CHAPTER-1

Introduction to

Investment and Securities

Investment

* Investment is the employment of funds on assets to earn income or capital appreciation.
* The individual who makes an investment is known as the investor.
* In economic terms, investment is defined as the net addition made to the capital stock of the country.
* In financial terms, investment is defined as allocating money to assets with a view to gain profit over a period of time.

Investments in economic and financial terms are inter-related where an individual's savings flow into the capital market as financial investment, which are further used as economic investment.

Speculation

* Speculation means taking business risks with the anticipation of acquiring short term gain.
* It also involves the practice of buying and selling activities in order to profit from the price fluctuations.
* An individual who undertakes the activity of speculation is known as speculator.
* Difference between Investor and Speculator

|  |  |  |
| --- | --- | --- |
| Base | Investor | Speculator |
| *Time horizon* | Has a relatively longer planning horizon. His holding period is usually of one or more than one year.  | Has a very short planning horizon. His holding period may be few days to months. |
| *Risk return* | His risk is less. | His risk is high. |
| *Decision* | Attaches greater significance to fundamental factors and carefully evaluates the performance of the company. | Attaches greater significance to market behaviourand inside information. |
| *Funds* | Uses his own funds. | Uses borrowed funds along with hispersonal funds. |

Investment Objectives

* Return Income: The total income, the investor receives during his holding period.



* Risk: Variability in the return.
* Liquidity: The ease with which the investment is converted into cash.
* Safety: It refers to the legal and regulatory protection to the investment.
* Hedge against inflation: The returns should be higher than the rate of inflation.

Securities:

* They are instruments which represent a claim over
an asset or any future cash flows.
* Securities are classified on the basis of return and source of issue.

Fixed income securities

* + Return

 Variable income securities

* + Issuers
		- Government
		- Quasi-Government
		- Public Sector Enterprises
		- Corporates

The Investment Process

The process of investment includes five stages:

1. Investment Policy: The policy is formulated on the basis of investible funds, objectives and knowledge about investment sources.
2. Security Analyses: Economic, industry and company analyses are carried out for the purchase of securities.
3. Valuation: Intrinsic value of the share is measured through book value of the share and P/E ratio.
4. Portfolio Construction: Portfolio is diversified to maximise return and minimise risk.
5. Portfolio Evaluation: The performance of the portfolio is appraised and revised.

Types of Preference Stocks

 There are different types of preference stocks, which are:

* + Cumulative preference shares
	+ Non-cumulative preference shares
	+ Convertible preference shares
	+ Redeemable preference shares
	+ Irredeemable preference shares
	+ Cumulative convertible preference shares

Equity Shares

Common stock or ordinary shares are most commonly known as equity shares.

* Stock is a set of shares put together in a bundle.
* A share is a portion of the share capital of a company divided into small units of equal value.
* The advantages of equity shares are:
	+ Capital appreciation
	+ Limited liability
	+ Hedge against inflation

Sweat Equity:

* It is a new equity instrument introduced in the Companies (Amendment) Ordinance, 1998.
* It forms a part of the equity share capital as its provisions, limitations and restrictions are same as that of equity shares.

Sweat Equity is for:

* + The directors or employees involved in the process of designing strategic alliances.
	+ The directors or employees who have helped the company to achieve a significant market share.

Non-voting Shares:

* The shares that carry no voting rights are known as non-voting shares.
* They provide additional dividends in the place of voting rights.
* They can be listed and traded on the stock exchanges.

Bonus Shares:

* Distribution of shares, in addition to the cash dividends, to the existing shareholders are known as bonus shares.
* These are issued without any payment for cash.
* These are issued by cashing on the reserves of the company.
* A company builds up its reserves by retaining part of its profit over the years.

Preference Stock:

* Preference stock provides fixed rate of return.
* Preference stockholders do not have any voting rights.
* Like the equity, it is a perpetual liability of the corporate.
* Preference stockholders do not have any share in case the company has surplus profits.

Debenture:

* It is a debt instrument issued by a company, which carries a fixed rate of interest.
* It is generally issued by private sector companies in order to acquire loan.
* The various features of a debenture are:

Ø Interest Ø Redemption Ø Indenture

* A company can issue various types of debentures, which are:
	+ Secured bonds or unsecured debenture
	+ Fully convertible debenture
	+ Partly convertible debenture
	+ Non-convertible debenture

Bond:

* A bond is a debt security issued by the government, quasi- government, public sector enterprises and financial institutions.
* Various features of a bond are:
	+ - The interest rate is generally fixed
		- It is traded in the securities market
		- At the time of issue of bonds, maturity date is specified
* Some of the types of bonds that a company can issue are:
	+ - Secured bonds and unsecured bonds
		- Perpetual bonds and redeemable bonds
		- Fixed interest rate bonds and floating interest rate bonds
		- Zero coupon bonds

Warrants:

* A warrant is a detachable instrument, which gives the right to purchase or sell equity shares at a specified price and period.
* It is traded in the securities market where the investor can sell it separately.
* Two types of warrants are:
	+ Detachable warrants: When the warrants are issued along with host securities and detachable, then they are known as detachable warrants.
	+ Puttable warrants:Represent a certain amount of equity shares that can be sold back to the issuer at a specified price, before a stated date.
* Some of the advantages of warrants are:
	+ They have limited risk.
	+ They offer potential for unlimited profits.
	+ They can be traded in the securities market.

Investment Information:

* An investor must have adequate knowledge about the investment alternatives and markets before making any kind of investment.
* The various sources from which an investor can gather the investment information are:
	+ Newspapers, Investment dailies
	+ Magazines and Journals
	+ Industry Reports
	+ RBI Bulletin
	+ Websites of the SEBI, RBI and other private agencies
	+ Stock market information

Fundamental Analysis

Concept of Fundamental Analysis

* It is the examination of various factors such as earnings of the company, growth rate and risk exposure that affects the value of shares of a company.
* Fundamental analysis consists of:
	+ - Economic analysis
		- Industry analysis
		- COMPANY ANALYSIS

Economic Analysis

* It is the analysis of various macro economic factors that have a significant bearing on the stock market.
* The various macro economic factors are:
	+ - Gross Domestic Product (GDP)
		- Savings and investment
		- Inflation
		- Interest rates
		- Budget
		- Tax structure

Economic Forecasting

* Forecasting the future state of the economy is needed for decision making.
* The following forecasting methods are used for analyzing the state of the economy:
	+ Economic indicators: Indicate the present status, progress or slow down of the economy.
	+ Leading indicators: Indicate what is going to happen in the economy. Popular leading indicators are fiscal policy, monetary policy, rainfall and capital investment.
	+ Coincidental indicators: Indicate what the economy is — GDP, industrial production, interest rates and so on.
	+ Lagging indicators: Changes occurring in leading and coincidental indicators are reflected in lagging indicators. Unemployment rate, consumer price index and flow of foreign funds are examples of such indicators.
	+ Diffusion index: It is a consensus index, which has been constructed by the National Bureau of Economic Research in USA.

Industry Analysis

* It is used to analyze the performance of the industries over the years.
* An industry is a group of firms that are engaged in the production of similar goods and services.
* Industries can be classified into:
	+ Growth industry: Has high rate of earnings and growth is independent of business cycle.
	+ Cyclical industry: Growth and profitability of the industry move along with the business cycle.
	+ Defensive industry: It is an industry which defies the business cycle.
	+ Cyclical growth industry: It is an industry that is cyclical and at the same time growing.
* An investor must analyze the following factors:
	+ Growth of the industry Ø Cost structure and profitability
	+ Nature of the product Ø Nature of the competition
	+ Government policy

Company Analysis

* In company analysis, the growth of the company is analyzed by the investor so that the present and future value of the shares can be known.
* The present and future value of shares is affected by a following number of factors such as:
	+ - Competitive edge of the company
		- Market share
		- Growth of sales
		- Stability of the sales

Financial Analysis

* It involves analyzing the financial statements of the company.
* The financial statements of the company include:
	+ Balance sheet: It shows the status of a company’s financial position at the end of the year.
	+ Profit and loss account: It shows the profit and loss made by the company during a period.

Analysis of Financial Statements

* It helps the investor in determining the financial position and progress of the company.
* The various simple analyses that are performed to ascertain the financial position of the company are:
	+ Comparative financial statement: In this , data from the current year’s balance sheet is compared with similar data from the previous year’s balance sheet.
	+ Trend analysis: It shows the growth and decline of sale and profit over the years.
	+ Common size income statement: It shows each item of expense as a percentage of net sales.
	+ Fund flow analysis: It is a statement of the sources and application of funds.
	+ Cash flow analysis: It shows cash inflow and outflow of a company during the year.
	+ Ratio analysis: It is the numerical relationship between the two items.

**Technical Analysis**

Technical Analysis

* A process of identifying trend reversals at an earlier stage to formulate the buying and selling strategy.
* Technical analyst study the relationship between price-volume and supply-demand for the overall market and the individual stock.

Assumptions

* The market value of the scrip is determined by the interaction of supply and demand.
* The market discounts everything.
* The market always moves in trend.
* History repeats itself. It is true to the stock market also.

Origin of Technical Analysis

* Technical analysis is based on the doctrine given by Charles H. Dow in 1884, in the Wall Street Journal.
* A. J. Nelson, a close friend of Charles Dow formalised the Dow theory for economic forecasting.
* Analysts used charts of individual stocks and moving averages in the early 1920s.

Dow Theory

* Dow developed his theory to explain the movement of the indices of Dow Jones Averages.
* The theory is based on certain hypothesis:
	+ The first hypothesis is that no single individual or buyer can influence the major trend of the market.
	+ The second hypothesis is that market discounts every thing.
	+ The third hypothesis is that the theory is not infallible.
* According to Dow theory the trend is divided into
	+ Primary
	+ Intermediate/Secondary
	+ Short term/Minor

Primary Trend

* The security price trend may be either increasing or decreasing.
* When the market exhibits the increasing trend, it is called ‘bull market’ and when it exhibits a decreasing trend it is called ‘bear market’.

Bull Market

* The bull market shows three clear-cut peaks.
* Each peak is higher than the previous peak.
* The bottoms are also higher than the previous bottoms.

Bear Market

* The market exhibits falling trend.
* The peaks are lower than the previous peaks.
* The bottoms are also lower than the previous bottoms.

The Secondary Trend

* The secondary trend or the intermediate trend moves against the main trend and leads to correction.
* The correction would be 33% to 66% of the earlier fall or increase.
* Compared to the time taken for the primary trend, secondary trend is swift and quicker.

Minor Trends

* Minor trends or tertiary moves are called random wriggles.
* They are simply the daily price fluctuations.
* Minor trend tries to correct the secondary trend movement.

Support and Resistance Level

* In the support level, the fall in the price may be halted for the time being or it may result even in price reversal.
	+ In this level, the demand for the particular scrip is expected.
* In the resistance level, the supply of scrip would be greater than the demand.
	+ Further rise in price is prevented.
	+ Selling pressure is greater and the increase in price is halted for the time being.

Indicators

Volume of Trade

* Volume expands along with the bull market and narrows down in the bear market.
* Technical analyst use volume as an excellent method of confirming the trend.

Breadth of the Market

* The net difference between the number of stock advanced and declined during the same period is the breadth of the market.
* A cumulative index of net differences measures the market breadth.

Short sales

* This is a technical indicator also known as short interest.
* It refers to the selling of shares that are not owned.
* They show the general situations.

Moving Average

* The word moving means that the body of data moves ahead to include the recent observation.
* The moving average indicates the underlying trend in the scrip.
* For identifying short-term trend, 10 to 30 days moving averages are used.
* In the case of medium-term trend 50 to 125 days are adopted.
* To identify long-term trend 200 days moving average is used.

Oscillators Oscillator shows the share price movement across a reference point from one extreme to another. The momentum indicates:

* + Overbought and oversold conditions of the scrip or the market.
	+ Signaling the possible trend reversal.
	+ Rise or decline in the momentum.

Relative Strength Index (RSI)

* RSI was developed by Wells Wilder.
* Identifies the inherent technical strength and weakness of a particular scrip or market. RSI can be calculated for a scrip by adopting the following formula

RSI =

Rs =

* + If the share price is falling and RSI is rising, a divergence is said to have occurred.
	+ Divergence indicates the turning point of the market.

Rate of Change (ROC)

* ROC measures the rate of change between the current price and the price ‘n’ number of days in the past.
* ROC helps to find out the overbought and oversold positions in a scrip.
* ROC can be calculated by two methods.
	+ In the first method current closing price is expressed as a percentage of the 12 days or weeks in past.
	+ In the second method, the percentage variation between the current price and the price 12 days in the past is calculated.

Charts

Charts are graphic presentations of the stock prices. These also have the following uses:

* + Spots the current trend for buying and selling
	+ Indicates the probable future action of the market by projection
	+ Shows the past historic movement
	+ Indicates the important areas of support and resistance

Point and Figure Charts

* These charts are one-dimensional and there is no indication of time or volume.
* The price changes in relation to previous prices are shown.
* The change of price direction can be interpreted.

*Some inherent disadvantages are:*

* + They do not show the intra-day price movement.
	+ Only whole numbers are taken into consideration, resulting in loss of information regarding minor fluctuations.
	+ Volume is not mentioned in the chart.

Bar Charts

* The bar chart is the simplest and most commonly used tool of a technical analyst.
* A dot is entered to represent the highest price at which the stock is traded on the day, week or month.
* Another dot is entered to indicate the lowest price on that particular date.
* A line is drawn to connect both the points.
* A horizontal nub is drawn to mark the closing price.

Chart Patterns

* + V Formation Ø Tops and bottoms
	+ Double top and bottom Ø Head and shoulders
	+ Inverted head and shoulders

Triangles

* The triangle formation is easy to identify and popular in technical analysis.
* The different triangles are:
	+ Symmetrical
	+ Ascending
	+ Descending—inverted

Technical Analysis and Fundamental Analysis

1. Fundamental analysts analyses financial strength of corporate, growth of sales, earnings and profitability.
	* The technical analysts mainly focus the attention on the past history of prices.
2. Fundamental analysts estimate the intrinsic value of the shares.
	* Technical analysts mainly predict the short term price movement.
3. Fundamentalists are of the opinion that supply and demand for stocks depend on the underlying factors.
	* Technicians opine that they can forecast supply and demand by studying the prices and volume of trading.

**Efficient Market Theory**

* Efficient market theory states that the share price fluctuations are random and do not follow any regular pattern.
* The expectations of the investors regarding the future cash flows are translated or reflected on the share prices.
* The accuracy and the quickness in which the market translates the expectation into prices are termed as market efficiency.

**Two Types of Market Efficiencies**

* **Operational efficiency**: Operational efficiency is measured by factors like time taken to execute the order and the number of bad deliveries. Efficient market hypothesis does not deal with this efficiency.
* **Informational efficiency**: It is a measure of the swiftness or the market’s reaction to new information.
	+ New information in the form of economic reports, company analysis, political statements and announcement of new industrial policy is received by the market frequently.
	+ Security prices adjust themselves very rapidly and accurately.
* **History of the Random-Walk Theory**
* French mathematician, Louis Bachelier in 1900 wrote a paper suggesting that security price fluctuations were random.
* In 1953, Maurice Kendall in his paper reported that stock price series is a wandering one.
* Each successive change is independent of the previous one.
* In 1970, Fama stated that efficient markets fully reflect the available information**.**

**Forms of Efficiencies**

They are divided into three categories:

* + **Weak form**
	+ **Semi-strong form**
	+ **Strong form**

The level of information being considered in the market is the basis for this segregation.

**Market Efficiency**



**Weak Form of EMH**

* Current prices reflect all information found in the volumes.
* Future prices can not be predicted by analysing the prices from the past.
* Buying and selling activities of the information traders lead the market price to align with the intrinsic value.

**Empirical Tests**

* + ***Filter rule:***
		- According to this strategy if a price of a security rises by atleast *x* per cent, investor should buy and hold the stock until its price declines by atleast *x* per cent from a subsequent high.
		- Several studies have found that gains produced by the filter rules were much below normal than the gains of the simple buy and hold strategy adopted by the investor.
	+ ***Runs test:***
		- It is used to find out whether the series of price movements have occurred by chance.
		- A run is an uninterrupted sequence of the same observation.
		- Studies using runs test have suggested that runs in the price series of stocks are not significantly from the run in the series of random numbers.
	+ ***Serial correlation:***
		- Serial correlation or auto-correlation measures the correlation co-efficient in a series of numbers with the lagging values of the same series.
		- Many studies conducted on the security price changes have failed to show any significant correlations.

**Semi-Strong Form**

* The security price adjusts rapidly to all publicly available information.
* The prices not only reflect the past price data, but also the available information regarding the earnings of the corporate, dividend, bonus issue, right issue, mergers, acquisitions and so on.
* The market has to be semi-strongly efficient, timely and correct dissemination of information and assimilation of news are needed.

**Strong Form**

* All information is fully reflected on security prices.
* It represents an extreme hypothesis which most observers do not expect it to be literally true.
* Information whether it is public or inside cannot be used consistently to earn superior investors’ return in the strong form.

**Market Inefficiencies**

* Announcement effect
* Low PE effect
* Small firm effect

**CHAPTER-2**

**Risk**

Concept of Risk

* Risk is expressed in terms of variability of return.
* An investor before investing in securities must properly analyze the risks associated with these securities.
* There are two types of risks:
	+ - Systematic risk
		- Unsystematic risk

SYSTEMATIC RISK

* It is the risk that is caused by external factors such as economic, political and sociological conditions.
* It affects the functioning of the entire market.
* They are of three types:
	+ - Market risk
		- Interest rate risk
		- Purchasing power risk

Market Risk

* Jack Francis has defined market risk as that portion of the total variability of returns that is caused by the alternating forces of bull and bear markets.
* When the stock market moves upwards, it is known as bull market. On the other hand, when the stock market moves downwards, then it is known as bear market.
* The two forces that affect the market are:
	+ Tangible events: Earthquake, war, political uncertainty and decrease in the value of money are some of the examples of tangible events.
	+ Intangible events: It is related to market psychology. Political unrest or fall of government affects the market sentiments.

Interest Rate Risk

* It is the risk caused by the variations in the market interest rates.
* Prices of debentures, bonds, etc. are mainly affected by the interest rate risk.
* The causes of interest rate risk are as follows:
	+ Changes in the government’s monetary policy
	+ Changes in the interest rate of treasury bills
	+ Changes in the interest rate of government bonds

Purchasing Power Risk

* Variations in returns are caused by the loss of purchasing power of currency.
* There are mainly two types of inflation:
	+ Demand-pull inflation: The demand for goods and services remains higher than the supply.
	+ Cost-push inflation: There is a rise in price due to the increase in the cost of production.
* Real future value =
* Real Rate of Return = 

 where r = rate of return

 IR = Inflation Rate

Unsystematic Risk

* It is a type of risk which is unique, specific and related to a particular industry.
* Managerial inefficiency, changes in preferences of the consumers, availability of raw material, labour problems, etc. are some of the causes of unsystematic risk.
* These are of two types:
	+ Business risk
	+ Financial risk

Business Risk

* It is the risk that is caused by the inefficiency of a company to manage its growth or stability of earnings.
* It can be classified as:
	+ Internal business risk: It is the risk that is associated with the operational efficiency of a company.
	+ External business risk: It is the risk that is the result of operating conditions imposed on the firm by the external environment.

Financial Risk

* It is associated with the capital structure of the company, which consists of equity and borrowed funds.
* A financial risk can be avoided by analyzing the capital structure of the company.
* The financial risk considers the risk between EBIT and EBT.
* The payment of interest affects the eventual earnings of the company.

Risk Measurement

* An efficient measurement of risks provides an appropriate quantification of risk.
* Standard deviation is used as a tool for measuring the risk, which is a measure of the variables around its mean.
* The following formula is used to calculate standard deviation:



Beta

Beta is the slope of the regression line.

* Beta describes the relationship between the stock return and index return.
* Beta = +1.0. One per cent change in index return causes one per cent change in stock return.
* Beta = +0.5. One per cent change in index return causes 0.5 per cent change in stock return.
* Negative beta indicates that the stock return and the market move in opposite directions.

Chapter-2

**Portfolio Construction**

Portfolio

* Portfolio is a combination of securities such as stocks, bonds and money market instruments.
* The process of blending together the broad asset classes so as to obtain optimum return with minimum risk is called portfolio construction.
* Diversification of investments helps to spread risk over many assets.

Approaches in Portfolio Construction

* Traditional approach evaluates the entire financial plan of the individual.

In the modern approach, portfolios are constructed to maximise the expected return for a given level of risk

Traditional Approach

The traditional approach basically deals with two

major decisions:

* + Determining the objectives of the portfolio
	+ Selection of securities to be included in the portfolio

Steps in Traditional Approach



Analysis of Constraints

* Income needs
	+ - Need for current income
		- Need for constant income
* Liquidity
* Safety of the principal
* Time horizon
* Tax consideration
* Temperament

Determination of Objectives

The common objectives are stated below:

* + Current income
	+ Growth in income
	+ Capital appreciation
	+ Preservation of capital

Selection of Portfolio

* Objectives and asset mix
* Growth of income and asset mix
* Capital appreciation and asset mix
* Safety of principal and asset mix
* Risk and return analysis

Diversification

* According to the investor’s need for income and risk tolerance level portfolio is diversified.
* In the bond portfolio, the investor has to strike a balance between the short term and long term bonds.

Stock Portfolio

Following steps as shown in the figure are adopted



Modern Approach

* Modern approach gives more attention to the process of selecting the portfolio.
* The selection is based on the risk and return analysis.
* Return includes the market return and dividend.
* Investors are assumed to be indifferent towards the form of return.
* The final step is asset allocation process that is to choose the portfolio that meets the requirement of the investor.

Managing the Portfolio

* Investor can adopt passive approach or active approach towards the management of the portfolio.
* In the passive approach the investor would maintain the percentage allocation of asset classes and keep the security holdings within its place over the established holding period.
* In the active approach the investor continuously assess the risk and return of the securities within the asset classes and changes them accordingly.

**Portfolio–Markowitz Model**

Simple Diversification

* Portfolio risk can be reduced by the simplest kind of diversification.
* In the case of common stocks, diversification reduces the unsystematic risk or unique risk.
* But diversification cannot reduce systematic or undiversifiable risk.

Diversification and Portfolio Risk


Problems of Vast Diversification

* Purchase of poor performers
* Information inadequacy
* High research cost
* High transaction cost

**The Markowitz Model**

Assumptions:

* The individual investor estimates risk on the basis of variability of returns.
* Investor’s decision is solely based on the expected return and variance of returns only.
* For a given level of risk, investor prefers higher return to lower return.
* Likewise, for a given level of return investor prefers lower risk than higher risk.

Portfolio Return



Rp = return on the portfolio

 X1 = proportion of total portfolio invested in security 1

 R1 = expected return of security 1

Portfolio Risk



* sp = portfolio standard deviation
* X1 = percentage of total portfolio value in stock X1
* X2 = percentage of total portfolio value in stock X2
* s1 = standard deviation of stock X1
* s2 = standard deviation of stock X2
* r12 = correlation co-efficient of X1 and X2



Proportion

* X1 = s2 ¸ (s1 + s2) the precondition is that the correlation co-efficient should be –1.0, Otherwise it is



Two Security Portfolios with Different Correlation Coefficients



Markowitz Efficient Frontier



Markowitz Efficient Frontier (Contd.)

* Each of the portfolio along the line or within the line ABCDEFGHI is possible.
* When the attainable sets are examined, some are more attractive than others.
* Portfolio B is more attractive than portfolios F and H because B offers more return on the same level of risk.
* Among all the portfolios, the portfolios which offer the highest return at a particular level of risk are called efficient portfolios.
* Here the efficient portfolios are A, B, C and D.

Utility Analysis

* Utility is the satisfaction the investor enjoys from the portfolio return.
* The investor gets more satisfaction of more utility in X + 1 rupees than from X rupee.
* Utility increases with increase in return.

Fair Gamble

* In a fair gamble which costs Re 1, the outcomes are
A and B events.
* Event ‘A’ will yield Rs 2.
* Occurrence of B event is a dead loss *i.e.* 0.
* The chance of occurrence of both the events are 50 : 50.
* The expected value of investment is

 (½)2 + ½(0) = Re 1.

Type of Investors

* Risk averse investor rejects a fair gamble because the disutility of the loss is greater for him than the utility of an equivalent gain.
* Risk neutral investor is indifferent to the fair gamble.
* The risk seeking investor would select a fair gamble *i.e.* he would choose to invest. The expected utility of investment is higher than the expected utility of not investing.

Indifference Curve and Efficient Frontier



Indifference Map and Efficient Frontier

* The utility of the investor or portfolio manager increases when he moves up the indifference map from I1 to I4.
* He can achieve higher expected return without an increase in risk.
* Even though the points T and S are in the I2 curve, R is the only attainable portfolio which maximises the utility of the investor.

Leveraged Portfolios

* To have a leveraged portfolio, investor has to consider not only risky assets but also risk free assets.
* Secondly, he should be able to borrow and lend money at a given rate of interest.

Risk Free Asset

* The features of risk free asset are:
	+ absence of default risk and interest risk.
	+ full payment of principal and interest amount.
* The return from the risk free asset is certain and the standard deviation of the return is nil.

**The Sharpe Index Model**

Need for Sharpe Model

* In Markowitz model a number of co-variances have to be estimated.
* If a financial institution buys 150 stocks, it has to estimate 11,175 *i.e.*, (N2 – N)/2 correlation
co-efficients.
* Sharpe assumed that the return of a security is linearly related to a single index like the market index.
* It needs 3N + 2 bits of information compared to
[N(N + 3)/2] bits of information needed in the Markowitz analysis.

Single Index Model

Stock prices are related to the market index and this relationship could be used to estimate the return of stock.

Ri = ai + bi Rm + ei

where Ri — expected return on security i

 ai — intercept of the straight line or alpha co-efficient

 bi — slope of straight line or beta co-efficient

 Rm — the rate of return on market index

ei— error term

Risk

* Systematic risk = bi2 × variance of market index

 = bi2 sm2

* Unsystematic risk = Total variance – Systematic risk

 ei2 = si2 – Systematic risk

* Thus the total risk = Systematic risk + Unsystematic risk

 = bi2 sm2 + ei2

Portfolio Variance

* The portfolio variance can be derived

where= variance of portfolio

 = expected variance of index

= variation in security’s return not related to the market index

xi = the portion of stock *i* in the portfolio

Expected Return of Portfolio

* For each security ai and bi should be estimated



* Portfolio return is the weighted average of the estimated return for each security in the portfolio.
* The weights are the respective stocks’ proportions in the portfolio.

Portfolio Beta

A portfolio’s beta value is the weighted average of the beta values of its component stocks using relative share of them in the portfolio as weights.



bp is the portfolio beta.

Selection of Stocks

* The selection of any stock is directly related to its excess return-beta ratio.



where Ri = the expected return on stock *i*

 Rf = the return on a riskless asset

 bi = the expected change in the rate of returnon stock *i* associated with one unit change in the market return

Optimal Portfolio

* The steps for finding out the stocks to be included in the optimal portfolio are as:
	+ Find out the “excess return to beta” ratio for each stock under consideration
	+ Rank them from the highest to the lowest
	+ Proceed to calculate Ci for all the stocks according to the ranked order using the

following formula



sm2 = variance of the market index

sei2 = variance of a stock’s movement that is not associated with the
 movement of market index *i.e.*, stock’s unsystematic risk

* + The cumulated values of Ci start declining after a particular Ci and that point is taken as the cut-off point and that stock ratio is the cut-off ratio C.

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**Capital Asset Pricing Theory and Arbitrage Pricing Theory**

The CAPM Theory

* Markowitz, William Sharpe, John Lintner and
Jan Mossin provided the basic structure for the CAPM model.
* It is a model of linear general equilibrium return.
* The required rate return of an asset is having a linear relationship with asset’s beta value *i.e.,* undiversifiable or systematic risk.

Assumptions

* An individual seller or buyer cannot affect the price of a stock.
* Investors make their decisions only on the basis of the expected returns, standard deviations and covariances of all pairs of securities.
* Investors are assumed to have homogenous expectations during the decision-making period.
* The investor can lend or borrow any amount of funds at the riskless rate of interest.
* Assets are infinitely divisible.
* There is no transaction cost.
* There is no personal income tax.
* Unlimited quantum of short sales, is allowed.

Lending and Borrowing

* It is assumed that the investor could borrow or lend any amount of money at riskless rate of interest.

 Rp = Portfolio return

Xf = The proportion of funds invested in risk free assets

 1 – Xf = The proportion of funds invested in risky assets

 Rf = Risk free rate of return

 Rm = Return on risky assets

* The expected return on the combination of risky and risk free combination is



Market Portfolio

* The market portfolio comprised of all stocks in the market.
* Each asset is held in proportion to its market value to the total value of all risky assets.

The Capital Market Line



The Capital Market Line (Contd.)

* The portfolio along the path Rf S is called lending portfolio, that is some money is invested in the riskless asset.
* If it crosses the point S, it becomes borrowing portfolio.
* Money is borrowed and invested in the risky asset.
* The straight line is called capital market line (CML).
* The CML represents linear relationship between the required rates of return for efficient portfolios and their standard deviations.

The Capital Market Line (Contd.)



* + ERp = portfolio’s expected rate of return
	+ Rm = expected return on market portfolio
	+ sm = standard deviation of market portfolio
	+ sp = standard deviation of the portfolio

Return

* The expected return of an efficient portfolio is

Expected return =Price of time + (Price of risk × Amount of risk)

* Price of time is the risk free rate of return
* Price of risk is the premium amount higher and above the risk free return

Security Market Line

* Capital market line does not show the risk-return trade off for other portfolios and individual securities.
* Standard deviation includes the systematic and unsystematic risk.
* Unsystematic risk can be diversified and it is not related to the market.
* Systematic risk could be measured by beta.
* The beta analysis is useful for individual securities and portfolios whether efficient or inefficient.

Security Market Line (Contd.)

 The SML helps to determine the expected return for a given security beta



Security Market Line



Evaluation of Securities with SML



Evaluation of Securities with SML (Contd.)

* The stocks above the SML yield higher returns for the same level of risk.
* They are underpriced compared to their beta value.



where Pi—present price

 Po—purchase price

 Div—dividend.

Empirical Tests of the CAPM

* The studies generally showed a significant positive relationship between the expected return and the systematic risk.
* But the slope of the relationship is usually less than that of predicted by the CAPM.
* The risk and return relationship appears to be linear. Empirical studies give no evidence of significant curvature in the risk/return relationship.
* The CAPM theory implies that unsystematic risk is not relevant, but unsystematic and systematic risks are positively related to security returns.
* The ambiguity of the market portfolio leaves the CAPM untestable.
* If the CAPM were completely valid, it should apply to all financial assets including bonds.

Present Validity of CAPM

* CAPM provides basic concepts which is truly of fundamental value.
* The CAPM has been useful in the selection of securities and portfolios.
* Given the estimate of the risk free rate, the beta of the firm, stock and the required market rate of return, one can find out the expected returns for a firm’s security.

Arbitrage

* Arbitrage is a process of earning profit by taking advantage of differential pricing for the same asset.
* The process generates riskless profit.
* In the security market, it is of selling security at a high price and the simultaneous purchase of the same security.

The Assumptions

* The investors have homogenous expectations.
* The investors are risk averse and utility maximisers.
* Perfect competition prevails in the market and there is no transaction cost.

Arbitrage Portfolio

* According to the APT theory, an investor tries to find out the possibility to increase returns from his portfolio without increasing the funds in the portfolio.
* He also likes to keep the risk at the same level.

If X indicates the change in proportion

DXA + DXB + DXC = 0

Factor Sensitivity

* The factor sensitivity indicates the responsiveness of a security’s return to a particular factor. The sensitiveness of the securities to any factor is the weighted average of the sensitivities of the securities.
* Weights are the changes made in the proportion. For examplebA, bB and bC are the sensitivities, in an arbitrage portfolio the sensitivities become zero.

bA DXA + bB DXB + bC DXC = 0

The APT Model

* According to Stephen Ross, returns of the securities are influenced by a number of macro economic factors.
* The macro economic factors are: growth rate of industrial production, rate of inflation, spread between long term and short term interest rates and spread between low grade and high grade bonds. The arbitrage theory is represented by the equation: Ri = l0 + l1 bi1 + l2 bi2 … + ljbij

where Ri = average expected return

 l1 = sensitivity of return to bi1

 bi1 = the beta co-efficient relevant to the particular factor

Arbitrage Pricing Equation

In a single factor model, the linear relationship between the return Ri and sensitivity bi can be given in the following form

Ri = lo + libi

* + Ri = return from stock A
	+ lo = riskless rate of return
	+ bi = the sensitivity related to the factor
	+ li = slope of the arbitrage pricing line

APT and CAPM

* The simplest form of APT model is consistent with the simple form of the CAPM model.
* APT is more general and less restrictive than CAPM.
* The APT model takes into account of the impact of numerous factors on the security.
* The market portfolio is well defined conceptually. In APT model, factors are not well specified.
* There is a lack of consistency in the measurements of the APT model.
* The influences of the factors are not independent of each other.

CHAPTER-3

**Bond Return and Valuation**

Concept of Bond

* It is a contract between a borrower and a lender in which the borrower is required to pay a certain amount of interest income to the lender.
* In general, bonds carry a fixed payment of interest till the maturity date.
* The rate of interest is also known as coupon rate.

Bond Risk

* Bonds are considered to be quite safe but they also carry a certain amount of risk.
* Types of bond risk:
	+ Interest rate risk: The value of bonds changes due to variability of the market interest rates.
	+ Default risk: The borrower fails to pay the agreed value of debt instrument on time.
	+ Marketability risk: There is difficulty in liquidating the bonds in the market.
	+ Callability risk: There is an uncertainty created in the returns of the investor by the issuer’s right to call the bond any time.

Bond Return

There are several ways of describing a rate of return on bond. Some of them are:

* + Holding period return
	+ The current yield
	+ Yield to maturity

Holding Period Return

* It is a return in which an investor buys a bond and liquidates it in the market after holding it for a definite period of time.
* The formula for calculating holding period of return is as follows:



* It can be calculated on a daily, monthly or annual basis.

The Current Yield

* It is a measure through which the investors can easily figure out the rate of cash flow on the investments made by them every year.
* It is calculated as:



Yield to Maturity

* It is the single discount factor that makes the present value of future cashflows from a bond equivalent to the current price of the bond.
* The following assumptions are used to calculate yield to maturity:
	+ There should not be any default.
	+ The interest payments are reinvested at yield to maturity.
	+ The investor has to hold the bond till its maturity.
	+ It is calculated as:

Bond Value Theorems

* These are evolved on the basis of three factors:

(i) coupon rate (ii) years to maturity (iii) expected rate of return.

* The five bond value theorems are as follows:
	+ Theorem 1: If the bond’s market price increases then its yield declines and vice versa.
	+ Theorem 2: If the bond’s yield remains constant over its life, then the discount or premium depends on the maturity period.
	+ Theorem 3: If the yield remains constant over its life, the discount and premium on bonds will decline at an increasing rate as its life gets shorter.
	+ Theorem 4: A raise in the bond’s price for a decline in the bond’s yield is greater than the fall in the bond’s price for a raise in the yield.
	+ Theorem 5: The percentage change in the bond’s price owing to change in its yield will be small if the coupon rate is high.

Duration

* It measures the time structure and interest rate risk of the bond.
* The formula for calculating the duration is as follows:



where D = Duration

 C = Cashflow

 R = Current yield to maturity

 T = Number of years

 Pv(ct) = Present value of the cashflow

 P0 = Sum of the present value of cashflow

Immunisation

* It is a technique that makes a bondholder relatively certain about the promised cash stream.
* An immunisation can be achieved by reinvesting the coupons in the bonds that offer higher interest rate.

Chapter 4

**Stock Return and Valuation**

Concept of Stock Return

* It is a return which includes current income and capital gain that is caused by increase in the price.
* The current income and capital gain are expressed as a percentage of the money invested in the beginning.
* An investor before investing in securities must properly analyze the returns associated with the securities.

Anticipated Return

* It is the expected rate of return an investor will get in future on his investments.
* The anticipated rate of return can be calculated with the help of probability.
* Probability refers to the likelihood occurrence of an event.
* It can be calculated as:



Multiple Year Holding Period

* If the holding period is more than a year, it is called multiple year holding period.
* The formula for calculating the multiple year holding period is as follows:



where g = annual expected growth in earnings, dividends and price

e = most recent earnings per share

 d / e = dividend pay out

 r = required rate of return

 P / E = price-earnings ratio

 N = holding period in years

Constant Growth Model

* The basic assumption of this model is that the dividends are expected to grow at the same rate.
* It is calculated as:



where P0 = Present value of the stock

 r = Required rate of return

 g = Growth rate

 D1 = Next year’s dividend

Two Stage Growth Model

* It is an extended form of constant growth model, where the growth stages are divided into:
	+ A period of remarkable growth
	+ A period of constant growth
* It is calculated as:



where D0 = Dividend of the previous period

gsand gn = Above normal and normal growth rate

 rs= Required rate of return

 N = Period of above normal growth

Valuation through Price-Earnings Ratio

* P/E ratio indicates price per rupee of share earnings.
* The advantages of price earning ratio are as:
	+ It helps in comparing the stock prices that have different earnings per share.
	+ It helps in estimating the stocks of those companies that do not pay the dividends.
* The formula for calculating P/E ratio is as:



Preferred Stock Valuation

* Preferred stocks are those stocks that provide a steady rate of return.
* Preferred stocks can be calculated with the help of the following formula:



where D = dividend paid

r = required rate of return

Chapter 5

**MUTUAL FUNDS**

* Mutual fund is an investment vehicle that pools together funds from investors to purchase stocks,bonds or other securities.An investor can participate in the mutual fund by buying the units of the fund.Each unit is backed by a diversified pool of assets,where the funds have been invested. A closed-end fund has a fixed number of units outstanding.It is open for a specific period.During that period investors can buy it.The initial offer period is terminated at the end of the pre-determined period. The closed-end schemes are listed in the stock exchanges.The investor can trade the units in the stock markets just like other securitirs.The prices may be either quoted at a premium or discount.
* In the open-end schemes,units are sold and bought continuously.The investors can directly approach the fund managers to buy or sell the units. The price of the unit is based on the asset value of the particular scheme.The net asset value of the fund is the value of the underlying securities of the scheme.The net asset value is calculated on a daily or weekly basis.
* The gain or loss made by the mutual fund is passed on to the investors after deducting the administrative expenses and investment management fees.The gains are distributed to the unit holder in the form of dividend or reinvested by the fund to generate furthrt gains.
* The mutual fund may be with or without a load factor.A commission or charge paid by the investors while purchasing or selling the mutual funf is known as load factor.Front-end load is charged when units are sold by the funds and back-end load is charged when the units are repurchased by the funds.The front-end load factor reduces the units when the investor buys it and back-end load reduces the investor’s proceeds when he sells the units.generally,the load factor ranges between 1&6 percent of the net asset value.sometimes,the fund may not charge both the loads.
* **What are the different types of mutual funds?**
* You may classify mutual funds into open-end and closed-end funds. An open-end fund does not have a fixed maturity period. You may redeem the units at any time. Closed-end funds have a fixed maturity period.
* You may invest in these funds during the initial period called the New Fund Offer. You can redeem your investment on the maturity date. However, closed-end funds are listed on the stock exchange and you may redeem units before the maturity date.
* Mutual funds may invest in equity and equity-related instruments, debt or a mix of both. You can broadly classify mutual funds into equity funds, debt funds and hybrid funds.
* **Equity funds:**Equity funds invest at least 65% of the total assets in equity and equity-related instruments. It may invest the remaining corpus in debt and money market instruments.
* **Debt funds:**Debt funds invest the bulk of the corpus in fixed income instruments such as bonds, government securities and money market instruments such as treasury bills, commercial paper and certificates of deposit.
* **Hybrid funds:**Hybrid funds put money in more than one asset class. It may be a combination of equity, debt and even a small proportion in gold. Hybrid funds are of different types such as aggressive hybrid funds, conservative hybrid funds, dynamic asset allocation or balanced advantage fund, equity savings fund, multi-asset allocation fund and balanced hybrid funds.
* **WHAT ARE THE DIFFERENT TYPES OF MUTUAL FUND SCHEMES?**
* Schemes according to Maturity Period

A mutual fund scheme can be classified into open-ended scheme or close-ended scheme depending on its maturity period.
* **1. Open-ended Fund/ Scheme**
* An open-ended fund or scheme is one that is available for subscription and repurchase on a continuous basis. These schemes do not have a fixed maturity period. Investors can conveniently buy and sell units at Net Asset Value (NAV) related prices which are declared on a daily basis. The key feature of open-end schemes is liquidity.
* **2. Close-ended Fund/ Scheme**
* A close-ended fund or scheme has a stipulated maturity period e.g. 5-7 years. The fund is open for subscription only during a specified period at the time of launch of the scheme. Investors can invest in the scheme at the time of the initial public issue and thereafter they can buy or sell the units of the scheme on the stock exchanges where the units are listed. In order to provide an exit route to the investors, some close-ended funds give an option of selling back the units to the mutual fund through periodic repurchase at NAV related prices. SEBI Regulations stipulate that at least one of the two exit routes is provided to the investor i.e. either repurchase facility or through listing on stock exchanges. These mutual funds schemes disclose NAV generally on weekly basis.

Schemes according to Investment Objective

A scheme can also be classified as growth scheme, income scheme, or balanced scheme considering its investment objective. Such schemes may be open-ended or close-ended schemes as described earlier. Such schemes may be classified mainly as follows:
* **1. Growth / Equity Oriented Scheme**

The aim of growth funds is to provide capital appreciation over the medium to long- term. Such schemes normally invest a major part of their corpus in equities. Such funds have comparatively high risks. These schemes provide different options to the investors like dividend option, capital appreciation, etc. and the investors may choose an option depending on their preferences. The investors must indicate the option in the application form. The mutual funds also allow the investors to change the options at a later date. Growth schemes are good for investors having a long-term outlook seeking appreciation over a period of time.

* **2. Income / Debt Oriented Scheme**
* The aim of income funds is to provide regular and steady income to investors. Such schemes generally invest in fixed income securities such as bonds, corporate debentures, Government securities and money market instruments. Such funds are less risky compared to equity schemes. These funds are not affected because of fluctuations in equity markets. However, opportunities of capital appreciation are also limited in such funds. The NAVs of such funds are affected because of change in interest rates in the country. If the interest rates fall, NAVs of such funds are likely to increase in the short run and vice versa. However, long term investors may not bother about these fluctuations.
* **3. Balanced Fund**
* The aim of balanced funds is to provide both growth and regular income as such schemes invest both in equities and fixed income securities in the proportion indicated in their offer documents. These are appropriate for investors looking for moderate growth. They generally invest 40-60% in equity and debt instruments. These funds are also affected because of fluctuations in share prices in the stock markets. However, NAVs of such funds are likely to be less volatile compared to pure equity funds.
* **4. Money Market or Liquid Fund**
* These funds are also income funds and their aim is to provide easy liquidity, preservation of capital and moderate income. These schemes invest exclusively in safer short-term instruments such as treasury bills, certificates of deposit, commercial paper and inter-bank call money, government securities, etc. Returns on these schemes fluctuate much less compared to other funds. These funds are appropriate for corporate and individual investors as a means to park their surplus funds for short periods.
* **5. Gilt Fund**
* These funds invest exclusively in government securities. Government securities have no default risk. NAVs of these schemes also fluctuate due to change in interest rates and other economic factors as is the case with income or debt oriented schemes.
* **6. Index Funds**
* Index Funds replicate the portfolio of a particular index such as the BSE Sensitive index, S&P NSE 50 index (Nifty), etc these schemes invest in the securities in the same weightage comprising of an index. NAVs of such schemes would rise or fall in accordance with the rise or fall in the index, though not exactly by the same percentage due to some factors known as "tracking error" in technical terms. Necessary disclosures in this regard are made in the offer document of the mutual fund scheme.

There are also exchange traded index funds launched by the mutual funds which are traded on the stock exchanges.
* **Structure of Mutual Funds in India**
* The Mutual Funds in India are regulated by SEBI MF Regulations, 1996 under which a mutual fund is formed as a Public Trust having **three tier structure of mutual funds**as follows:
* **Sponsor -** For creation of a mutual fund
* **Trustees -**To look after interest of investors
* **Asset Management Company -**To invest and manage the funds
* **Sponsor -** Sponsor is any person who either itself or in association with another body corporate sets up a mutual fund. The major objective behind establishing a mutual fund is to earn money by doing fund management. We can compare a sponsor with a promoter of a company.
* **Trustees -** Trustees are appointed to manage the trust. The primary responsibility of the trustees is to protect the interest of the investors of the mutual funds. They are considered as the primary guardians of the investors' funds. They also ensure that the operations of the mutual fund comply with the relevant regulations.
* **Asset Management Company -**Asset management company (AMC) is created by the sponsor to manage the funds of the mutual fund. It is considered as the investment Manager of the Trust and an operational arm of the mutual fund. It is the responsibility of the trustees to make sure that the AMC has proper system and procedures in place. AMCs fee structure of mutual funds charge a small fee for fund management.
* Apart from above entities, following entities also play a vital supporting role in the smooth functioning of a mutual fund.
* **Custodian -** Custodian is an independent organisation. Custodian keeps the physical custody of the all the securities bought by the AMC. The securities are bought in the name of trustees but they are not kept with them. Securities, which are in physical form, are kept in the safe custody of a custodian and securities, which are in De-Materialized form, are kept with a Depository Participant, as per the advice of custodian.
* **Registrar and transfer agent (RTA) -** The main function of an RTA is to process, maintain and update all the investors records. Other function is to offer the investor servicing through its office and various other branches located in different parts of the country. It processes all the transactions like application, purchase, redemption, switch etc submitted by the investors directly or through the AMC in various schemes and plans.
* **Auditors -** They perform auditing of the AMC's accounts. They also ensure that the accounts of schemes are maintained independently from that of the AMC. They make sure that separate books of account are prepared and maintained for each scheme of the mutual fund and their annual reports are also being prepared. The auditor of the mutual fund schemes and the auditor of the AMC must be different.
* **Fund accountants -** The function of fund accountants is to calculate the NAV (fund price) of the schemes based on the assets and liabilities of each scheme.
* **Brokers -** Brokers are registered members of the stock exchange. AMC utilizes their services to buy and sell securities on the stock exchanges.
* **Depositories -** Now-a-days, the financial securities whether bonds, shares, debentures, etc. are not kept in physical form but they are kept in electronic form (known as dematerialised form). These securities are kept in their demat form with an entity called a Depository. A depository is responsible for maintenance of ownership records and facilitation of trading in dematerialised securities. Presently, there are 2 depositories in India which are National Securities Depository Ltd (NSDL) and Central Depository Services Ltd (CSDL). The Mutual Funds also keep their securities in demat form with the depositories.
* Depository interacts with its clients or investors through its agents, called Depository Participants (DPs). For availing the services of a depository, the client/ investor (here mutual fund) needs to open depository account (Demat Account) with a Depository Participant (DP). Mutual Funds can buy or sell shares ot other financial securities of various companies through their Demat Accounts.
* **Legal Advisors -** A group of advocates and solicitors is appointed as Legal Advisors for a Mutual Fund for offering legal services and advices about planning and execution of various schemes of mutual funds. They charge a fee for providing legal advices.
* **Advantages of mutual funds**
* 1.**Professional Management** : The biggest advantage of investing in mutual funds is that they are managed by qualified and professional expertise that are backed by a dedicated investment research team which analyses the performance and prospects of companies and selects suitable investments.
2. **Portfolio Diversification**: Since one of the primary rules of investment is to diversify portfolios, a mutual fund can be a simple and successful way to accomplish this goal. They invest in a number of companies across a broad cross-section of industries and sectors. This diversification reduces the risk because seldom do all stocks make losses at the same time and in the same proportion.
3. **Convenient Administration**: Investing in a mutual fund reduces paperwork and helps you to avoid many problems such as bad deliveries, delayed payments and unnecessary follow up with brokers and companies. Mutual Funds save your time and make investing easy and convenient.
4. **Return Potential**: Over a medium to long-term, mutual funds have the potential to provide a higher return as they invest in a diversified basket of selected securities.
5. **Low Costs**: Mutual funds are one of the best investment options considering the costs involved. They are a relatively less expensive if compared to directly investing in the capital markets because the benefits of scale in brokerage, custodial and other fees translate into lower costs for investors.
6. **Liquidity**: Mutual funds provide liquidity in two ways. In open-end schemes,the investor can get back his money at any time by selling back the units to the fund at NAV related prices. In closed-end fund,he has the option to sell the units through the stock exchange.
7. **Transparency**: Mutual funds provide information on each scheme about the specific investments made thereunder and so on.
8. **Flexibility**: currently most funds have regular investment plans, regular withdrawal plans and dividend reinvestment schemes.A great deal of flexibilty is assured in the process.
9. **choice of Schemes**: mutual funds offer a variety of schemes to suit varying needs of the investors.
10. **Well Regulated**: All mutual funds are registered with SEBI and they function within the regulatory provisions framed to protect the interests of investors. The operations of mutual funds are regularly monitored by SEBI.

**Portfolio Evaluation**

**The Concept**

* Portfolio manager evaluates his portfolio performance and identifies the sources of strength and weakness.
* The evaluation of the portfolio provides a feed back about the performance to evolve better management strategy.
* Evaluation of portfolio performance is considered to be the last stage of investment process.

**Sharpe’s Performance Index**

* Sharpe index measures the risk premium of the portfolio relative to the total amount of risk in the portfolio.
* Risk premium is the difference between the portfolio’s average rate of return and the riskless rate of return.

**Formula for
Sharpe’s Performance Index**

Sharpe Index

**Treynor’s Performance Index**

* The relationship between a given market return and the fund’s return is given by the characteristic line.
* The fund’s performance is measured in relation to the market performance.
* The ideal fund’s return rises at a faster rate than the general market performance when the market is moving upwards.
* Its rate of return declines slowly than the market return, in the decline.

**Treynor’s Index Formula**

Rp = a + bRm + ep

* Rp = Portfolio return
* Rm = The market return or index return
* ep = The error term or the residual
* a, b = Co-efficients to be estimated

Beta co-efficient is treated as a measure of undiversifiable systematic risk.



**Jensen’s Performance Index**

* The absolute risk adjusted return measure was developed by Michael Jensen.
* The standard is based on the manager’s predictive ability.

**Jensen Model**

The basic model of Jensen is:

Rp = a + b (Rm – Rf)

* + Rp = average return of portfolio
	+ Rf = riskless rate of interest
	+ a = the intercept
	+ b = a measure of systematic risk
	+ Rm = average market return
* ap represents the forecasting ability of the manager. Then the equation becomes

Rp – Rf = ap + b(Rm – Rf)

*or*

Rp = ap + Rf + b(Rm – Rf)