPM has been regarded as a useful tool for both analyst of financial securities andfinancial managers, it is not without critics. The CAPM has serious limitations in the real world,discussed as follows:

1. The CAPM is based on expectations about the future. Expectations cannot be absorbed but we do have actual returns. Hence empirical tests and data for practical use tend to be based almostexclusively on historical returns.
2. Beta (systematic risk) coefficient is unstable, varying from period to period depending up on the method of complication. They may not be reflective of true risk involved. Due to the unstable nature of beta it may not reflect the future volatility of returns although it is based on the post history. Historical evidence of the tests of beta showed that they are unstable and they are not positively related to future risk.
3. CAPM focuses attention only on systematic (market related) risk. However, total risk has been found to be more relevant and both types of risk appear to be positively related to returns.
4. Investors do not seen to follow the postulation of CAPM and do not diversify in a planned manner.
5. The analysis of SML is not applicable to the bond analysis, although bonds are a part of the portfolio of the investors. The factors influencing bonds in respect of risk and return are different and the risk of bonds is rated and known to investors.

Thus, it can said that the applicability of CAPM is broken by the less practical nature of this model as well as complexity and difficulty of dealing with beta values.

13.9 RISK FREE RATE OF LENDING OR BORROWING

The three factors discussed in CAPM are systematic risk (B), the expected market return

and the risk free rate. The risk free rate is the least discussed of the three factors. It is used only twice in CAPM. It is first used as a minimum rate of return ® and it is used to find out the risk premium (rm -R). Thus, any error in estimating the risk free rate of return would lead to a wrong estimate of the expected rate of return for an asset or portfolio. Choosing a wrong risk free rate would mean that the analyst would misunderstand the sources of the asset's returns, the quality of its performance or have poor data on which to make forecasts.

In CAPM theory, the risk free asset is one of the two choices available to the investor. The investor can reduce the risk of the portfolio by increasing the amount of risk free asset in the portfolio orhe can increase the risk by reducing the risk free asset position or by borrowing at the risk free rate to further invest. In fact, the risk free rate is the rate that will entice investors to choose between current orfuture consumption between savings or investment. The price required to induce an investor to forgo current consumption for a certain future sum, to forgo liquidity, is the price of time or the risk free rate ofreturn.

The separation theorem propounded by James Tobin States that the investors make portfolio choices solely on the basis of risk and return, separating that decision from all other factors, the CAPM is incomplete because it ignores other relevant factors. Thus, it is implied that each investor will spread his funds among risky securities in the same relative proportion, adding risk free borrowing or lending inorder to achieve a personally preferred overall combination of risk and return. Risky portion of every investor's portfolio is independent of the investor's risk return preference. The justification for this is thatthe risky portion of each investor's portfolio is simply beyond the either axis. Even if the investor commits zero proportion in these securities, the prices of these would eventually fall, thereby causing the expected returns of these securities to rise until the resulting tangency portfolio has a non-zero proportion associated with it. Ultimately, everything will be balanced out. When all the price adjusting stops the market will be brought into equilibrium.

13.10 ARBITRAGE PRICING MODEL

Like the CAPM, the arbitrate pricing model is an equilibrium model of asset pricing but its originsare significantly different. Whereas the CAPM is a single factor model, the APM is a multi-factor model. Instead of just a single beta value, there is a. whole set of beta values-one for each factor. Arbitrate pricing theory out of which APM arises states that the expected return on investment is dependent uponhow that investment reacts to a set of individual macro-economic

factors (the degree of reaction being measured by the beta) and the risk premium associated with each of those macroeconomic factors. The APM was developed in 1976 by Ross. This model does not depend critically on the notion of an underlying market portfolio. Instead, it is model that derives returns from the properties of the process generating stock returns and employs arbitrate pricing theory to define equilibrium. Under certain circumstances it derives a risk return relationship identical to the SML of the CAPM. The arbitrate theory is based on the following assumptions:

i. The investors have homogeneous beliefs/expectations

ii. The investors are risk avert utility maximisers

iii. The markets are perfect so that factors like transaction costs are not relevant

iv. The security returns are generated according to a factor model

v. Risk returns analysis is not the basis. The model takes the view that there are underlying factors that give rise to returns on stocks. Examples of these factors might include such variables as real economic growth and inflation or such financial variables as dividend yield and capital structure. The objective of security analysis is to identifythese factors in the economy and the sensitivities of security return to movements in these factors. A formal statement of such a relationship is termed as a factor model of security returns.

9.4.(1) SINGLE FACTOR MODEL

According to this model the asset depends on a single factor, say Gross National Product or industrial production on interest rates, money supply, interest rates and so on. In general, a singlefactor model can be represented in equation from as follows:

R = E + bf + e

Where E = uncertain return on security I

b = security's sensitivity to change in the factor

f = the actual return on the factor e = error term (unexplained variable)

Thus, this model only states that the actual return on a security equals the expected return plus sensitivity times factor movement plus residual risk.

9.4.(2) MULTIPLE FACTOR MODEL

Work suggests that a number of variables should be taken into account for asset pricing. The above mentioned equation can, thus be expanded to:

$$R=E + b_1f_1 + b_2f_2 + b_3f_3 + \quad + e$$

Each of the middle terms in the equation is the product of returns on a particular economic factor and the given stock's sensitivity to that factor.

But the basic question is what three factors are? They are the underlying economic forces that are the primary influences on the stock market. Several factors appear to have been identified as being important. Some of these factors, such as inflation and money supply, individual production and personal consumption do have aspects of being interrelated. In particular, the researchers have identified the following factors:

- Changes in the level of industrial production in the economy
- Changes in the shape of the yield curve
- Changes in the default-risk premium (i.e. changes in the return required on bonds with differentperceived risk of default.)
- Changes in the inflation rate
- Changes in the interest rate
- The level of personal consumption
- The level of money supply in the economy

9.4.(3) DERIVING THE ARBITRAGE PRICING THEORY

With the help of APM, investment strategies of many types can be selected if there are many securities to be selected and a fixed amount to be invested the investor can choose in a manner that hecan aim at zero nonfactor risk. This is possible by combining securities to hedge out the sensitivity of a portfolio to all but one factor.

APT says nothing about either the magnitude or the rings of the facto coefficients or what the factors themselves might be. The model does not give us this guidance nor did Ross when he first found this model. The theory does not say anything about how the identify and magnitude of the factorsshould be determined. It says that by active trading of securities with different sensitivities to the important factors. Investors trade away opportunities for excessive gains.

Since there are only a few systematic factors affecting returns, many portfolios are close substitutes for each other and thus will have the same value. Excessive gains come only when, by buying some assets and selling others the investor hedges his portfolio and thereby insulates it from risk without eliminating excess return. These excessive gains are called arbitrate profits. In efficient markets, excess returns are eliminated by trading and investors cannot on average or over time, find opportunities to arbitrate for profits.

A simple example will demonstrate what arbitrate profit is and how an investor can take advantage of it, if it were available. Let us assume a market where there are only three assets, all sensitive to only one factor e.g. changes in the real interest rate. The sensitivities of each of the assets to the common factor, real interest rate and the expected returns are shown in the following table:

Asset	**Factor Sensitivity**	**Expected Returns**
A	0.0	8%
B	0.5	12%
C	1.5	15.5%

It can be seen that asset B is expected to have a return of 12%. Since the return that would usually be expected for an asset with sensitivity to interest rate is 10.5%, asset B promises an excess return of 1.5%. To take advantage of this excess return and to do so with no risk, an investor can arbitrate among three assets, the investor with Rs.2000 need only buy Rs.1000 of asset B and short sell Rs.667 of risk free security A and Rs.333 of security c. the results of buying and short selling activities are shown in the following table:

Amount	**Asset**	**Expected Return**	**Factor Sensitivity**
Buy: Rs. 1000	B	12%	0.5
Short sell-Rs.667	A	(5.4%)*	0.0
Rs. 333	C	(5.11)**	(0.5)***

		(10.5%)	(0.5)
Portfolio: Rs.2000		1.5%	0.0

.67x8% **.33x15.5% ***.33x1.5

The investor earns 1.5% excess return and does so without risk, the factor sensitivity of asset B is offset by the average sensitivity of the short sold portfolio, and inequities offer opportunities to arbitrate.

The same situation exists when assets are priced on more than one factor. APT allows for as many factors as are important in the pricing of the assets. The Apt thus describes of most investors, who are opportunity seekers and believe that opportunities to make profits exist. Such investors however dislike higher levels of risk. The fact is that there is always a trade-off between risk and return, which is not considered by the APT model. Therefore, in practical portfolio operations, it is better to combine the capital asset pricing theory and the APT model.

9.4.(4) PRACTICAL APPLICATIONS OF APT

Since the introduction of APT by Ross, it has been empirically discussed, evaluated and tested:

(i) An initial test of APT was conducted by Roll and Ross. They used a statical technique called factor analysis. The input to factor analysis is the covariance matrix among the returns to the securities in the sample. Factor analysis determines the set of factor beta that best explains the covariance among the securities in the sample. Because of its complex nature, the factor analysis can be employed on relatively small samples of firms. Conducting the tests on small samples they can be diversified away and they will not be priced. As such they are of no interestIH testing the theory.

(ii) Dhyrymes, friend and Gultekin, found that as the number of securities in the factor analysis increase say from fifteen to sixty, the number of significant factors increases from three to seven. In a later paper they found that the number of priced factors increases with the numberof securities factor analysis. These initial empirical results indicate that the APT may be difficult to test by factor analysis.

(iii) Chen, Roll and Ross found that as an alternative to using factor analysis. Investor can

hypothesis that a given set of specified factors explain the covariance matrix among securities. In this approach, the investor can use large samples to estimate the factor betas and the factor prices. They determined that a large fraction of the covariances among securities can be explained on the basis of unanticipated changes in four specified factors:

- The difference between the yield on a long term and short term risk free security.
- The rate of inflation.
- The growth rate in industrial production
- The difference between yields of high rated securities and risk free securities.

(iv) Shanken argued that the shares of stock traded in the market place are actually portfolios of theindividual units of production in the economy. Given a factor structure that explains the covariance among the returns to individual units of production, we may not be able to recognize it on the basis of the portfolio.

Thus, the investors are in a position on similar to the one they were in with the CAPM. In the CAPM, even the best assets are only a small fraction of the true market portfolio. With the Apt, even if the investor increases the size of the sample; his sample is only a small fraction of the total number of production units in the international economic system. The APT also does not tell the number of factors,the investor should expect to see or the names for any of the factors. Consequently, the number of factors priced by the market is greater than the number he estimated. Investors may, however, feel more comfortable if he finds that the number of priced factors increases at a decreasing rate as the sample size increases.

13.11 SELF CHECK EXERCISE

1. Explain Capital Market Theory.
2. Explain Security Market Line.
3. Discuss the asset pricing implication of CAPM.
4. Explain Arbitrage Pricing Model.

13.12 SUMMARY

William F. Sharpe and John Linter developed the Capital Asset Pricing Model (CAPM). The model is based on the portfolio theory developed by Harry Markowitz. The model

emphasizes the risk factor in portfolio theory is a combination of two risks, systematic risk and unsystematic risk. The model

suggests that a security's return is directly related to its systematic risk, which cannot be neutralized through diversification. The combination of both types of risks stated above provides the total risk. The total variance of returns is equal to market related variance plus company's specific variance. CAPM explains the behaviour of security prices and provides a mechanism whereby investors could assess the impact of a proposed security investment on the overall portfolio risk and return. CAPM suggests that the prices of securities are determined in such a way that the risk premium or excess returns are proportional to systematic risk, which is indicated by the beta coefficient. The model is used for analyzing the risk-return implications of holding securities. CAPM refers to the manner in which securities are valued in line with their anticipated risks and returns. A risk-averse investor prefers to invest in risk-free securities. For a small investor having few securities in his portfolio, the risk is greater. To reduce the unsystematic risk, he must build up well-diversified securities in his portfolio.

13.13 GLOSSARY

Beta: The measure of asset sensitivity to a movement in the overall market.

CAPM: A model that explains relative security prices in terms of a security's contribution to the risk ofthe whole portfolio, not its individual standard deviation.

Security Characteristic Line (SCL): It represents the relationship between the market return (r_m) andthe return of a given asset i (r_i) at a given time t.

Arbitrage: The practice of taking advantage of a state of imbalance between two (or possibly more)markets and thereby making a risk-free profit, Rational Pricing.

13.14 ANSWERS TO SELF CHECK EXERCISE

1. For answer refer to section 13.5
2. For answer refer to section 13.6
3. For answer refer to section 13.7
4. For answer refer to section 13.10

13.15 TERMINAL QUESTIONS

1. .Explain capital market theory. What are its assumptions?

2. Discuss Capital asset Pricing Model. What are its limitations?

13.16 SUGGESTED READINGS

- Samuels J. M, F.M. Wilkesard R.E. Brayshaw, Management of Company Finance, Chapmanand Flail, London
- Smith, Edger Lawrence, Common Stocks as Long-term Investment, New York, MacMillan.
- Sprinkel, Beryl, W., Money and Stock Prices, Homewood III, Richard S. Irwin, Inc.
- Sudhindhra Bhatt, Security Analysis and Portfolio Management, Excel Books.
- Fischer, D.E., Security Analysis and Portfolio Management, Prentice Hall, 1983.
- Reilly, F.K., Investment Analysis & Portfolio Management, Drygen Press, 1985.

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CHAPTER-14

ARBITRAGE PRICING THEORY

Structure:-

14.0 LEARNING OBJECTIVES

After reading this chapter, you will be able to:-

- Discuss in detail the arbitrate pricing theory
- Describe some the problem associated with the empirical testing of APT

14.1 INTRODUCTION

Arbitrage Pricing Theory (APT) in finance is a general theory of asset pricing, which has become influential in the pricing of shares. APT holds that the expected return of a financial asset can be modeled as a linear function of various macro-economic factors or theoretical market indices, where sensitivity to changes in each factor is represented by a factor specific beta coefficient. The model- derived rate of return will then be used to price the asset correctly - the asset price should equal the expected end-of period- price discounted at the rate implied by

model. If the price diverges, arbitrage should bring it back into line. The theory was initiated by the economist Stephen Ross in 1976.

14.2 ARBITRAGE PRICING THEORY

The, CAPM and Its extensions are based on Specific assumptions on investors asset demand i.e.

Investor care only about mean return and varianceInvestor hold only traded assets

The CAPM has several weaknesses which the APT attempts to overcome.

The Arbitrage Pricing theory starts with specific assumptions on the distribution of asset returns and relies on approximate arbitrage argument.

In particular, APT assumed a "factor model" of asset returns.

14.3 ASSUMPTIONS OF APT:

Returns are generated according to a linear factor model.The numbers of assets are close to infinite.

Investor has homogeneous expectations

Capital markets are perfect (i.e. no transaction cost).

14.4 ARBITRAGE IN ECONOMICS AND FINANCE

In Economics and Finance Arbitrate is the practice of taking advantages of price differential between two or more market: combinations of matching deals are struck that capitalize upon the imbalance, the profit being the difference between the market prices. When used by academics, an arbitrage is a transaction that involves no negative cash flow at any probabilistic or temporal state and apositive cash flow in at least on state; in simple terms, a risk free profit.

A person who engages in arbitrage is called an arbitrageur, the term is mainly applied to trading in financial instruments, such as bonds, stocks, derivatives, commodities and currencies.

If the market prices do not allow for profitable arbitrate, the prices are said to constitute an arbitrate equilibrium or arbitrate free market. An arbitrate is equilibrium is a precondition for a general economic equilibrium.

Statistical arbitrate is an imbalance in expected values. A casino has a statistical arbitrate

in almost every game of chance that it offers.

14.5 CONDITIONS FOR ARBITRAGE

Arbitrage is possible when one of the three conditions is met:

1. The same asset does not trade at the same price on all markets. ("The law of one Price")
2. Two assets with identical cash flows do not trade at the same price.
3. An asset with a known price in the future does not today trade at its future price' discounted at the risk free interest rate (or, the asset does not have negligible costs of storage; as such for example, this condition holds for grain but not for securities.

Examples:

In the most simple example, any good sold in one market should sell for the same price in another. Traders may, for example, find out that the price of wheat is lower in agricultural regions thanin cities, purchase the good and it cities, purchase the good, and transport it to another region to sell at the higher price. This type of price arbitrate is the most common; but this simple example ignores the cost of transport, storage, risk and other factors. "True" arbitrate requires that there be no risk involved where securities are traded on more than one exchange, arbitrate occurs by simultaneously buying in one and selling on the other.

Economics use the term "global labor arbitrate" to refer to the tendency of manufacturing jobs toflow towards whichever country has the lowest wages per unit output at present and has reached the minimum requisite level of political and economic development to support industrialization. At present many such jobs appears to be flowing towards china, though some which require English are coming toIndia.

High demand limited goods such as an event ticket as video game console. The market price is fixed secondary deals such as online auctions will often fetch consistently higher price. Then can involve almost no risk at all under the right circumstances, but requires an, investment of time toactually acquire the in demand good to sell.

14.6 SELF CHECK EXERCISE

1. Discuss the assumptions of Arbitrage pricing theory.
2. What are conditions for arbitrage?

3. Discuss APT asset pricing line.

14.7 SUMMARY

The Arbitrage Pricing Model (APM) looks very similar to the CAPM, but its origins are significantly different. Whereas the CAPM is a single-factor model, the APM is a multi-factor model instead of just a single beta value; there is a whole set of beta values - one for each factor. Arbitrage Pricing Theory, out of which the APM arises, states that the expected return on an investment is dependent upon how that investment reacts to a set of individual macro-economic factors (the degreeof reaction being measured by the betas) and the risk premium associated with each of those macro- economic factors. The APT differs from the CAPM in that it is less restrictive in its assumptions.

14.8 GLOSSARY

Beta: The measure of asset sensitivity to a movement in the overall market.

CAPM: A model that explains relative security prices in terms of a security's contribution to the risk ofthe whole portfolio, not its individual standard deviation.

Security Characteristic Line (SCL): It represents the relationship between the market return (r_m) andthe return of a given asset i (r_i) at a given time t.

Arbitrage: The practice of taking advantage of a state of imbalance between two (or possibly more)markets and thereby making a risk-free profit, Rational Pricing.

14.9 ANSWERS TO SELF CHECK EXERCISE

1. For answer refer to section 14.3
2. For answer refer to section 14.5
3. For answer refer to section 14.6

14.10 TERMINAL QUESTIONS

1. Critically evaluate Arbitrage Pricing Model.
2. As an investor, how do you use the APT?
3. What do you see as the difference between arbitrage and the APT?

14.11 SUGGESTED READINGS

- Samuels J. M, F.M. Wilkesard R.E. Brayshaw, Management of Company Finance, Chapmanand Hall, London
- Smith, Edger Lawrence, Common Stocks as Long-term Investment, New York, MacMillan.
- Sprinkel, Beryl, W., Money and Stock Prices, Homewood III, Richard S. Irwin, Inc.
- Sudhindhra Bhatt, Security Analysis and Portfolio Management, Excel Books.
- Fischer, D.E., Security Analysis and Portfolio Management, Prentice Hall, 1983.
- Reilly, F.K., Investment Analysis & Portfolio Management, Drygen Press, 1985.

CHAPTER-15

FACTOR MODEL

15.0 LEARNING OBJECTIVES

After reading this chapter, you will be able to:-

- Describe the Factor Model and its types
- Discuss the uses and importance of factor model
- Discuss the advantages and disadvantages of factor model

15.1 INTRODUCTION

This analysis technique helps investors diversify portfolio based on the profits and losses depicted. Factor models intricately combine macroeconomic, fundamental, and statistical

factors to establish market equilibrium and ascertain requisite rates of return. By tethering a security's returns to one or more risk factors within a linear framework, these models offer an alternative avenue to the Modern Portfolio Theory for investment analysis. The realm of factor models is categorized into two principal variants: single-factor and multiple-factor models. These frameworks elucidate the interplay of factors affecting asset returns, enabling a deeper understanding of investment dynamics. Factor models, as the name suggests, are techniques that help assess the risks and returns that a security or financial instrument is supposed to generate or derive. These models take into consideration the factors that commonly influence the financial instruments as well as factors that specifically influence to those instruments only. Based on the types of factors these models consider, they can be explicit and implicit in nature. The explicit class is the one which depends on the predetermined determinants, which are independent of the data or instrument involved. Such factors are based on the established theories and include determinants, like inflation, economic growth, etc.

15.2 FACTOR MODELS

Factor Models refers to the study and assessment of financial models factors (macroeconomic, fundamental, and statistical) to determine the market equilibrium and calculate the required rate of return. Such models associate the return of a security to single or multiple risk factors in a linear model and can be used as alternatives to Modern Portfolio Theory. Factor models allow entities to study the risk and return associated with a security. The factors that are studied can be basic, technical, macroeconomic, etc. This analysis technique helps investors diversify portfolio based on the profits and losses depicted. Factor models intricately combine macroeconomic, fundamental, and statistical factors to establish market equilibrium and ascertain requisite rates of return. By tethering a security's returns to one or more risk factors within a linear framework, these models offer an alternative avenue to the Modern Portfolio Theory for investment analysis. The realm of factor models is categorized into two principal variants: single-factor and multiple-factor models. These frameworks elucidate the interplay of factors affecting asset returns, enabling a deeper understanding of investment dynamics. Factor models, as the name suggests, are techniques that help assess the risks and returns that a security or financial instrument is supposed to generate or derive. These models take into consideration the factors that commonly influence the financial instruments as well as factors

that specifically influence to those instruments only. Based on the types of factors these models consider, they can be explicit and implicit in nature. The explicit class is the one which depends on the predetermined determinants, which are independent of the data or instrument involved. Such factors are based on the established theories and include determinants, like inflation, economic growth, etc.

On the contrary, the implicit class indicates the model type that depends on the internal input only. Some examples of implicit class of models include factor analysis, component analysis. These analyses not only help derive factors, but also factor exposures. These models serve multiple purposes, which make these models one of the most significant risk and reward assessment techniques. Below are some of the functions related to factor models:

- Maximization of the excess return, i.e., Alpha (α) of the portfolio;
- Minimization of the volatility of the portfolio, i.e., the Beta (β) of the portfolio;
- Ensure sufficient diversification to cancel out the firm-specific risk.

In short, factor models help investors understand the opportunities, potential, and risks associated with the financial instruments they are willing to invest in. Based on the analysis and assessment of the risk and returns that a security offers, the investors make smarter and wiser investment decisions.Researchers developed factor models to approximate the returns of financial securities or transactions by applying various statistical techniques to factors influencing the compared return. Therefore, the models are so-called because the outcome depends on the factors included. The weight assigned to each factor depends on how much it affects the return or the dependent variable, considering factors such as government rules and regulations, seasonality, market environment, etc. There can be various types of models depending on the depth of the analysis. Therefore, they are broadly classified into two heads, which are single and multi-factor models. Regression is a popular method for using simpler or more complicated statistics.

15.3 TYPES OF FACTOR MODEL

As described above, there can be two broad heads of these models, Single Factor Models and Multi-Factor Models. The equations of each are as follows:

15.3.1 Single Factor Model

This model involves using only one independent variable to approximate the dependent variable and has an equation of the following form:

$y = \alpha + \beta 1X1 + \in 1$

Here y is the dependent variable, = the intercept variable, = the slope variable, = the independent variable or the factor, = error term

CAPM equation is an example of the single factor model wherein the equation is as follows:

$E(r) = Rf + \beta 1(Rm - Rf)$

Here we approximate the expected return on the basis of risk-free return and the market risk premium. At the same time, beta is the slope coefficient, and risk-free return is the intercept coefficient.

The intercept coefficient implies the value of the dependent variable when the factor value = 0

The slope coefficient determines the rate of change in the dependent variable to the rate of change in the independent variable.

15.3.2 Multiple Factor Model

A multi-factor model is a financial model that employs multiple factors in its calculations to explain market phenomena and/or equilibrium asset prices. A multi-factor model can be used to explain either an individual security or a portfolio of securities. It does so by comparing two or more factors to analyze relationships between variables and the resulting performance.

Multi-factor models are used to construct portfolios with certain characteristics, such as risk, or to track indexes. When constructing a multi-factor model, it is difficult to decide how many and which factors to include. Also, models are judged on historical numbers, which might not accurately predict future values.

Multi-factor models also help explain the weight of the different factors used in the models,

indicating which factor has more of an impact on the price of an asset.

Multi-Factor Model Formula

Factors are compared using the following formula:

Ri = ai + _i(m) * Rm + _i(1) * F1 + _i(2) * F2 +...+_i(N) * FN + ei

Where:

Ri is the return of security

Rm is the market return

F(1, 2, 3 ... N) is each of the factors used

_ is the beta with respect to each factor including the market (m)

e is the error term

a is the intercept

Types of Multi-Factor Models

Multi-factor models can be divided into three categories: macroeconomic models, fundamental models, and statistical models.

- **Macroeconomic models:** Macroeconomic models compare a security's return to such factors as employment, inflation, and interest.
- **Fundamental models:** Fundamental models analyze the relationship between a security's return and its underlying financials, such as earnings, market capitalization, and debt levels.
- **Statistical models:** Statistical models are used to compare the returns of different securities based on the statistical performance of each security in and of itself. Many times, historical data is used in this type of modeling.

Construction of Multi-Factor Models

- The three most commonly used models to construct a multi-factor model are a combination

model, a sequential model, and an intersectional model.

- **Combination model:** In a combination model, multiple single-factor models, which utilize a single factor to distinguish stocks, are combined to create a multi-factor model. For example, stocks may be sorted based on momentum alone in the first pass. Subsequent passes will use other factors, such as volatility, to classify them.
- **Sequential model:** A sequential model sorts stocks based on a single factor in a sequential manner to create a multi-factor model. For example, stocks for a specific market capitalization may be sequentially analyzed for various factors, such as value and momentum, sequentially.
- **Intersectional model:** In the intersectional model, stocks are sorted based on their intersections for factors. For example, stocks may be sorted and classified based on intersections in value and momentum.

Measurement of Beta

- The beta of a security measures the systematic risk of a security in relation to the overall market. A beta of 1 indicates that the security theoretically experiences the same degree of volatility as the market and moves in tandem with the market.
- A beta greater than 1 indicates the security is theoretically more volatile than the market. Conversely, a beta less than 1 indicates the security is theoretically less volatile than the market.
- When multi-factor models are used by investment managers to assess the risk of investments, beta is an important factor that they can use.

15.4 USES AND IMPORTANCE OF FACTOR MODEL

- The Finance industry presently utilizes many different models, while organizations can develop new models for specific industries or any other purpose.
- These applications extend beyond Finance and encompass various disciplines such as

science, economics, sociology, anthropology, etc.

- Investors use factor models developed by many indices to predict their returns, aiding them in investing decisions.
- These models are also used in identifying the most appropriate capital structure for a company because the WACC formula is also a multi-factor model that considers the costs and weights of capital sources and therefore helps calculate the cost of capital for different capital structures.
- Analysts use such models to identify the causes of a given return in the performance attribution of portfolios. Thus, the skill and performance of the portfolio manager are also quantified, based on which her remuneration number is generated.

15.5 ADVANTAGES OF FACTOR MODEL

- Factor models help pinpoint the cause of the change in the dependent variables and identify the factors causing the same. Once the cause-and-effect relationship is clearly defined, it is easier to harness and predict such impacts in a structured manner.
- Investing can be scientific and higher returns can achieve using models with high predictive power. Therefore, algorithms can generate automated trading. However, such automation is only used when the stakes are not very high because this limits the losses, which might be huge otherwise.
- Businesses can develop marketing and expansion strategies based on factor models of their domain and thereby develop a plan to achieve higher profits and then closely monitor the results. This helps them align the company's goals and objectives as a whole.

15.6 DISADVANTAGES OF FACTOR MODEL

- Identifying the right factors is not an easy task, and many cautions need to be considered to draw a valid conclusion out of a given model. If the data set is affected by multicollinearity or serial correlations and other violation of regression assumptions, then the model can become unstable and not have any consistent predictive power.

- Factor models are not highly cost-effective. They require sophisticated statistical techniques, which in turn require expensive technology and, therefore, cannot be used by smaller companies or retail investors who don't possess the necessary resources.
- These models require highly skilled human capital because these require advanced mathematical acumen; therefore, the people involved in such research come at a high cost.
- At times adding more factors might not explain the effect on the dependent variable, and therefore, the model might reach a particular limit and that might not be too extensive to justify the time, money, and effort that goes into such analysis.

15.6 SELF CHECK EXERCISE

1. What do you mean by factor model?

2. Discuss the uses and importance of factor model.

3. Explain the types of factor model.

15.7 SUMMARY

Factor models intricately combine macroeconomic, fundamental, and statistical factors to establish market equilibrium and ascertain requisite rates of return. By tethering a security's returns to one or more risk factors within a linear framework, these models offer an alternative avenue to the Modern Portfolio Theory for investment analysis. The realm of factor models is categorized into two principal variants: single-factor and multiple-factor models. These frameworks elucidate the interplay of factors affecting asset returns, enabling a deeper understanding of investment dynamics. Factor models, as the name suggests, are techniques that help assess the risks and returns that a security or financial instrument is supposed to generate or derive. These models take into consideration the factors that commonly influence the financial instruments as well as factors that specifically influence to those instruments only. Based on the types of factors these models consider, they can be explicit and implicit in nature.
GLOSSARY

15.8 ANSWERS TO SELF CHECK EXERCISE

1. For answer refer to section 15.2
2. For answer refer to section 15.4
3. For answer refer to section 15.3

15.9 TERMINAL QUESTIONS

1. Define factor model. Explain its types.

2. Discuss the uses and importance of factor model.

15.10 SUGGESTED READINGS

- Samuels J. M, F.M. Wilkesard R.E. Brayshaw, Management of Company Finance, Chapmanand Hall, London
- Smith, Edger Lawrence, Common Stocks as Long-term Investment, New York, MacMillan.
- Sprinkel, Beryl, W., Money and Stock Prices, Homewood III, Richard S. Irwin, Inc.
- Sudhindhra Bhatt, Security Analysis and Portfolio Management, Excel Books.
- Fischer, D.E., Security Analysis and Portfolio Management, Prentice Hall, 1983.
- Reilly, F.K., Investment Analysis & Portfolio Management, Drygen Press, 1985.

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"ASSIGNMENTS"

Answer the following Assignments:

1. Discuss the various methods of portfolio analysis.

2. Discuss fundamental analysis approach used in share evaluation.

3. Differential between investment and speculation.

4. Explain in detail the Dow Theory.

5. Discuss efficient market hypothesis and its various forms.