**FUNDAMENTALS OF INVESTMENTS**

**2019 ADMISSION**

Prepared by
Jabira farsana.K
Assistant professor
Department of commerce and management

**CPA College of global studies**

**Syllabus**
**BC6B15 FUNDAMENTALS OF INVESTMENTS**
**Lectures hours per Week: 5, credit -4, Internal: 20**
**External: 80, Examination: 3 hours**

Module 1

The Investment Environment: The investment decision process - Types of Investments Commodities, Real Estate and Financial Assets. Security market indices - Sources of financial information - Concept of return and risk   (18 Hours)

Module 2

Fixed Income Securities: Bond Features - Types of bonds - Estimating bond yields Types of bond risks Default risk and credit rating - Bond valuation   (10 Hours)

Module 3

Approaches to Security Analysis: Fundamental Analysis- Technical Analysis and Efficient Market Hypothesis - Dividend capitalisation models - Price Earnings Multiple approach to equity valuation (20 hours)

Module 4

Portfolio Analysis and Financial Derivatives: Portfolio and Diversification Portfolio Risk and Return - Introduction to Financial Derivatives Financial Derivatives markets in India (17 hours)

Module 5

Investor Protection: SEBI & role of stock exchanges in investor protection Investor grievances and their Redressal system - Insider trading – Investor's awareness and activism (10 Hours)

(Theory and problems may be in the ratio of 50% and 50% respectively)

**Reference Books:**

1. Donald E. Fisher and Ronald  Jordan: Securities Analysis and Portfolio Management. Prentice Hall, New Delhi
2. S. Kevin: Security Analysis and Portfolio Management
3. Souran Harry vestment Management, Prentice Hall of India
4. Francis and Archer: Portfolio Management Prentice Hall of India. 5. Gupta LC. Stock Exchange Trading in India. Society for Capital Market Research and Development, Delhi,
6. Machi Raja, H.R. Working of Smock Exchanges in India, Wiley Eastern Lad. New Delhi.

# Module 1

## Investment environment

**Meaning of investment**

Investment is the employment of funds with the aim of getting return on it.

In finance, investment means the purchase of financial product or other item or value with an expectation of favorable future returns.

**Definition of investment**

According to Sharpe, " investment is sacrifice of certain present value for some uncertain future value"

**Investment environment**

**1. Securities**: The term security refers to a legal document that shows an ownership interest. In other words, security is a piece of paper evidencing the investor's right to the assets.eg: share, bond, Treasury bill, commercial paper etc...

**2. Security Markets**: A security market or financial market is a mechanism designed to facilitate the exchange of financial assets or securities by bringing buyers and sellers of securities together.

a. **Money Market and Capital Market:**
   - **Money market** refers to a financial market in which very short –term debt securities are traded.
   - **Capital market** is a financial market in which long-term debt or equity –backed securities are bought and sold.

b. **Primary Market and Secondary Market:**
   - **Primary market:** The primary market is where securities are created. It's in this market that firms sell new stocks and bonds to the public for the first time.
   - **Secondary market:** The secondary market is where investors buy and sell securities from other investors.

**3. Financial Intermediaries:** A Financial intermediary is an institution or individual that acts as a middleman among different parties in order to facilitate financial transaction.

**Investment Decision Process**

1. Defining an investment objective

2. Analyzing securities

3. Portfolio construction:

Portfolio is a collection of securities. Therefore, a portfolio comprises of different types of securities and assets. It is not desirable to invest the entire funds of an individuals or an institution in a single security.

   a) Decision made on the allocation of portfolio across different asset classes.eg (equities, fixed income securities, real estate etc…)
   b) Decision made on asset selection
   c) Execution

 4. Performance evaluation

5. Portfolio revision

**Types of investment**

**1. Real investment**

   Real investment is physical investments. They are tangible assets used to produce goods or services, such as buildings, land machinery or cognitive assets that are utilized in the production of commodities or services.

- Real estate
- Commodities (eg: industrial metal like copper, aluminum, zinc, nickel.

  Gold, silver, oil, sugar, coffee, cotton, rubber etc…)
- Bullion
- Veblen goods and antiques

2**. Financial investments**

These investments are freely tradable and negotiable

- **Bonds**

  Bonds are instruments, which give a fixed rate of interest for a fixed period of maturity. (e.g.: government bonds, treasury bills, corporate bonds, railway bonds

- **Equities**

  Investors invest in an equity share of a company, he become owner of the company. There is no assured return on shares and stocks and hence these investments carry more risk.

- **Mutual funds**

  A mutual fund pools money from investors and invests in different securities.

## 3. Non Securitized Financial Securities

E.g.: Bank Deposit, Post Office Deposits, Company Fixed Deposits.

## Characteristics of investment

- Return
- Risk
- Safety
- Liquidity or marketability
- Stability of income
- Tax consideration

## Investment objectives

- Short term high priority objectives
- Long term high priority objectives
- Low priority objectives
- Money making objectives

**Objectives broadly defined as**

- Improve standard of living
- Financial security
- Returns on profitability
- Value for money
- Peace of mind

**Need and benefits of investment**

- Income
- Capital appreciation
- Highly regulated through statutory agency like SEBI.
- Tax advantages
- Collateral
- Confidentiality
- Flexibility
- Liquidity
- Spreading of risk and maximization of return.

**Sources of financial information**

An investor evaluates investment alternatives based on his risks and rewards and selects those investments that meet his objectives. In order to make good analysis and intelligent decision, investors collect information from various sources which are mostly secondary in nature.

1. **Sources of company data**
   a) Annual reports
   b) Prospectus
   c) Stock exchange official directory
   d) Investment guides
   e) Newspapers and journals

2. **Sources of international economic data**

a) International financial statistics

b) Manuals by rating companies (eg: moody's, standard and poor etc…)

c) International journals

**Difference between investment and speculation**

| Basis for comparison | investment | Speculation |
|---|---|---|
| **Meaning** | The purchase of an asset with the hope of getting returns | Speculation is an act of conducting a risky financial transaction, in the hope of substantial profit. |
| **Basis for decision** | Fundamental factors,i.e performance of the company | Technical charts and market psychology |
| **Time horizon** | Longer term | Short term |
| **Risk involved** | Moderate risk | High risk |
| **Intent to profit** | Changes in value | Changes in prices |
| **Expected rate of return** | Modest rate of return | High rate of return |
| **Funds** | Own fund | Own fund and borrowed fund |
| **Income** | stable | Uncertain |
| **Behavior of participants** | Conservative and cautious | Daring and careless |

**Difference between investment and gambling**

| Basis of comparison | Investment | Gambling |
|---|---|---|
| **Meaning** | The purchase of an asset with the hope of getting returns | Gambling is taking part in a game during which you risk money, or something of monetary value,inorder to win money or a prize |
| Planning horizon | Long planning horizon | Short planning horizon |
| Basis for decision | Scientific analysis of intrinsic worth of the security | Based on tips and rumors |
| Nature | Planned activity | Unplanned activity |
| Risk | Commercial risk | Artificial risk |
| Return expectation | Risk-return trade off determines returns | Negative returns are expected |
| Motive | Safety of principal and stability of returns | Entertainment while earning |
| Relationship | Long term relationship with business | Short term relationship with player |

## Investment alternatives

- Shares
- Debentures
- Bonds
- Public deposits
- Bank deposits
- Post office savings
- Public provident fund(PPF)

- Money market instruments (e.g. Treasury bill, certificate of deposit, commercial paper etc...)
- Mutual funds
- Life insurance
- Real estate
- Gold and silver
- Derivatives

**Security market indices**

**Meaning of stock market index**

Stock market index or (stock market indices) is an indicator of trend in the movement of prices of securities traded in a stock market on a specified day. It is a statistical indicator that provides a representation of the value of the securities constituted by it.

**Features of stock market index**

- It is an independent, full service index provider, supplying accurate,reliable and transparent index data.
- They are delivered through a variety of real time and end of day market data vendors.(news papers,magazines,radio and televisions)
- It represents the whole market
- It gives an idea of portfolio construction
- It is an index of diversification.

**Importance (usefulness) of stock market indices**

- They are helpful in understanding the trends in the market
- They help the investors to allocate fund rationally among securities
- It is possible to predict future movements of the stock market with the help of stock market indices.
- They reflect the status of the general economy.

**Different stock indexes**

**BSE Sensitive index (BSE sensex)**

Bombay stock exchange(BSE) .it came out with a stock index .it is computed from a sample of 30 stocks of large,well established and  financially sound companies.

**International market indices**

- BBC global 30
- S&P Global 1200
- AMEX Composite
- Dow jones indexes

**Indian market indices**

- BSE national index
- NSE S&P CNX nifty
- CNX nifty junior
- S&P CNX 500

**Difference between S&P CNX nifty and BSE sensitive India**

| S&P CNX nifty | BSE sensex |
|---|---|
| Based on 50 stocks | Based on 30 stocks |
| More diversified index ,accurately reflecting overall market conditions | More vulnerable to movements of individual stocks |
| Less risk | Higher risk |
| More liquid | Less liquid |
| Price base BSE Prices | Price base BSE prices |

**Return**

Return is the benefit associated with an investment

Total returns = income + price change

Rate of return =  $\dfrac{\text{Income + price}}{\text{Purchase price}} * 100$

**Expected return**

It is the weighted average of all possible returns.

$$\sum_{t=1}^{n} XiPi$$

$\overline{X}$ = expected return

$X_{i}$ = possible return

$P_{i}$ = probability associated with return

**Problem related to calculation of return**

1. The Price at the End Was Rs 280 and the Holder Received Dividend of Rs 25per Share. Calculate the Rate Of Return.

2. Price at the Beginning of An Equity Share Is Rs 140the Price At the End Was Rs 160.The Holder Received a Dividend of Rs 8 Per Share. Calculate The Rate of Return.

3. An Investment Provides a Return Of 10%, 20%, 30% and 40% With Probabilities Of 25%, 30%, 15% And 30%.Calculate Expected Return.

4. A Stock Costing Rs 130 Pays No Dividends. The Possible Prices That the Stock Might Sell for at the End of the Year with Respective Probabilities are

| Price | Probability |
|-------|-------------|
| 120   | 0.1         |
| 130   | 0.1         |
| 140   | 0.2         |
| 150   | 0.3         |
| 160   | 0.2         |
| 170   | 0.1         |

**Risk**

Risk refers to the degree of uncertainty and /or potential financial loss inherent in investment decision.

**Types of investment risk**

- Systematic risk
- unsystematic risk or diversifiable risk

**Sources of risk**

1) market risk
2) interest rate risk
3) purchasing power risk
4) regulation risk
5) business risk
6) reinvestment risk
7) international risk
   - exchange rate risk
   - country risk
8) Liquidity risk

**Measurement of risk**

Variance: $\sigma^2$

Co-efficient of variation (C.V) = $\dfrac{\sigma}{\overline{X}}$

Standard deviation: $\sqrt{\sigma^2}$

## Measurement of systematic risk

Beta ($\beta$)

The systematic risk of a security is measured by a statistical measure called beta.

$$\beta = \frac{r_{im}\sigma_i\sigma_m}{\sigma^2_m}$$

$\beta$ = beta of an investment in shares

$r_{im=}$correlation coefficient of the return on the shares with the returns on the market

$\sigma_{i\,=}$ SD of return on stock

$\sigma_{m=}$ SD of return of market index

$\sigma^2_m$ = variance of the returns on the market

## Interpretation of beta

Beta >1: aggressive shares

Beta <1: defensive shares

Beta = 1: neutral shares

## Correlation method

$$r = \frac{n\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{n\Sigma X^2 - (\Sigma X)^2}\,\sqrt{n\Sigma Y^2 - (\Sigma Y)^2}}$$

Standard deviation of stock

$$\sigma = \sqrt{\frac{N\Sigma X^2 - (\Sigma X)^2}{N^2}}$$

Standard deviation of BSE index

$$\sigma = \sqrt{\frac{N\Sigma Y^2 - (\Sigma Y)^2}{N^2}}$$

**Problem related to measurement of risk**

1. The return and the probability distribution of an investment are given below. The initial investment is Rs 100.calculate standard deviation.

| Return | Probability |
|--------|-------------|
| 10 | .20 |
| 20 | .30 |
| 30 | .40 |
| 40 | .10 |

2. Mr .A. considering investing in V LTD. The correlation coefficient between the company's returns and the return on the market is .876.the standard deviation of the returns on the stock is 18.68.the standard deviation of the returns on the market is 10.11.calculate the beta value.

3. The monthly return data in percent of ACC stock and BSE index is given below. Calculate beta of ACC stock.(Using correlation method)

| Month | ACC | BSE |
|-------|-------|-------|
| 1 | 8.53 | 7.56 |
| 2 | 9.65 | 8.46 |
| 3 | 12.25 | 10.30 |
| 4 | 9.00 | 12.25 |
| 5 | 13.75 | 11.75 |
| 6 | 6.65 | 9.42 |

## Regression method

$Y = \alpha + \beta X$

Y = percentage change in price of specific security

X = percentage change in market price index

$\alpha$ = intercept of regression line

$\beta$ = beta – slope of regression line

## $\alpha$ (Alpha)

It is a measure of residual risk.

$\alpha = \overline{Y} - \beta\overline{X}$

$$\beta = \frac{n\Sigma XY - (\Sigma X)(\Sigma Y)}{n\Sigma X^2 - (\Sigma X)^2}$$

## Practical problem

1. Monthly return data (in percent) for CIPLA Stock and BSE Index for a 12 month period are given below. Calculate beta under a) correlation method b) regression method

| Month | CIPLA stock | BSE index |
|-------|-------------|-----------|
| 1 | 10.27 | 11.00 |
| 2 | 9.31 | 3.69 |
| 3 | 6.73 | 4.20 |
| 4 | 5.68 | -4.93 |
| 5 | 2.60 | 3.05 |
| 6 | 2.86 | 5.88 |
| 7 | 2.78 | 3.74 |
| 8 | 3.84 | 2.63 |
| 9 | -6.51 | -2.10 |
| 10 | -23.42 | -21.35 |
| 11 | 0.00 | -4.55 |
| 12 | 6.64 | 2.80 |

## Capital asset pricing model

The capital asset pricing model (CAPM) is a model that describes the relationship between risk and expected return and that is used in the pricing of risky securities.

$r_i = r_f + \beta_i(r_m - r_f)$

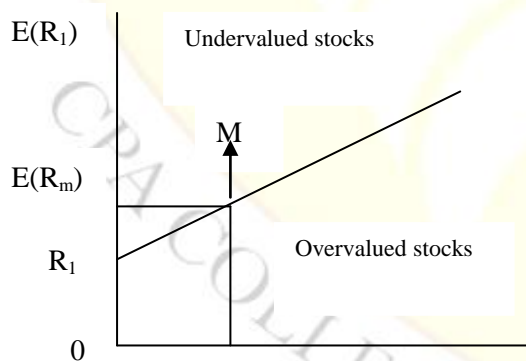$r_f$ = risk free rate

$\beta_i$ = beta of the security

$r_m$ = market return

## Practical problem

1. What is the required return on the shares if the return on the market is 11% and the risk free rate is 6%? The respective beta values are 0.5, 1.0 and 2.0.

## Security market line

The graphical representation of capital asset pricing model (CAPM) is called security market line.the line that gives the expected return/systematic risk combinations of assets in a well functioning,active financial market .



- The securities plotted above the SML,i.e the risk free rate ,are undervalued because their expected return to their risk is low
- The securities plotted below the SML are overvalued because their expected return compared to their risk is high.

**The arbitrage pricing model**

The arbitrage pricing model (APM) is a model that was developed out of the CAPM and considers various numbers of independent factors which may affect the share price.

# Module 2

## Fixed Income Securities

**Security**

Security is a type of transferable interest representing financial value.

**Types of securities**

Equities

Debt securities

Fixed income securities: fixed income securities are a type of debt instruments that provides returns in the form of regular, or fixed, interest payments and repayments of the principal when the security reaches maturity.

Debentures

Debenture is a certificate issued by the company acknowledging the debt due by it to its holders.

**Characteristics of money market instruments**

- Short-term nature
- Low risk
- High liquidity
- Close to money

**Important money market instruments**

- Treasury bills
- Commercial papers
- Certificate of deposit-CD
- Repurchase agreement(Repo)
- Banker's acceptance

**Government securities (G-Secs)**

G-secs is a tradable instrument issued by the central government or the state governments. It acknowledges the government's debt obligation.

State government securities –SGL

'Gilt edged' securities

The gilt edged securities refers to the securities issued by government, backed by the reserve bank of India (RBI).the term gilt-edged means best quality

**Advantages of Govt securities**

- Greater safety and lower volatility compared to other financial instruments
- No TDS on interest payments
- Greater diversification opportunities
- Higher leverage available in case of borrowing against G-secs

**Bonds**

- A bond is referred to as a fixed income instrument. It is a debt instrument created for the purpose of raising capital.
- Bonds are debt securities .when debt securities are issued by the government and public sector organisations.
- Bond is a long term contract in which the bondholders lend money to a company. In return, company promises to pay the bond owners a series of interest, known as the coupon payments, until the bond matures.

**Features of bonds**

- Face or par value
- Coupon or yield
- Maturity
- Quality of bond issuer
- Credit ratings

- Callable bonds
- Bond prices fluctuate inversely with market interest rates.

**Types of bonds**

- Zero coupon bond
- Deep discount bonds
- Convertible bond
- Callable and putable bonds
- Foreign bonds
- Index-linked bonds
- Junk bonds
- Strips
- Public sector undertaking bonds (PSU Bonds)
- Bonds of public financial institutions (PFIs)
- Floating rate notes

**Benefits of investing in bonds**

- Income predictability
- Safety
- Diversification
- Choice

**Types of bond risks**

- Purchasing power risk
- Default risk and credit rating
- Interest rate risk
- Price risk
- Reinvestment risk

**Valuation of bonds**

It is the process of determining the fair price of a bond.

**Estimating bond yields**

1. Coupon rate or nominal yield
2. Current yield
   **Current yield:**
   $$\frac{C}{P_0}$$

   C: Annual interest receivable from the bond

   $P_0$: Current market price of the bond

**Practical problems.**

1. An investor buys a 10% debenture of ABC Company at Rs 90.calculate the current yield on the instrument.

2. If a bond face value Rs .100 and a coupon rate of 12%, is selling for Rs 800.what is the current yield of the bond.

3. A two year bond face value of Rs 1000, issued at a discount for Rs 797.19.what is the spot interest rate.

**Spot interest rate**

Annual dividends are not paid in the case of zero coupon bonds. The return on this bond is in the form of discount on issue of the bond. The return received from a zero coupon bond is expressed on an annualised basis is the spot interest rate.

**Yield to maturity**

The yield or return on the instrument is held till its maturity.

**Assumptions**

- There should not be any default
- The investor has to hold the bond till maturity
- All the coupon payments should be reinvested immediately at the same interest rate as the same yield to maturity of the bond.

Yield to maturity from a bond is the total return, interest plus capital gain, obtained from a bond held to maturity.

**Methods for calculation YTM**

1.Formula Method

2.Trial and Error Method

**Formula method**

$$\text{Approx YTM}: \frac{C + \dfrac{F-P}{n}}{\dfrac{(F+P)}{2}}$$

C=Coupon payment

F= Face value

P=the price the investor paid for the bond

n= the number of years to maturity

**Trial and Error Method**

Equation

Coupon rate * PVFAs(yrs,%) + face value * PVFs (yrs,%)

PVFAs = present value annuity factor

PVFs = present value factor

**Yield to call (YTC)**

This is another yield measure which is commonly used in case of bonds that may be redeemed before maturity date.

$$P = \frac{C_1}{(1+K)^1} + \frac{C_2}{(1+K)^2} + \frac{C_3}{(1+K)^3} + \ldots \ldots \ldots \ldots \frac{C_n}{(1+k)^n} + \frac{M}{(1+K)^n}$$

M = call price

n = number of periods until first call date

Equation

Coupon rate * PVFA (yrs, %) + call price * PVF (yrs, %)

Calculate exact YTC by using interpolation

$$YTC = \text{Lower rate} + \left[ \frac{\text{Surplus}}{\text{Surplus} + \text{deficit}} \right] (\text{Higher rate} - \text{Lower rate})$$

**Practical problems**

1. Hilton ltd has a 14 percent debenture with a face value of Rs.100 that matures at par in 15 years. The debenture is callable in 5 years at Rs 114.it currently sell for Rs.105.calculate the following.

    1. Current yield          2.yield to call       3.yield to maturity

2. ARs .1000 face value bond bearing a coupon rate of 3.5% matures after 10 years. The expected yield to maturity is 6%.the present market price is Rs.802.can the investors buy it?

3.what is the present value of a bond with face value of Rs 1000,coupon rate 8% and maturity period of 3 years and YTM=10%

**Valuation of irredeemable bond**

$$P_0 = \frac{i}{K_0}$$

$P_0$: price of bond

i=Nominal annual interest (the coupon rate * the nominal value of the bond

$K_0$ = Market discount rate, annual return required on similar bonds.

**Practical problem:**

1. A firm has in issue irredeemable bonds with a par value of rs.1000 and a coupon rate of 18% pa.The required rate of return /YTM on these bonds is 24%.what should be the value of these bonds on the market?

**Bond price theorems**

The relation between bond prices and change in market interest rates have been stated by G.Malkiel in the form of five principles. These principles are popularly known as bond pricing theorems.

**Theorem one:** bond prices and bond yield move in opposite directions

**Theorem two:** for a given change in bond's yield to maturity, the longer the term to maturity of the bond, the greater will be the magnitude of the change in the bond's price.

**Theorem three:** for a given change in bond's yield to maturity, the size of the change in the bond's price increases at a diminishing rate as the bond's term to maturity lengthens.

**Theorem four:** for a given change in bond's yield to maturity, theabsolute magnitude of the resulting change in the bond's price is inversely related to the bond's coupon rate.

**Theorem five:** for a given change in bond's yield to maturity, the magnitude of the price increase caused by a decrease in yield is greater than the price decrease caused by an increase in yield.

**Bond duration**

The average time required for recovery of interest payments and the principal.

Bond duration can be defined as the weighted average life of the bond and reflects the time required for recovery of interest payment and principal.

$$D= \sum_{t=1}^{T} \frac{PV\,(C_1)}{P0} *T$$

D= Duration

C = cash flow

r=current yield to maturity

T=Number of years

$P_V(C)$ =Present value of the cash flow

$P_0$ = Sum of the present values of cash flow

**Practical problems**

1. A bond of Rs.1000 par value with a 7% coupon rate having a maturity period of 4 years is issued. Bond currently yields 6%.calculate the duration for the bond?

2. A bond of Rs 100 par value with a 15% coupon rate issued 4 years ago is redeemable after 6 years. Bond currently yields 14%.calculate duration of the bond.

3. Find the duration of 12% coupon bond with a face value of Rs.100 making annual interest payments, if it has five years until maturity. The bond is redeemable at 5 %premium at maturity. The market is interest rate is currently 14 %.

# Module 3

## Approaches to security analysis

**Fundamental analysis**

Fundamental analysis is a method used to determine the value of stock by analysing the financial data that is 'fundamental' to the company. This means that fundamentals analysis takes into consideration only those variables that are directed to the company itself such as its earnings, its dividends and its sales.

**Top – down and bottom –up approach**

- Top -down forecasting approach

  Economic analysis $\longrightarrow$ industry analysis $\longrightarrow$ company analysis

- Bottom up forecasting approach

  Company analysis $\longrightarrow$ industry analysis $\longrightarrow$ economic analysis

**E-I-C analysis**

- Economic (macroeconomic) analysis
- Industry analysis
- Company analysis

ECONOMIC ANALYSIS

INDUSTRY ANALYSIS
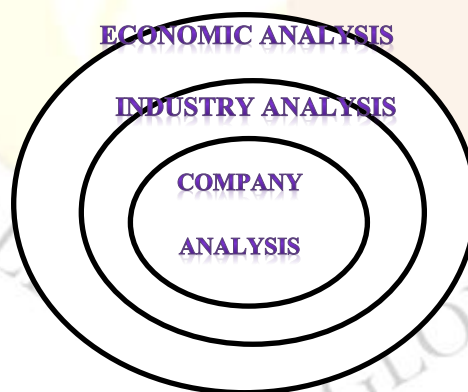
COMPANY

ANALYSIS

**Steps in fundamental analysis**

- Analysing the overall economy
- Analysing the industry in which the company operates
- Analysing the company

1. **Economic analysis**

- Agricultural growth
- Industrial growth
- Type of economy
- Business cycle
- Gross domestic product (GDP)
- Savings and investment
- Interest rates
- Price level and inflation
- Unemployment
- Government budget and deficit financing
- The tax structure
- Balance of payment ,forex reserves and exchange rate
- Infrastructure facilities
- Demographic factors
- Political stability

2. **Industry analysis**

- Product or services
- Estimating growth
- Industry life cycle
- Raw material and other inputs
- Production cost and profit
- Competitive forces
- Cyclical industries
- Capacity utilisation
- Nature of demand
- Government policy

### 3. Company analysis

- Business model
- Market share
- Customers
- Growth of sales
- Competitive advantage
- Management
- Labour and other industrial problems
- Financial analysis

### Tools of fundamental analysis

- Ratio analysis
  - Profitability ratios
  - Liquidity ratios
  - Debt ratios
  - Asset-utilization ratios
  - Market value ratios
- Earnings per share
- Price to earnings ratio(P/E Ratio)
- Project earnings growth(PEG)
- Price to sales ratio
- Price to book ratio
- Price to book ratio
- Dividend payout ratio
- Dividend yield
- Book value
- Return on equity

### Advantages of fundamental analysis

- Long term trends
- Identification of value
- Understanding about business

- Knowing company

**Limitations of fundamental analysis**

- Defective practice
- Unscientific process
- Time consuming
- Industry/company specific
- Subjectivity
- Analyst bias

**Technical analysis**

Technical analysis is the examination of price movements to forecast future price movements. The roots of modern-day technical analysis originate from the Dow Theory developed around 1900 by Charles Dow.

Technical analysis is based on two fundamental assumptions.

- Historic price
- Market does not move in a random manner

Technical analysis uses a variety of charts and calculations to spot trends in the market and individual stocks and to try to predict what will happen next.

**Assumptions of technical analysis**
- Price discounts everything
- Price move in trends
- History tends to repeat

**Main considerations in technical analysis**
- Price
- Time
- Volume
- Breadth

**Price fields**

- Open
- High
- Low
- Close
- Volume
- Open interest
- Bid
- Ask

**Advantages of technical analysis**

- Focus on price
- Trend prediction
- Entry and exit recommendations
- Provides valuable information
- Provides early signal
- Quick and less expensive

**Limitations of technical analysis**

- Lack of accuracy
- Bias of analysis
- Based on past price
- Many interpretations
- Ignore fundamental
- Lateness
- Mixed signals

**Difference between fundamental and technical analysis**

| BASIS FOR COMPARISON | FUNDAMENTAL ANALYSIS | TECHNICAL ANALYSIS |
|---|---|---|
| Meaning | Fundamental Analysis is a practice of analyzing securities by determining the intrinsic value of | Technical analysis is a method of determining the future price of the stock using charts to identify the |

| | the stock. | patterns and trends. |
|---|---|---|
| Relevant for | Long term investments | Short term investments |
| Function | Investing | Trading |
| Objective | To identify the intrinsic value of the stock. | To identify the right time to enter or exit the market. |
| Decision making | Decisions are based on the information available and statistic evaluated. | Decisions are based on market trends and prices of stock. |
| Focuses on | Both Past and Present data. | Past data only. |
| Form of data | Economic reports, news events and industry statistics. | Chart Analysis |
| Future prices | Predicted on the basis of past and present performance and profitability of the company. | Predicted on the basis of charts and indicators. |
| Type of trader | Long term position trader. | Swing trader and short term day trader. |

**Methods and tools used in technical analysis**

**Stock charts**

This uses charts to identify recognisable trends and pattern in the formation of stock price.

**Quantitative analysis**

This uses various statistical properties to help assess the extent of an overbought /oversold currency.

**Stock charts**

It gained popularity in the late 19<sup>th</sup> century from the writings of Charles. Dow in the wall street journal.

A chart is a visual representation of data, in which the data is represented by symbols such as lines in a line chart, bars in a bar chart or candles in a candlestick chart.

A stock chart is a simple two axis(X-Y) plotted graph of price and time.

# Types of charts

- Line charts
- Bar charts
- Candlestick charts
- Point and figure charts

## Line charts



- Line chart is the simplest type of stock chart. This is the most basic type of chart and is created by joining a series of closing prices together
- The single line represents the security's closing price on each day.
- Dates are displayed bottom of the chart and prices are displayed on the side.

## Bar charts

- Bar is a symbol created by connecting a series of price points, typically used to illustrate movements in the price of stocks for a time period.
- A bar chart has a few components such as closing price on the right side of the bar and the opening price depicted on the left side of the bar.
- Top of the vertical line indicates the highest price a security traded during the day
- Bottom line represents the lowest price.
- They are also known as OHLC charts or open –high-low-close charts.

**Candlestick charts**
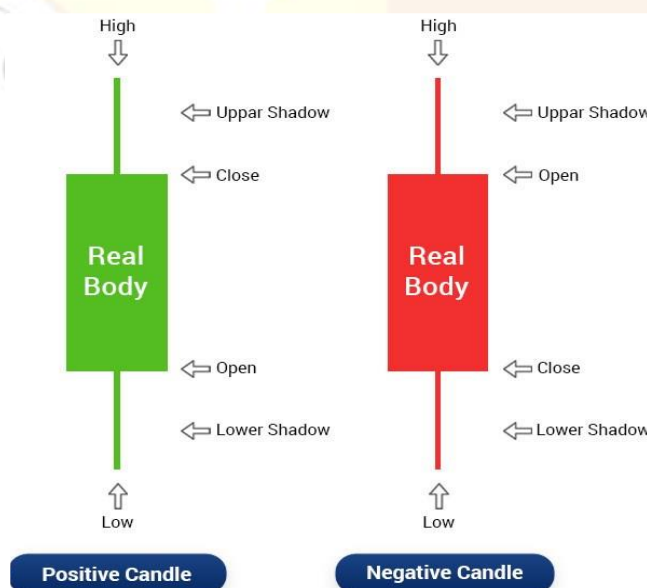
- A candlestick chart (also called Japanese candlestick chart) is a style of financial chart used to describe price movements of a security, derivative, or currency. Each "candlestick" typically shows one day, thus a one-month chart may show the 20 trading days as 20 candlesticks. The chart received its name because its markers or indicators have a body shaped like a candle.
- It displays the open, close, daily high and low price.
- A candlestick is composed of three parts; upper shadow, lower shadow and body. Body is coloured green or red.
- Bullish candle: when the close price is higher than open price (green or white)
  Bearish candle: when the close is lower than the open (red or black)
- Upper shadow :vertical line between the high of the day and the close (bullish candle) or open (bearish candle)
- Lower shadow : The vertical line between the low of the day and the open (bullish candle) or close (bearish candle)
- Real body : difference between open and close ;coloured portion of candlestick

**Point and figure charts**
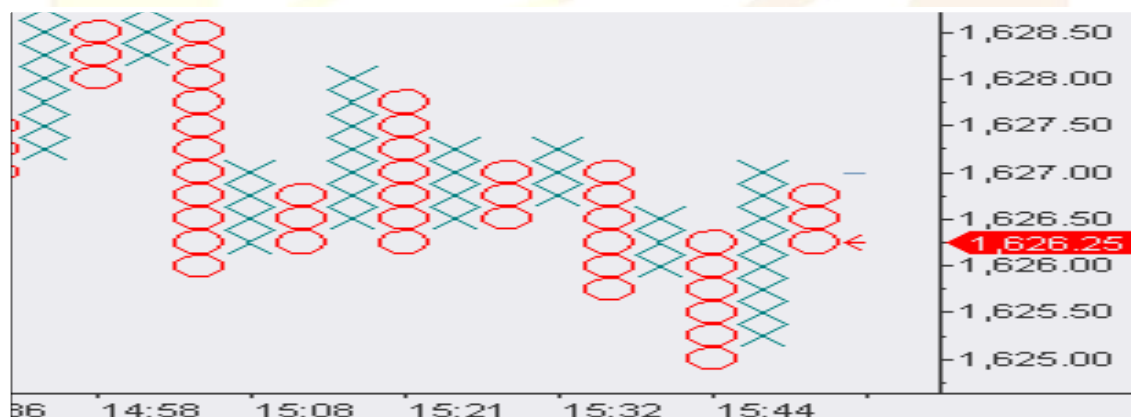


- Point and figure is a charting technique used in technical analysis. Point and figure charting does not plot price against time as time-based charts do. Instead it plots price against changes in direction by plotting a column of Xs as the price rises and a column of Os as the price falls.
- Point and figure based on price only.so it is known as one dimensional-they do not take into account time or volume.

**Tools of technical analysis**

- Trend lines
- Chart patterns
- Market indicators

**Trend lines**

A trend line is a straight line that connects two or more price points and then extends into the future to act as a line of support or resistance. Many of the principles applicable to support and resistance levels can be applied to trend lines as well.

**Types of trend lines**

- Uptrend line: An uptrend line is a straight line drawn upward to the right that connects 2 or more low points. The second low must be higher than the first for the line to have an upward incline. Uptrend lines act as support and indicate that there is more demand than supply, even as the price rises.
- Down trend line: When Prices keep moving downwards it is said to be a falling trend. Falling trends are defined by trend lines that are drawn between two or more peaks (high points) to identify price resistance.it has a negative slope and is formed by connecting two or more high points.
- Flat or neutral line: If the prices are moving in narrow range, the trend can be said as flat one.
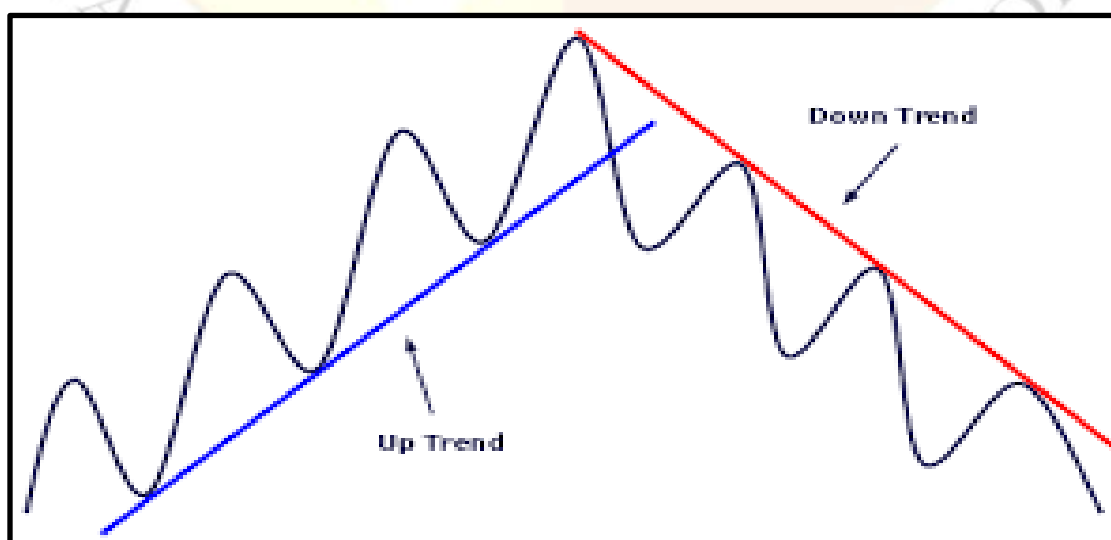
**Chart patterns**

Chart patterns are simply more complex versions of trend lines.it can be used to make short term or long term forecasts. Some well-known patterns include

1. SUPPORT AND RESISTANCE LEVEL
2. CUP AND HANDLE
3. HEAD AND SHOULDER
4. DOUBLE TOPS AND BOTTOMS
5. FLAGS & PENNANTS
6. TRIANGLE
7. WEDGES
8. GAPS
9. RECTANGLE

**1. SUPPORT AND RESISTANCE LEVEL**

A **support level** is a level where the price tends to find support as it falls. This means that the price is more likely to "bounce" off this level rather than break through it.

A **resistance level** is the opposite of a support level. It is where the price tends to find resistance as it rises. Again, this means that the price is more likely to "bounce" off this level rather than break through it.

## 2. CUP AND HANDLE

- A cup and handle is a technical chart pattern that resembles a cup and handle where the cup is in the shape of a "u" and the handle has a slight downward drift.
- A cup and handle is considered a bullish signal extending an uptrend, and is used to spot opportunities to go long.
- Technical traders using this indicator should place a stop buy order slightly above the upper trend line of the handle part of the pattern.
- The cup and handle both continuation and reversal pattern



The Cup and Handle Pattern

## 3. HEAD AND SHOULDER

- A head and shoulders pattern is a technical indicator with a chart pattern described by three peaks, the outside two are close in height and the middle is highest.
- A head and shoulders pattern describes a specific chart formation that predicts a bullish-to-bearish trend reversal.
- The head and shoulders pattern is believed to be one of the most reliable trend reversal patterns.

## 4. DOUBLE TOPS AND BOTTOMS

### DOUBLE TOPS

- A double top is an extremely bearish technical reversal pattern that forms after an asset reaches a high price two consecutive times with a moderate decline between the two highs.
- When the underlying investment moves in a similar pattern to the letter "M"
- It is not as easy to spot as one would think because there needs to be a confirmation with a break below support.

**DOUBLE BOTTOMS**

- A double bottom pattern is a technical analysis charting pattern that describes a change in trend and a momentum reversal from prior leading price action.
- It describes the drop of a stock or index, a rebound, another drop to the same or similar level as the original drop, and finally another rebound.
- The double bottom looks like the letter "W". The twice-touched low is considered a support level.
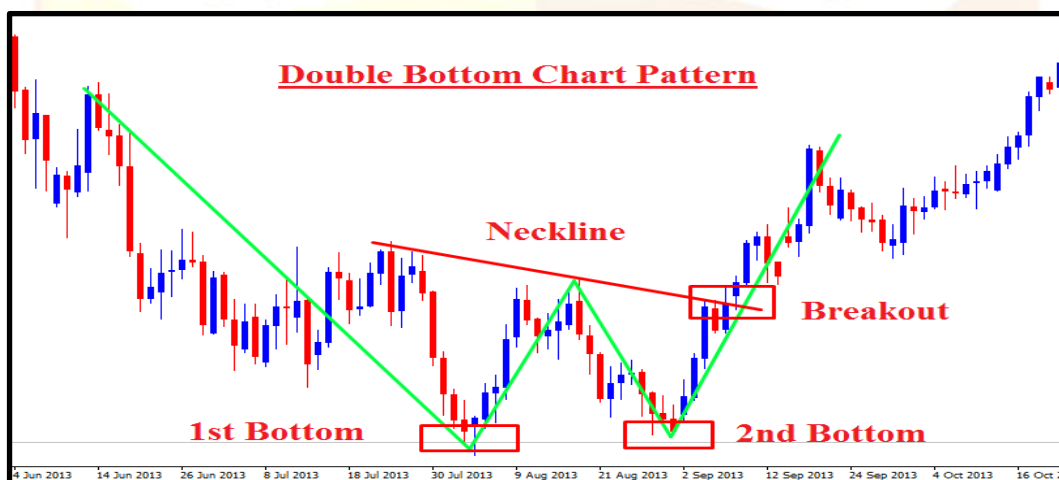


**5. TRIANGLE**

- In technical analysis, a triangle is a continuation pattern on a chart that forms a triangle-like shape.
- Triangles are similar to wedges and pennants and can be either a continuation pattern, if validated, or a powerful reversal pattern, in the event of failure.
- There are three potential triangle variations that can develop as price action carves out a holding pattern, namely ascending, descending, and symmetrical triangles.
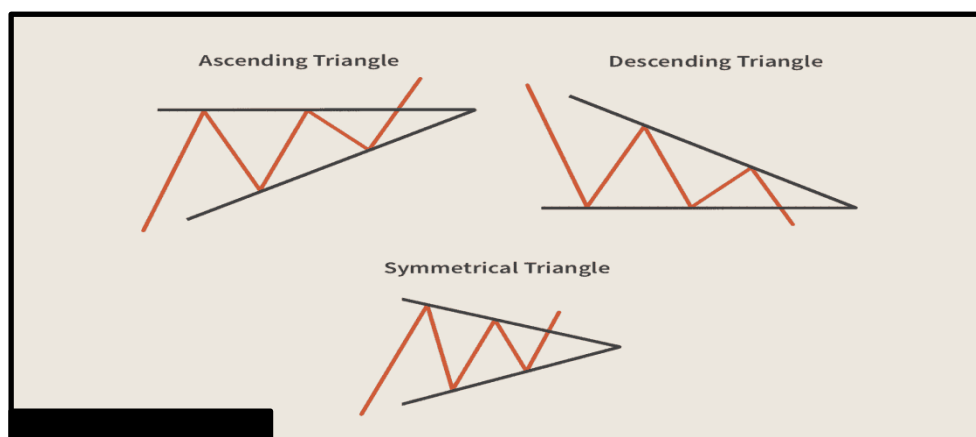
## 6. FLAGS & PENNANTS

## FLAGS

- The flag pattern is encompassed by two parallel lines. These lines can be either flat or pointed in the opposite direction of the primary market trend. The pole is then formed by a line which represents the primary trend in the market.
- The pattern, which could be bullish or bearish, is seen as the market potentially just taking a "breather" after a big move before continuing its primary trend.



## PENNANTS

In technical analysis, a pennant is a type of continuation pattern formed when there is a large movement in a security, known as the flagpole, followed by a consolidation period with converging trend lines - the pennant - followed by a breakout movement in the same direction as the initial large movement, which represents the second half of the flagpole.

## 7. WEDGES

- Wedge patterns are usually characterized by converging trend lines over 10 to 50 trading periods.
- The patterns may be considered rising or falling wedges depending on their direction.
- These patterns have an unusually good track record for forecasting price reversals.
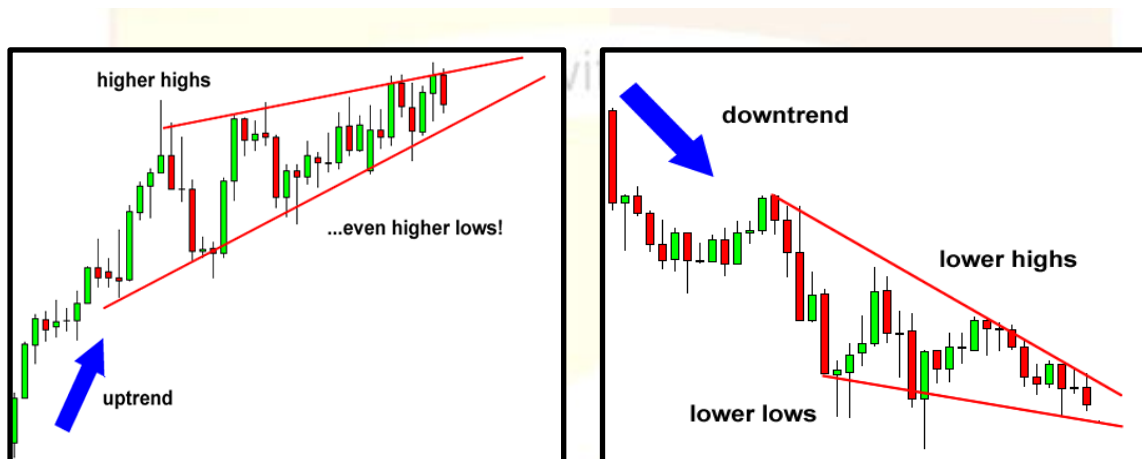


## 8. GAPS

- A gap is defined as an unfilled space or interval. On a technical analysis chart, a gap represents an area where no trading takes place. On the Japanese candlestick chart, a window is interpreted as a gap.
- In an upward trend, a gap is produced when the highest price of one day is lower than the lowest price of the following day. Conversely, in a downward trend, a gap occurs when the lowest price of any one day is higher than the highest price of the next day.

## 9. RECTANGLE

A rectangle is a chart pattern formed when price is bounded by parallel support and resistance levels. The price will "test" the support and resistance levels several times before eventually breaking out. From there, the price could trend in the direction of the breakout, whether it is to the upside or downside.
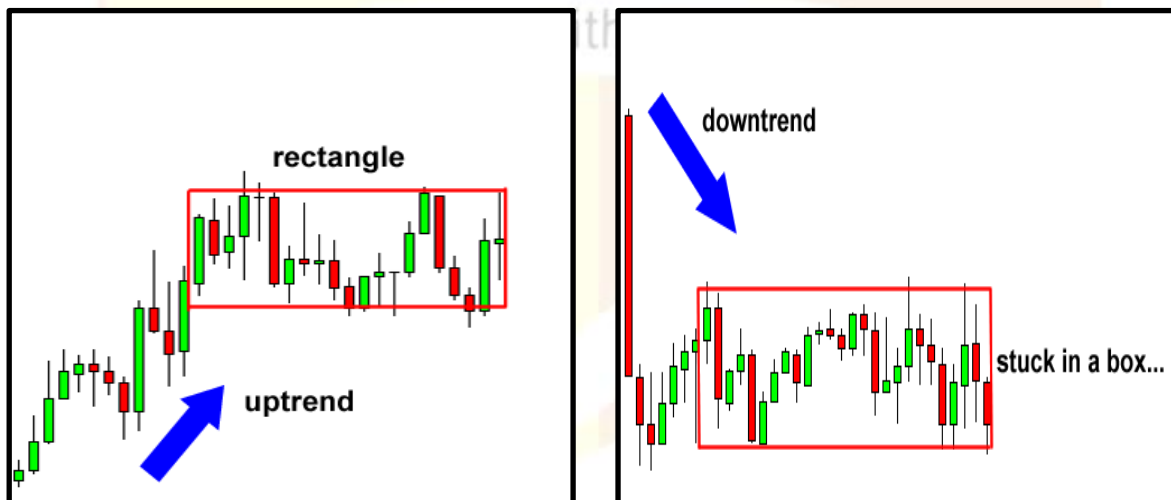


**Indicators and oscillators**

**Indicators**

Indicators represent a statistical approach to technical analysis .it primarily uses the price and volume of stocks to get further insight into the price movement of a security. They help a technical analyst to confirm trends, judge a chart quality, understand volumes and thus derive BUY/SELL signals.

- Two primary types of indicators
1. Leading indicators
2. Lagging indicators

## 1. Moving averages

The moving average (MA) is a simple technical analysis tool that smooths out price data by creating a constantly updated average price. The average is taken over a specific period of time, like 10 days, 20 minutes, 30 weeks or any time period the trader chooses.

**Two types of moving average**

- Exponential moving average(EMA)
- Simple moving average(SMA)

  A simple moving average (SMA) calculates the average of a selected range of prices, usually closing prices, by the number of periods in that range.
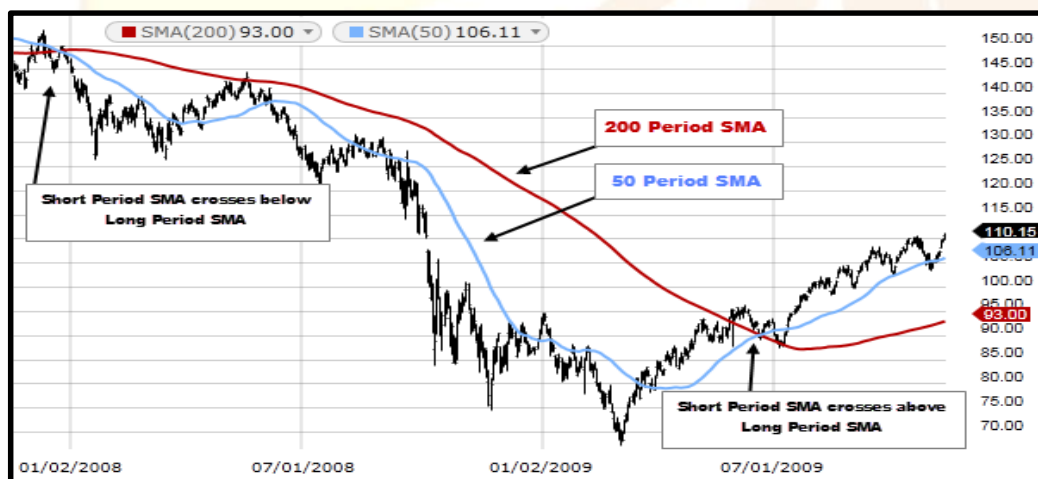
  E.g.: 5-day moving average evolving over three days
  Daily closing prices: 20,21,22,23,24,25,26

  First day of 5-day SMA: (20+21+22+23+24)/5: 22
  Second day of 5-day SMA :( 21+22+23+24+25)/5:23
  Third day of 5-day SMA: (22+23+24+25+26)/5:24



**2. Exponential moving average (EMA)**

An exponential moving average (EMA) is a type of moving average (MA) that places a greater weight and significance on the most recent data points. The exponential moving average is also referred to as the exponentially weighted moving average.

**The formula for exponential moving average is as follows:**

EMA = (current closing price – previous EMA) × Weighting factor +previous EMA

Weighting factor =2/(period + 1)

## Market breadth

Breadth indicators are mathematical formulas that measure the number of advancing and declining stocks, and/or their volume, to calculate the participation in a stock index's price movements. By evaluating how many stocks are increasing or decreasing in price, and how much volume these stocks are trading, breadth indicators help in confirming stock index price trends, or can warn of impending price reversals.

Market breadth: Rising Stocks /Falling Stocks

Market breadth >1: bullish signal

Market breadth <1: bearish signal

## Advance –decline line

The advance/decline line (A/D) is a technical indicator that plots the difference between the number of advancing and declining stocks on a daily basis. The indicator is cumulative, with a positive number being added to the prior number, or if the number is negative it is subtracted from the prior number.

A/D Line = (No of advancing stocks –No of declining stocks) + previous periods A/D line value.

- When A/D Line is positive ,more stocks advancing than declining and the A/D Line moves up
- When A/D Line is negative, more stocks declining than advancing and the A/D Line moves down.
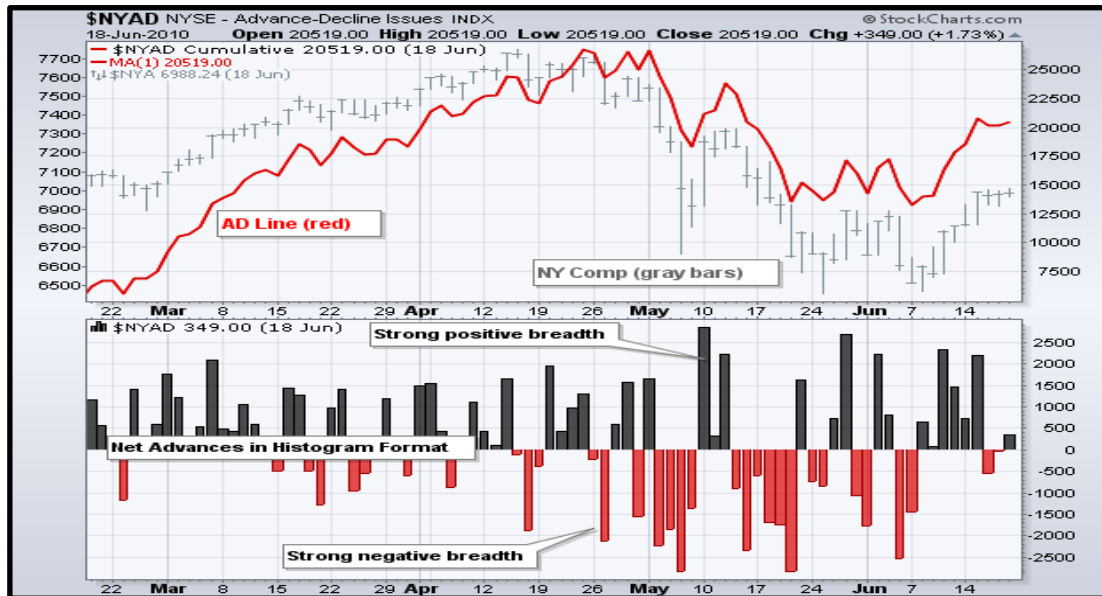
**Market momentum and volume**

Market momentum is the ability of a market to sustain an increase or decrease in prices. Market momentum is a function of a price change during a specific period of time versus the trading **volume** during that period. In other words, high trading volume increases the market momentum of a price change and vice versa.

**3. Relative strength index (RSI)**

The relative strength index (RSI) is a momentum indicator used in technical analysis that measures the magnitude of recent price changes to evaluate overbought or oversold conditions in the price of a stock or other asset.

RSI: 100 – [100/ (1+RS)]

RS = (Avg.gain per day)/ (avg loss per day)

n = days (most analyst use 9-15 days RSI)

**Oscillators**

An oscillator is an indicator that fluctuates above and below a centerline or between set levels as its value changes over time. Oscillators can remain at extreme levels (overbought or oversold) for extended periods, but they cannot trend for a sustained period.

Oscillators are divided as

- Centred oscillators
- Banded oscillators

1. **Moving average convergence and divergence**

Moving Average Convergence Divergence (MACD) is a trend-following momentum indicator that shows the relationship between two moving averages of a security's price. A nine-day EMA of the MACD called the "signal line," is then plotted on top of the MACD line, which can function as a trigger for buy and sell signals.
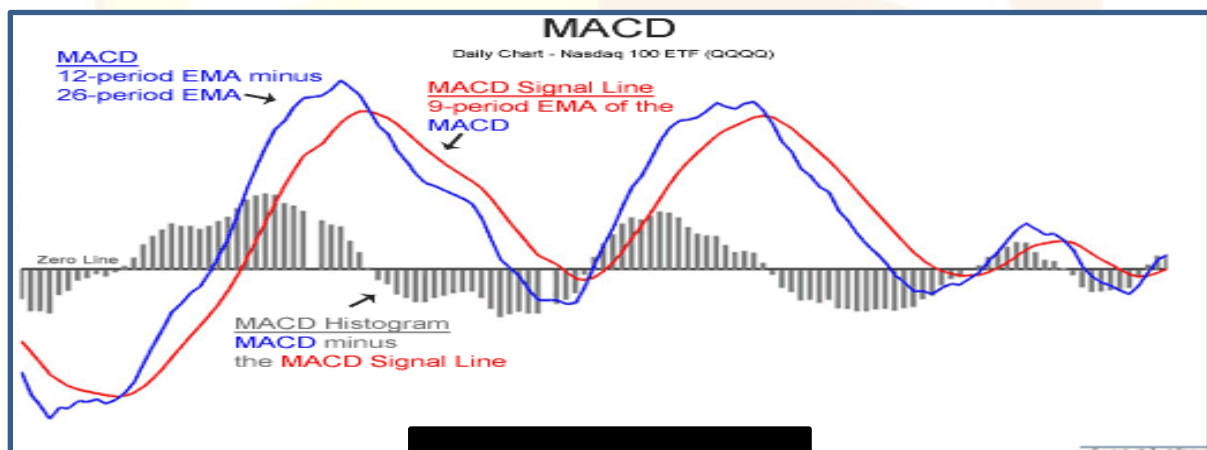


**2. Rate of Change**

The rate of change (ROC) Indicator, which is also called momentum, is a pure momentum oscillator that measures the percent change in price from one period to the next. The ROC calculation compares the current price with the price "n" periods ago.

- In general prices are rising as long as the rate of change remains positive and prices are falling when the rate of change is negative.

Momentum (M) = CCP - OCP

**3. Stochastic oscillator**

A stochastic oscillator is a momentum indicator comparing a particular closing price of a security to a range of its prices over a certain period of time.

The stochastic oscillator displayed as two lines

- The main line is called "%K". %K also known as "stochastic fast", tracks the current market rate for the stock.
- The second line, called "%D" is a moving average of %K. It is referred to as "stochastic slow".

**%K =** 100 × (Closing price –lowest price of N Periods)/(highest price of N Periods – lowest price of N Periods)

%D=3-period moving average of %K

**Dow Theory**

- Charles Dow developed Dow Theory from his analysis of market price action in the late 19th century.
- Some of the most important contributions to Dow theory were
  William P Hamilton, Robert Rhea, E-George Schaefer and Richard Russell .
- It is necessary to understand this theory in order to get a clear idea about technical analysis. Dow Theory mainly focused on price.
- The theory identified three types of price movements or trends namely
  a) Primary trend

  Three stages of primary trend

  (i) Primary bull market
  1. Accumulation
  2. Public participation or big move
  3. Excess
  ii) Primary bear market
  1. Distribution
  2. Public Participation or Big Move
  3. Panic or Despair
  **b)** Secondary (reaction) trend

  **c)** Minor trends or daily fluctuations

**Efficient market theory**

Efficient market theory holds that markets operate efficiently because at any given time, all publicly known information is factored into the price of any given asset. This means that an investor can't get ahead of the market by trading on new information because every other trader is doing the same thing.

**Assumptions**

- Information is free and quick to flow.
- All investors have the same access to information
- Transaction costs, taxes and any bottlenecks are not there and not hampering the free forces of market
- Every investor has access to lending and borrowing at the same rate.
- Market absorbs the information quickly and the market responds to new technology, new trends, changes in tastes and habits of consumers etc... Efficiently and quickly.

**Forms of market efficiency**

1) Strong form
2) Semi strong form
3) Weak form

**Random walk theory**

- The random walk theory states that market prices evolve at random and do not follow any regular pattern. Hence price cannot be predicted.
- The hypothesis was popularized by Murton malkeil.
- The theory says that future stock prices are completely independent of past stock prices.
- The path that a stock's price follows is a "random walk" that cannot be determined from historical price information, especially in the short term.
- The prices move in a random fashion like the walk of drunkard, each move independent to the other.

**Assumptions**

- Market is supreme and no individual investor or group can influence it.
- Stock prices discount all information's quickly

- Markets are efficient and that the flow information is free and unbiased

- Nobody has better knowledge or insider information

- These prices move in an independent fashion, within undue pressures or manipulation

- Investors behave in a rational manner and demand a supply forces are the result of rational investment decisions.

**Criticism of the theory**

- One of the criticisms to the random walk theory is that it ignores the trends in the market and various momentum factors that have an impact on the prices.

- With the availability of real time data and almost instant executions, individuals can act on information like never before

- Another criticism states that the stock market is vast and there are a countless number of elements that can have a large impact on stock prices.

**Elliot wave theory**

The Elliott Wave Theory was developed by Ralph Nelson Elliott to describe price movements in financial markets, in which he observed and identified recurring, fractal wave patterns. Waves can be identified in stock price movements and in consumer behaviour.

- Investors trying to profit from a market trend could be described as "riding a wave".

- A large, strong movement by homeowners to replace their existing mortgages with new ones that have better terms is called a refinancing wave.

- According to this theory there are eight waves.it states that in general there will be 5 waves in given direction followed by usually what is termed and ABC correction or 3 waves in the opposite direction.

- Out of the 5 waves, 3 waves are in the direction of the movement and are called impulse waves.

- Two waves are against the direction of the movement and are called corrective waves or reaction waves.

Elliott Wave Movement
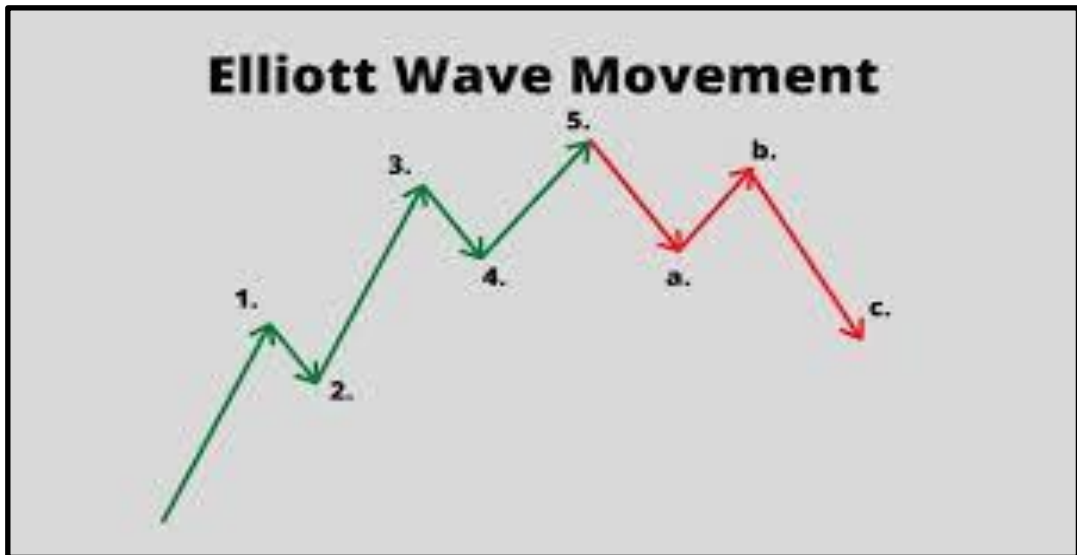
In this figure wave 1, 3 and 5 are the impulse waves and waves 2 and 4 are the corrective waves.

**Wave 1**: the stock makes its initial move upwards.

**Wave 2**: the stock is considered as overvalued.

**Wave 3**: it is a longest and strongest wave. More people found out about the stock, more people want the stock and they buy it for a higher price.

**Wave 4**: at this point people again take profits because the stock is again considered expensive.

**Wave 5**: this is the point that most people buy the stock and is most driven by hysteria and not guided by reasons.

**ABC Correction**

An ABC correction is when the stock will go down /up/down in preparing for another 5 way cycle up. During this time frame volatility is usually much less than the previous 5 wave cycle, and what is generally happening is the market is taking a pause while fundamentals catch up.

…………………
…………………

**Equity valuation**

In finance, valuation is a process of determining the fair market value of an asset. Equity valuation therefore refers to the process of determining the fair market value of equity securities.

It is the process of estimating the intrinsic value for common stocks.

**Time Value of money**

The time value of money (TVM) is the concept that money you have now is worth more than the identical sum in the future due to its potential earning capacity. TVM is also sometimes referred to as present discounted value.

**Compounding**

The process of computing the future value, based on initial amount, the interest per period and the number of years is called compounding.

$$FV = PV (1+r)^n$$

FV = Future value

PV = present value

r = the interest rate per period

n = the number of compounding periods

**Example**

1. Mr .A gives to Mr.B ₹100.Mr .B takes it to the bank. They will give him 10% interest per year for 2 year. What will be the future value?

   Solution

   $FV = PV (1+r)^n$

   $FV = ₹100 (1+.1)^2$

   $FV = ₹100 (1.1)^2$

   $FV = ₹100 (1.21)$

   $FV = ₹121$

**Discounting**

The process of finding present value based on future value, the interest rate and the number of periods, is known as discounting.

$$PV = \frac{FV}{(1+r)^n}$$

**Example**

1. What is the present value of ₹1000 to be received after 5 years if it to be invested at 6% per annum.

   Solution

   $PV = F/(1+r)^n$
   $PV = ₹1000 / (1+.06)^5$
   $PV = ₹1000 / 1.338$
   $PV = ₹747.38$

**Multipel approach to equity valuation**

- Asset based valuation
- Relative valuation
- Discount cash flow valuation

**Equity valuation models**

- Dividend discount models
- Price ratio models

**Dividend discount models**

It is a method used to value stocks that uses the theory that a stock is worth the sum of all future dividends.

- Dividend capitalizations models
- Dividend growth models

**Dividend capitalizations models**

- Single period valuation models

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

$P_0$ = the current price of the stock

$D$ = the dividend paid at the end of one year

$k$ = required return on equity investments

$P_1$ = the selling price at the end of period one

**Example**

1. An investor would like to get a dividend of 30 paisa from a share and want to sell it next year for ₹60 after keeping it for one year. The required rate is 20%.what will be the present value of this share?

<u>Solution</u>

Here $k = 0.20$    $D_1 = ₹0.30$   $P_1 = ₹60$

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

$$P_0 = \frac{.30}{1.20} + \frac{60}{1.20}$$

$$= 0.25 + 50$$

$$= Rs\ 50.25$$

- Multiperiod valuation model

$$P_0 = \frac{D_1}{(1+K)} + \frac{D_2}{(1+K)} + \ldots \frac{D_n}{(1+K)^n} + \frac{P_n}{(1+K)^n}$$

$$P_0 = \Sigma \frac{D_n}{(1+k)^n} + \frac{P_1}{(1+K)^n}$$

$P_0$ = the current price of the stock

$D_1, D_2, D_3, D_n$ = the annual dividend to be received each year

$K$ = required return on equity investments

$Pn$ = the selling price at the end of the holding period

$N$ = holding period in years

**Example**

1. An investor expects to get a dividend of ₹3,₹4 and ₹5 from a share during the next three year and hope to sell it at ₹80 at the end of the third year. The required rate of return is 20%.what will be the present value of share to the investor.

Solution

$$P_0 = \Sigma \frac{D_n}{(1+k)^n} + \frac{P_1}{(1+K)^n}$$

$$P_0 = \frac{3}{(1.20)^1} + \frac{4}{(1.20)^2} + \frac{5}{(1.20)^3} + \frac{80}{(1.20)^3}$$

= 2.5+2.78+2.89+46.30

= Rs 54.47

**Dividend growth models**

- Constant growth model

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

$P_0$ = price

$D_1$ = the next dividend . $D_1 = D_0(1+g)$

k=requires rate of return

k=growth rate

$D_0$ = the last dividend

**Example**

1. Last year's dividend of a company is ₹40.the expected growth rate is 5 %.rate of return is 10%.find the value of equity share?

Solution

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

$$P_0 = \frac{D_0(1+g)}{(K-g)}$$

$$P_0 = \frac{40(1+0.05)}{(0.10-0.05)}$$

$$= Rs\ 840$$

- The multiple growth model

$P_0 = V1 + V2$

$$V1 = \frac{D_1}{(1+K)^1} + \frac{D_2}{(1+K)^2} +... \frac{D_n}{(1+K)^n}$$

$$V1 = \sum_{t=1}^{n} \frac{D_t}{(1+k)^1}$$

Second phase dividends would be

$$D_N+1=D_N(1+g)^1$$

$$D_N+2=D_N(1+g)^2$$

$$D_N+3=D_N(1+g)$$

Gordon share valuation models

$$P_0= \frac{D_N(1+g)}{(k-g)}$$

$$V2= \frac{D_N(1+g)}{(k-g)(1+k)^N}$$

The present value of two periods V1+V2 may be added to give the intrinsic value of the share. Hence the valuation model will be as shown below

$$V1=\sum_{t=1}^{n} \frac{D_t}{(1+k)^1} + \frac{D_N(1+g)}{(k-g)(1+k)^N}$$

**Example**

1. A Company paid dividends amounting to ₹0.75 per share during the last year. The company is expected to pay ₹ 2 per share during the next year. Investors forecast a dividend of ₹ 3 per share in the year after that .then it is expected that dividends will grow at 10 percent per year into an indefinite future. Would you buy or sell the share if the current price of the share is ₹54.investors required rate of return is 15 percent.

Solution

$$V1= \frac{D_1}{(1+K)^1} + \frac{D_2}{(1+K)^2} +....... \frac{D_n}{(1+K)^n}$$

$$V1= \frac{2}{(1+0.15)^1} + \frac{3}{(1+0.15)^2}$$

$$=1.74+2.27$$

$$=4.01$$

$$V2= \frac{D_N(1+g)}{(k-g)(1+k)^N}$$

$$V2= \frac{3(1+.10)}{(0.15-0.10)(1+0.15)^2}$$

$$=49.91$$

$P_0 =$ Intrinsic value

$=V1+V2$

$=4.01+49.91$

$=$ Rs 53.92

The current market price of the share is ₹54 which is almost equal to its intrinsic value of ₹ 53.92.Hence neither buying or selling is recommended.

**Multiplier approach**

- Price to earnings (P/E) approach

$$(P/E) \text{ ratio} = \frac{\text{market price of share}}{\text{Earnings per share}}$$

Stock price $=$ EPS $\times$ P/E Ratio

**Limitations of P/E Approach**

- Quality of earnings
- Low predictability
- Capital expenditure
- Different growth rates

**Valuation of preference shares**

Preference share provide fixed income to the investors.

$$P_0 = \frac{D}{r}$$

D= the dividend paid

r = the required rate of return

**Example**

1. The annual dividend from a preference share is ₹ 5 and the required rate of return is 10 percent. What is it worth today?

Solution

$$P_0 = \frac{D}{r}$$

$$\frac{5}{.10} = Rs\ 50$$

# MODULE 4

# PORTFOLIO ANALYSIS

## Portfolio Analysis

Portfolio analysis is an examination of the components included in a mix of products with the purpose of making decisions that are expected to improve overall return... It might also refer to an investment portfolio composed by securities.

## Types of portfolios

- Aggressive portfolio
- Conservative portfolio
- Efficient portfolio

## Portfolio management

Portfolio management is the art and science of selecting and overseeing a group of investments that meet the long-term financial objectives and risk tolerance of a client, a company, or an institution.

## Objectives of portfolio management

- Stable current return
- Marketability
- Tax planning
- Appreciation in the value of capital
- Liquidity
- Safety of the investment.

## Portfolio management process

- Setting the objectives
- Selection of asset mix
- Formulation of portfolio strategy
- Security analysis

- Portfolio execution
- Portfolio revision
- Performance evaluation

**Portfolio and diversification**

Portfolio diversification is the process of investing your money in different asset classes and securities in order to minimize the overall risk of the portfolio.

**Portfolio return**

- Portfolio return refers to the gain or loss realized by an investment portfolio containing several types of investments.
- Portfolios aim to deliver returns based on the stated objectives of the investment strategy, as well as the risk tolerance of the type of investors targeted by the portfolio.

$$R_P = \sum_{t=1}^{n} x_i r_i$$

$R_P$= Return on the portfolio

$x_i$= proportion of total portfolio invested in security -1

$r_i$=expected return of security – 1

**Example 1**

There two equity shares, A and B in a portfolio with expected return of 20 and 30 percent respectively. Total fund invested between A and B is 40% and 60%.compute expected return.

Solution

Expected return of stock –A = (0.40×20) =8

Expected return on stock –B = (0.60 ×30) = 18

Total Expected return =8+18 = 26 percent

**Portfolio risk**

Portfolio risk is a chance that the combination of assets or units, within the investments that you own, fail to meet financial objectives. Each investment within a portfolio carries its own risk, with higher potential return typically meaning higher risk.

1. **Covariance**

Covariance is the statistical measure used to measure portfolio risk.

$$Cov_{xy}= \frac{\sum\limits_{t=1}^{n} (R_x - \overline{R_x})(R_y - \overline{R_y})}{N}$$

$\backslash R_x$= Return on security X

$R_y$=Return on security Y

$\overline{R_x}$ =Expected return on X

$\overline{R_y}$=Expected return on Y

N=Number of observations

**Interpretation**

- If the returns of the two securities move in the same direction consistently the covariance would be positive and the risk is more on such portfolio.
- If the returns of the two securities move in the opposite direction consistently the covariance would be negative and the risk is lower on such portfolio.

## 2. Correlation

Dividing the covariance between two securities by product of the standard deviation of each securities by product of the standard deviation of each security gives such a standardised measure. It is called coefficient of correlation.

$$r_{xy} = \frac{Cov_{xy}}{\sigma_x \sigma_y}$$

$r_{xy}$ = coefficient of correlation between X and Y

$Cov_{xy}$ is the covariance between X and Y securities

$Cov_{xy} = r_{xy}\sigma_x\sigma_y$

### Example 1

The return of two securities X and Y for a four years period is given below. Calculate co variance.

| Year | Return X | Return Y |
|------|----------|----------|
| 1 | 10 | 17 |
| 2 | 12 | 13 |
| 3 | 16 | 10 |
| 4 | 18 | 8 |

Solution

| year | Return ($R_X$) | Deviation ($R_X-\overline{R_X}$) | Return $R_Y$ | Deviation ($R_Y-\overline{R_Y}$) | Product of deviation ($R_X-R_X$)($R_Y-R_Y$) |
|------|------|------|------|------|------|
| 1 | 10 | -4 | 17 | 5 | -20 |
| 2 | 12 | -2 | 13 | 1 | -2 |
| 3 | 16 | 2 | 10 | -2 | 4 |
| 4 | 18 | 4 | 8 | -4 | 16 |
| Mean return | 56/4=14 | | 48/4=12 | | -42 |

$$\text{Cov}_{xy}= \frac{\sum\limits_{t=1}^{n} (R_x - \overline{R_x})(R_y-\overline{R_y})}{N}$$

$$= -42/4$$

$$=10.5$$

**Example 2**

The return and expected return of stock X and Y for two periods is given below.

| Period | stock | return | expected return |
|--------|-------|--------|-----------------|
| Period-1 | X | 7 | 9 |
| | Y | 13 | 9 |
| Period – 2 | X | 11 | 9 |
| | Y | 5 | 9 |

Solution

| Return $R_X$ | Deviation From expected return | Return $R_Y$ | Deviation From expected return | Product of deviation |
|-----|-----|-----|-----|-----|
| 7 | -2 | 13 | 4 | -8 |
| 11 | 2 | 5 | -4 | -8 |
| | | | | -16 |

$$\text{Cov}_{xy}= \frac{\sum\limits_{t=1}^{n} (R_x - \overline{R_x})(R_y-\overline{R_y})}{N}$$

$$= -16/2$$

$$= -8$$

The coefficient of correlation can be calculated as follows

$$r_{xy} = \frac{Cov_{xy}}{\sigma_x \sigma_y}$$

$$= \frac{-8}{(2) \times (4)}$$

$$= -1$$

## Portfolio risk of two securities

The relationship between each security in the portfolio with every other security as measured by the covariance of return has also to be considered. The variance of a portfolio with only two securities in it may be calculated as under

$$\sigma_p^2 = X_X^2 \sigma_X^2 + X_y^2 \sigma_y^2 + 2X_X X_Y (r_{xy} \sigma_x \sigma_y)$$

$\sigma_p^2$ = portfolio variance

$X_X$ = proportion of portfolio invested in security X

$X_y$ = proportion of portfolio invested in security Y

$\sigma_X^2$ = Variance of Security X

$\sigma_y^2$ = Variance of Security Y

$\sigma_X$ = Standard deviation of security X

$\sigma_y$ = Standard deviation of security Y

$r_{xy}$ = Correlation coefficient between X and Y

**Example 1**

Given the following example, find out the expected risk of the portfolio

| Security | Expected return % | Proportion of investment % | SD |
|----------|-------------------|----------------------------|-----|
| ACC | 10 | 40 | 0.2 |
| DCM | 15 | 60 | 0.3 |

Correlation coefficient between these two securities is 0.5

<u>Solution</u>

$$\sigma_p^2 = X_X^2\sigma_X^2 + X_y^2\sigma_y^2 + 2X_XX_Y(r_{xy}\sigma_x\sigma_y)$$

$$\sigma_p^2 = (0.40)^2(0.2)^2 + (0.6)^2(0.3)^2 + 2(0.4)(0.6)((0.5)(0.2)(0.3))$$

$$= 0.0064 + 0.0324 + 0.0144$$

$$= 0.0532$$

$$\sigma_p = \sqrt{0.0532}$$

Portfolio risk = 0.231

**Portfolio with more than two securities**

Risk –return calculation of portfolio with more than two securities

**Expected portfolio return**

$$R_P \quad = \sum x_i r_i$$

**Portfolio variance**

$$\sigma p^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} x_i\, x_j\, \sigma_{ij}$$

$\sigma p^2$ = Portfolio variance

n    n

$\sum$    $\sum$ = Double summation means $N^2$ numbers are to be added

i= 1   j= 1

$X_1$ = proportion of money invested in security i

$X_j$ = proportion of money invested in security j

$\sigma_{ij}$ = the covariance between pair of securities i and j

n = total number of securities in the portfolio

**Example 1**

The estimates of the standard deviations and correlation coefficients for three stocks are given below

| Stock | Security | Correlation with stock | | |
|-------|----------|------|------|------|
| | | A | B | C |
| A | 32 | 1 | -0.8 | 0.4 |
| B | 26 | -0.8 | 1 | 0.65 |
| C | 18 | 0.4 | 0.4 | 1 |

The proportions of investments are 0.15 of stock A, 0.50 of stock B and 0.35 of stock Calculate the portfolio variance.

<u>Solution</u>

Variance and co variance matrix

| Weight | Security | 0.15 | 0.5 | 0.35 |
|--------|----------|------|-----|------|
| | | A | B | C |
| 0.15 | A | (1*32*32) | (-0.8*32*26) | (0.4*32*18) |
| 0.5 | B | (-0.8*26*32) | (1*26*26) | (0.65*26*18) |
| 0.35 | C | (0.4*18*32) | (0.65*18*26) | (1*18*18) |

Simplified form of co-variance matrix

| Weight | Security | 0.15 | 0.5 | 0.35 |
|--------|----------|------|-----|------|
|        |          | A    | B   | C    |
| 0.15   | A        | 1024 | -666 | 230 |
| 0.5    | B        | -666 | 676 | 304  |
| 0.35   | C        | 230  | 304 | 324  |

$\sigma p^2$ = (0.15 ×0.15×1024) + (0.15×0.5×-666) + (0.15×0.5×230) + (0.5×0.15×676) + (0.5×0.35×304) + (0.35 ×0.15×230) + (0.35 ×0.5×304) + (0.35 ×0.355×324)

=262.38

Portfolio standard deviation is

$\sqrt{57.37} = 7.57$

**Markowitz model**

The foundation for modern portfolio theory ("MPT") was established in 1952 by harry Markowitz. The most important aspect of Markowitz model was his description of the impact on portfolio diversification by the number of securities within a portfolio and their covariance relationships. Markowitz started with the idea of risk aversion of average investors and their desire to maximise the expected return with the least risk. He used the statistical analysis for measurement of risk and mathematical programming for selection of assets in a portfolio in an efficient manner.

Markowitz introduced the concept of diversification.Accordding to this concept; a combination of securities will significantly reduce the overall risk of a portfolio. Risk and reward are two aspects of investment considered by investors.

Harry Markowitz model (HM model),is also known as mean variance model because it is based on the expected return (mean) and the standard deviation (variance) of different portfolios, helps to make the most efficient selection by analysing various portfolios of the given assets.

**Assumptions**

- Investors are rational. They seek to maximize returns while minimizing risk.
- Investors are only willing to accept higher amounts of risk if they are compensated by higher expected returns.
- Investors timely receive all pertinent information related to their investment decisions.
- Investors can borrow or lend an unlimited amount of capital at a risk free rate of interest.
- Markets are perfectly efficient and absorb information quickly and perfectly.
- Markets do not include transaction costs or taxes.
- It is possible to select securities whose individual performance is independent of other portfolio investments.

**Efficient portfolio**

An efficient portfolio is either a portfolio that offers the highest expected return for a given level of risk, or one with the lowest level of risk for a given expected return. The line that connects all these efficient portfolios is the efficient frontier.

**Efficient frontier**

The concept of efficient frontier was also introduced by Markowitz.it is a graphical representation of all the possible mixtures of risky assets for an optimal level of return given any level of risk, as measured by standard deviation. The chart given below shows a hyperbola showing all the outcomes for various portfolio combinations of risky assets. Standard deviation is plotted on X axis and return is plotted on the Y axis.

For every level of return, there is one portfolio that offers the lowest possible risk, and for every level of risk, there is a portfolio that offers the highest return. These combinations are plotted on graph, and the resulting line is the efficient frontier.
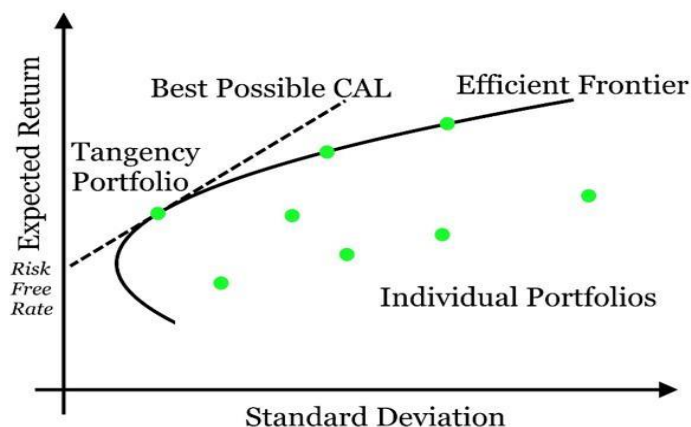
The straight line (capital allocation line) represents a portfolio of all risky assets and the risk free assets. Tangency portfolio is the point where the portfolio of only risky assets meets the combination of risky and risk free assets. This portfolio maximizes return for the given level of risk.

- Lower part of the hyperbola will have lower return and eventually higher risk.
- Portfolio to the right will have higher returns but also higher risk.
- Any portfolio lies on the upper part of the curve is efficient; it gives the maximum expected returns for a given level of risk.

**Optimal portfolio**

Harry Markowitz introduced the idea of the optimal portfolio in 1952.the concept of "optimal portfolio "comes from the modern portfolio theory.

This model shows that it is possible for different portfolios to have different levels of risk and return. This means that individual investors should determine how much risk they are willing to take on, and then they can allocate or diversify their portfolios according to the results of that decision.

The optimal portfolio aims to balance securities with the greatest potential returns with an acceptable degree of risk or securities with the lowest degree of risk for a given level of potential return.

The selection of the optimal portfolio thus depends on the investor's risk aversion, or conversely on his risk tolerance. This can be graphically represented through a series of risk return utility curves or indifference curve.



$u_1$, $u_2$, $u_3$ = indifference curves with $u_1 < u_2 < u_3$
$P^*_{MEF}$ = optimal portfolio on Markowitz efficient frontier
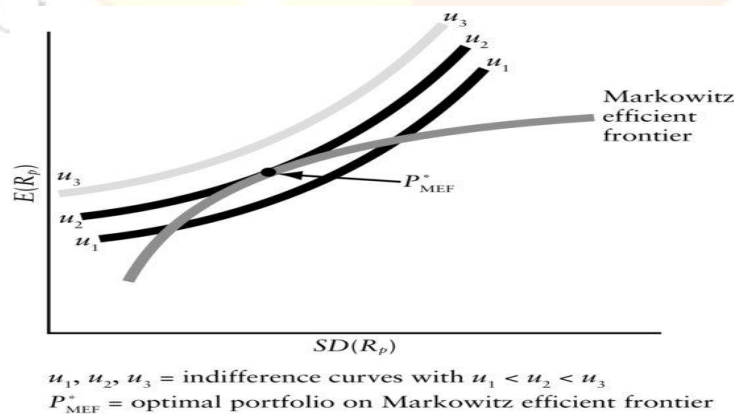
Each indifference curve represents different combinations of risk and return all of which are equally satisfactory to the concerned investor. Each successive curve moving upward to the left represents a higher level satisfaction or utility.

The optimal portfolio for an investor would be the one at the point of tangency between the efficient frontier and the risk return utility or indifference curve.

**Portfolio analysis with index model**

Number of securities increases and results in a large co-variance matrix, which in turn results in a more complex computation. Due to these practical difficulties, in 1963 William Sharpe has developed a simplified single index model(SIM) for portfolio analysis is taking concept from Markowitz's concept of index for generating covariance terms. Simplification is achieved through index models.

**Two types of index models**

- Single index models
- Multiple index models

**Single index model**

The Single Index Model (SIM) is an asset pricing model, according to which the returns on a security can be represented as a linear relationship with any economic variable relevant to the security. In case of stocks, this single factor is the market return.

When the market moves up, prices of most shares also tend to increase. When the market goes down, the prices of most shares tend to decline. Thus the return of an individual security is assumed to depend on the return on the market index.

The return of individual security may be expressed as

$$R_i = \alpha_1 + \beta_i R_m + e_i$$

$\alpha_1$ = Component of security i's return that is independent of the market's performance.

$\beta_i$ = Constant that measures the expected change in $R_i$ given a change in $R_m$

$R_m$ = Rate of return on the market index

**e$_i$ =** Error term representing the random or residual item

**Measurement of Security under Single Index Model**

$$R_i = \alpha_1 + \beta_i \overline{R_m}$$

**Example 1**

Estimated value of beta of a security is 2 and alpha is 3 and market return is 15%.calculate the expected return of security under single index model.

Solution

$Ri = \alpha_1 + \beta i \overline{R_m}$

3+2(15)=33%

**Measurement of security risk under single index model**

$$\sigma_1{}^2 = \beta_i{}^2 \, \sigma^2{}_m + \sigma^2 ei$$

$\sigma_1{}^2$ = Variance of Individual Security

$\sigma^2{}_m$ =Variance of Market Index Return

$\sigma^2 ei$ =Variance of Residual Return of Individual Security

$\beta_i$ =Beta Coefficient T Of Individual Security

**Example 1**

Estimated value of beta square of a security is 2 and the variance of market index return is 120, variance of residual return of individual security is 400.calculate variance under single index model.

Solution

$$\sigma_1^2 = \beta_i^2\, \sigma_m^2 + \sigma^2ei$$

$$= 2\times120 + 400$$

$$= 640$$

**Portfolio return under single index model**

$$\overline{R}_P = \alpha_p + \overline{\beta}_p R_m$$

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

$w_i$ = proportion of investment in individual security

$\alpha_i$ = specific return of individual security

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

$w_i$ = proportion of investment in individual security

$\beta_i$ = beta coefficient of individual security

**Portfolio risk under single index model**

$$\sigma_p^2 = \left(\beta_p\right)^2 \sigma_m^2 + \sum_{i=1}^{n} w_i^2 \sigma_{ei}^2$$

$\left(\beta_p\right)^2 \sigma_m^2$  = systematic risk

$\sum_{i=1}^{n} w_i^2 \sigma_{ei}^2$  = weighted average of variances of residual return of security $\beta_p$

**Example 1**

A portfolio consists of four securities with the following features

| Security | Weight | Alpha | Beta | Residual variance |
|----------|--------|-------|------|-------------------|
| A | 0.4 | 1 | 1.2 | 320 |
| B | 0.2 | 2 | 0.8 | 450 |
| C | 0.1 | 0.8 | 1.6 | 270 |
| D | 0.3 | 1.6 | 1.3 | 180 |

Calculate the return and risk of the portfolio under single index model if the return on market is 13% and the standard deviation of return on market index is 12%.

Solution

The total portfolio return can be calculated as follows

$$\overline{R}_P = \alpha_p + \beta_p \overline{R}_m$$

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

$(0.4)(1) + (0.2)(0.2) + (0.1)(0.8) + (0.3)(1.6)$

$=1.36$

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

$(0.4)(1.2) + (0.2)(0.8) + (0.1)(1.6) + (0.3)(1.3)$

$= 1.19$

$$\overline{R}_P = \alpha_p + \beta_p \overline{R}_m$$

$= 1.36 + (1.19)(13)$

$= 16.83$

Total portfolio risk can be calculated as follows

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

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

$= (0.4)^2(320) + (0.2)^2(450) + (0.1)^2(270) + (0.3)^2(180)$

$51.2 + 18 + 2.7 + 16.2$

$=88.1$

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

$(1.19)^2(13)^2 + 88.1$

$239.32 + 88.1$

$=327.4209$

Hence standard deviation of portfolio is

$\sigma_p = \sqrt{327.42} = 18.09$

**Multi index model**

Multi index model considers the extra factors like inflation, economic growth, interest rate etc… that cause securities to move together.

$$R_i = \alpha_i + \beta_m R_m + \beta_1 R_1 + \beta_2 R_2 + \beta_3 R_3 + ei$$

According to this model return of individual security is a function of following four factors.

1. The general market factor – $R_m$

2. Three extra market factors – $R_1, R_2, R_3$

Return and risk of individual securities as well as portfolio return and variance can be calculated in the same pattern used in the case of single index model .beta coefficient ,alpha, and residual term also have the same meaning used in the single index model

Calculation is same as to single index model.

# Module 5
## Investor protection

**Investor**

An investor is a person that allocates capital with the expectation of a future financial return or to gain an advantage. Types of investments include: equity, debt securities, real estate, currency, commodity, token, derivatives such as put and call options, futures, forwards, etc.

**Types of investors**

- Individual investors are not experienced
- Experienced investors
- Occasional investors

**Investor protection**

The term investor protection is a wide term including various measures designed to protect the investors from malpractices of companies, merchant bankers, depositary participants and other intermediaries.

Investors are heterogeneous group and they all need equal degree of protection for their invested amount from the corporate securities.

**SEBI & role of stock exchanges in investor protection**

The Securities and Exchange Board of India is the regulator of the securities and commodity market in India owned by the Government of India. It was established on 12 April 1988 and given Statutory Powers on 30 January 1992 through the SEBI Act, 1992.

SEBI acts as a watchdog for all the capital market participants and its main purpose is to provide such an environment for the financial market enthusiasts that facilitate efficient and smooth working of the securities market.

The Indian capital market were regulated and resolved by capital issues (control) act 1947

Principles and policies under the control act were regulated by controller of capital issues (CCI).according to Narasimha committee observations; financial market needs a single regulatory authority which should be able to regulate all the activities in the securities market. Later on the CCI was closed and SEBI was established in year 1992.

**Functions of SEBI**

A) A review of the market operations, organizational structure and administrative control of the exchange
B) Registration and Regulation of the Working of Intermediaries
C) Registration and Regulation of Mutual Funds, Venture Capital Funds &Collective Investment Scheme
D) Promoting & Regulating Self-Regulatory Organizations
E) Prohibiting fraudulent and unfair trade practices in the Securities Market
F) Prohibition of Insider Trading
G) Investor Education and the training of Intermediaries

**Objectives of SEBI**

- Maintaining a conductive environment
- Encourage education among investors
- Development of infrastructure
- Fair and proper functioning.

**SEBI's investor protection strategy has four elements**

- Building capacity of investors
- Make proper disclosure
- Make transaction safe
- Redressal of investor grievances

**Investor's grievances and Redressal system**

- Grievances against listed companies

- Grievances against stock brokers and depository participants

- Grievances against intermediaries

- Investor's grievances relating to refund

- Regulatory action against suspended companies

- Issuance of no objection certificate (NoC)

- Information on liquidated and sick companies

- Grievances relating to brokers and sub brokers

**Difficulties in existing grievance Redressal system**

- No centralised database

- Delay in redressal

- Loss /misplacement of records

- Required large storage space

**Measures taken by SEBI to handle grievance redressal**

- Establishment of centralized data base

- Disclosure and investor protection (DIP) guidelines

- Investors protection fund (IPF)

- Investor awareness program

- The role of AMFI(association of mutual funds in India)

- Compensation to the investors

**Insider trading**

**Definition**

Insider trading is defined by the black's law dictionary in the following words-"the use of Material non-public information in trading the shares of the company by a corporate insider or any other person who owes a fiduciary duty to the company"

**Meaning**

Insider trading is the trading of a public company's stock or other securities based on material, non-public information about the company. In various countries, some kinds of trading based on insider information is illegal.

Insiders trading is the purchase or sale of securities by individuals, usually brokers, who have access to price sensitive information that is not readily available to the public, and are exploiting this information for personal gain.

**Different types of insider trading cases are as follows**

- Corporate officers ,directors, and employees who traded the corporations securities after learning of significant ,confidential corporate developments
- Friends, business associates, family members, and other "tippees" of such officers, directors, and employees, who traded the securities after receiving such information.
- Employees of law, banking, brokerage and printing firms who were given such information to provide services to the corporation whose securities they traded.
- Government employees who learned of such information because of their employment by the government.
- Other persons who misappropriated and took advantage of confidential information from their employers.

**Unpublished price sensitive information**

Unpublished Price Sensitive Information (UPSI) means any information which relates to the internal matter of a company and is not disclosed by the company in the regular course of business. If such information is leaked, it affects the price of securities of the company in the stock market.

The following information would be considered as the price sensitive information within the purview of the SEBI regulations

- Periodical financial results of the company
- Intended declaration of dividends(both interim and final)

- Issue of securities or buy back of securities

- Any major expansion plans or execution of new projects

- Amalgation ,mergers and takeovers

- Disposal of the whole or substantial part of the undertaking

- Significant changes in policies, plans or operations of the company

**Share dealing code**

The share dealing code of the company is an important governance code to prevent any insider trading activity by dealing in shares of the company. The code restricts the directors of the company and other specified employees to deal in the securities of the company on the basis of any unpublished price sensitive information available to them by virtue of their position in the company.

A copy of the share dealing code of the company is made available to all the employees of the company and the compliance of the same is ensured.

**Investor awareness**

Investor Awareness is a term used in investor relations, by public companies and similar bodies, to describe how well their investors, and the investment market in general, know their business. Its significance is that investors are expected to base their investment decisions on awareness and knowledge, and a lack of these may lead to a low profile amongst its peers in the market (i.e. competing businesses and investment opportunities), to the detriment of the business.

**Rights as a shareholder**

- To receive the share certificates, on allotment or transfer (if opted for transaction in physical mode) as the case may be .in due time.
- To receive copies of the annual report containing the balance sheet, the profit & loss account and the auditor's report
- To participate and vote in general meetings either personally or through proxy.
- To receive dividends in due time once approved in general meetings.

- To receive corporate benefits like rights, bonus etc. once approved

- To apply to company law board (CLB) to call or direct the annual general meeting.

- To inspect the minutes books of the general meetings and to receive copies thereof.

- To proceed against the company by way of civil or criminal proceedings

- To apply for the winding up of the company

- To receive the residual proceeds

- To receive offer to subscribe to right shares in case of further issue of shares.

- To demand a poll on any resolution

- To requisite an extra ordinary general meeting

**Responsibilities as a security holder**

- To be specific

- To remain informed

- To be vigilant

- To participate and vote in general meetings

- To exercise his rights on his own or as a group

**Measure taken for investor awareness**

- Securities market awareness campaign(SMAC)

- Workshops

- Advertisement

- Educative materials

- All India radio

- Website dedicated to investor education

- Cautionary message on television

- Internet based response system

- Investor awareness program by BSE

- BSE training institute

- BSE's official website

**Investor activism**

Investor activism can be defined as "a shareholder or group of shareholders in a publicly traded company that tries to make changes in management and/or operations in a way that suits the shareholder(s)'interests"

**Advantages of investor activism**

- High pressure to the management
- Generating new ideas
- Increase in stock price
- Some changes in the management

**Drawbacks of investor activism**

- Reduction in share price
- Activism for personal interest
- Activists are not always right
- Activists are not consistent

**Regulatory framework of SEBI**

- SEBI Act ,1992
    1. Protecting the interests of investors in securities
    2. Promoting the development of the securities market
    3. Regulating the securities market
- The companies act, 1956, which sets the code of conduct for the corporate sector in relation to issuance, allotment and transfer of securities and disclosures to be made in public issues.
- The securities contracts (regulation) Act, 1956, which provides for the regulation of transactions in securities through control over stock exchange.

- The depositories act 1996 which provides for electronic maintenance and transfers of ownership of demat (dematerialized) shares.

    1. Making securities of public limited companies freely transferable, subject to certain expectations.

    2. Dematerialising the securities in the depository mode

    3. Providing for the maintenance of ownership records in a book entry form.

☐ The prevention of money laundering act ,2002