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SALEM - 636 011, Tamil Nadu, India.

CENTRE FOR DISTANCE AND ONLINE EDUCATION

(CDOE)

MASTER OF COMMERCE

SEMESTER - I

ELECTIVE PAPER I A
SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

(Candidates admitted from 2024 onwards)

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SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

UNIT I - SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT
Investment — Meaning — Nature and scope of Investment — Investment vs Speculation – Type of Investors – Investment Avenues – Factors influencing the investment choice – Portfolio Management Meaning and significance, Active Vs. Passive portfolio management – Strategic Vs. Tactical asset allocation-Factors Affecting Investment Decisions in Portfolio Management.

Meaning, types and significance of Investment and Portfolio Management

UNIT OBJECTIVES

This unit aims to equip learners with a comprehensive understanding of investment principles, portfolio management strategies, and their practical applications. By exploring fundamental concepts like investment types, investor behavior, and risk management, participants will gain insights into diverse investment avenues and the strategies employed in optimizing portfolios. Real-life case studies will illustrate the impact of economic factors, market dynamics, and ethical considerations on investment decisions, fostering critical thinking and strategic

planning skills in financial management.

1.1. INTRODUCTION OF INVESTMENT

Investment is the act of putting money into something, such as stocks, bonds, real estate, or a business, with the hope that it will grow in value over time. People invest to increase their wealth, generate income, or achieve financial goals like buying a house, funding education, or saving for retirement.

Investing involves some level of risk, but it also offers the potential for rewards. The key to successful investing is understanding how much risk you are willing to take and diversifying your investments to protect against losses. In essence, investment is about making your money work for you to build a better financial future.

1.1.1 MEANING OF INVESTMENT

An investment is an asset or item acquired to generate income or gain appreciation. Appreciation is the increase in the value of an asset over time. It requires the outlay of are source today, like time, effort, and money for a greater pay off in the future, generating a profit.

1.1.2 TYPES OF INVESTMENT

Stocks or Equities A share of stock is a piece of ownership of a public or private company. The investor may be entitled to dividend distributions generated from the company's net profit. The stock's value can also grow and sell for capital gains. The two primary types of stocks to invest in are common and preferred.

Bonds or Fixed-Income Securities An investment that often demands an upfront investment, and pays recurring interest over time, called a coupon payment. At maturity, the investor receives the capital invested into the bond. Like debt, bond investments are a mechanism for governments and companies to raise money.

Index Funds or Mutual Funds Index and mutual funds aggregate specific investments to craft one investment vehicle. An investor can buy shares of a single mutual fund that owns shares of multiple companies. Mutual funds are actively managed while index funds are often passively managed. This means that the investment professionals overseeing the mutual fund are trying to beat a specific

benchmark, while index funds attempt to imitate a benchmark.

Real Estate Real estate investments are investments in physical, tangible spaces that can be utilized. Land can be built on, office buildings can be occupied, warehouses can store inventory, and residential properties can house families. Real estate investments may encompass acquiring sites, developing sites for specific uses, or purchasing ready-to-occupy operating sites.

Commodities Raw materials such as agriculture, energy, or metals are commodities. Investors can invest in tangible commodities, like owning a bar of gold, or choose alternative investment products that represent digital ownership such as a gold ETF. Oil and gas are considered commodities.

Collectibles Collecting or purchasing collectibles involves acquiring rare items in anticipation of those items increasing in value and demand. From sports memorabilia to comic books, these physical items often require substantial physical preservation, considering that older items usually carry higher value.

Cryptocurrency A blockchain-based currency used to transact or hold digital value. Cryptocurrency companies can issue coins or tokens that may increase in value. These tokens can be used to transact with. Cryptocurrency can be staked on a blockchain where investors agree to lock their tokens on a network to help validate transactions. These investors are rewarded with additional tokens.

1.1.3 CHARACTERISTICS OF INVESTMENT

1. Risk and return
2. Liquidity
3. Time horizon
4. Diversification
5. Inflation protection
6. Tax efficiency
7. Market volatility
8. Investment goals
9. Psychological factors
10. Cost efficiency

Risk and Return

Risk refers to the possibility of not achieving expected returns or experiencing losses. Higher risk is typically associated with higher potential returns, requiring alignment of risk tolerance with investment choices.

Liquidity

Liquidity denotes how quickly an investment can be converted into cash without affecting its value significantly. Cash is the most liquid asset, while real estate and certain investments may have lower liquidity.

Time Horizon

Time horizon is the duration an investor intends to hold an investment before needing access to funds. Short-term investments focus on immediate gains, medium-term on growth or financial milestones, and long-term on compounding returns.

Diversification

Diversification involves spreading investments across different asset classes, sectors, and regions to mitigate risk. It helps achieve more stable returns by balancing performance across different economic scenarios.

Inflation Protection

Certain investments, like commodities, real estate, and inflation-linked securities, act as hedges against inflation. They aim to preserve or increase the value of investments in the face of rising prices.

Tax Efficiency

Tax efficiency optimizes after-tax returns by managing the tax impact of investment decisions. Utilizing tax-advantaged accounts and strategies like tax-loss harvesting can enhance long-term returns.

Market Volatility

Market volatility refers to rapid fluctuations in asset prices due to economic data, geopolitical events, or investor sentiment. Long-term investors should focus on their

goals and use strategies like dollar-cost averaging to manage volatility.

Investment Goals

Goals such as retirement planning, education funding or home buying guide investment strategies. They determine asset allocation and risk tolerance, aligning investments with specific financial aspirations.

Psychological Factors

Psychological biases like fear of missing out or loss influence investor behavior. Awareness and education help in making rational decisions and maintaining a disciplined investment approach.

Cost Efficiency

Cost efficiency minimizes expenses associated with acquiring, managing, and selling investments. Choosing low-cost options such as index funds or ETFs can enhance overall returns by reducing management and transaction fees.

1.1.4 OBJECTIVES OF INVESTMENT

The need for investment will grow as you move ahead in life. Growing responsibilities will demand an increase in investment. The primary objectives of investment are listed below

Safeguard your Money

Investing keeps your money safe from immediate and unnecessary expenditures. It also helps you keep your money safe from inflation effects. Inflation erodes the value of your money unless it is invested in an interest-earning asset. Thus, investing will help you automatically keep up with inflation.

Grow your Savings

Investment is the only way to start growing your invested money. It allows your money to earn interest and if you keep the interest invested it will also start to earn interest.

Build Funds for Emergencies

Life is usually a series of ups and downs. Few times you are earning decent and saving money while other times you need a large sum for an emergency. Building investment pools help you on such rainy days.

Secures your Retired Life

Retired life is where you don't have a source of income to sustain your life. Once you have built a retirement corpus, you can experience the freedom that comes with it.

Save Tax

Investment in tax-saving instruments like life insurance plans, ULIPs, PPF, NPS, etc allows you to claim deductions on your taxable income. Thus, investing in specific assets can help you reduce your tax liability. Many of these investments also help you reduce your future tax with tax-free maturity values.

Fund Bigger Life Goals

Your monthly income will not be enough to purchase your next car or build a house for your family. However, if you invest a small sum in a few years both could be possible.

1.1.5 SCOPE OF INVESTMENT

1. **Diversification** Spreading your investments across a variety of asset classes, such as stocks, bonds, real estate, and commodities, can help to manage risk and potentially increase returns.

2. **Long-term investing** Instead of trying to time the market, consider taking a long-term approach to invest. This can involve investing in a diverse portfolio of assets and holding onto them for several years or more.

3. **Risk management** It's important to carefully consider the risks associated with any investment and to ensure that your portfolio is properly diversified. This can help to mitigate the impact of any potential losses.

4. **Research and due diligence** It's always a good idea to thoroughly research any investment before committing your money. This can involve looking at the track record of the investment, the management team, and the underlying fundamentals of the asset.

1.1.5. SCOPE OF INVESTMENT MANAGEMENT

The scope of investment management is vast and will eventually expand even more in the upcoming years. Some of the future trends will include the following-

Asset Allocation

Investment managers must allocate assets across different asset classes, such as stocks, bonds, and real estate, to achieve the client's investment goals.

Investment Analysis

Analyze securities and financial instruments to make informed investment decisions.

Risk Management

Manage risks associated with investments, such as market risk, credit risk, and liquidity risk.

Portfolio Management

Manage portfolios of investments on behalf of clients, taking into account the client's investment objectives and risk tolerance.

Performance Reporting

Investment managers must provide regular performance reports to clients, outlining investment returns, fees, and expenses.

1.1.6 INVESTMENT VS SPECULATION

Meaning of Speculation

Speculation involves making investment decisions based on market fluctuations and short-term opportunities to capitalize on price movements. It is characterized by

High Risk Speculators accept a high level of risk, with the potential for significant losses.

Short-term Focus Speculative investments are typically short-term, ranging from days to months.

Market Sentiment Decisions may be influenced by rumors, market trends, and speculative tips rather than in-depth research.

High Potential Returns Speculators aim for unusually high returns, often exceeding those achievable through traditional investments.

Aggressive Approach Speculators often adopt a bold and aggressive stance, willing to take chances for potentially large gains.

Examples of speculative investments include day trading, investing in cryptocurrencies, commodities trading, and ventures with high volatility such as start-up companies or exploration stocks in mining.

Meaning of Investment

Investment, on the other hand, is a deliberate and strategic approach to allocating funds with the goal of generating sustainable returns over the long term. Key characteristics include

Lower Risk Investments are typically chosen based on thorough research, historical performance, and economic fundamentals, aiming to minimize risk.

Long-term Horizon Investors commit to assets for extended periods, often years or decades, to benefit from compounding returns and economic growth.

Fundamental Analysis Investment decisions are grounded in fundamental analysis, including market research, financial statements, and economic forecasts.

Stable Returns Investors prioritize stable returns and the preservation of capital, seeking reasonable and predictable profits over time.

Conservative Approach Investors maintain a cautious and disciplined approach, considering the long-term implications of their decisions.

Examples of investments include stocks of established companies (blue-chip stocks), government bonds, real estate, mutual funds, and retirement savings accounts.

Difference between Speculation and Investment

SPECULATION	INVESTMENT
Meaning	
Executing a dangerous monetary exchange or venture or investment with the assumption for high benefit making that can go wayward.	Purchasing of a share or an asset or anything for getting steady returns or benefits.
Investors' Point of View	
Indiscreet and forceful conduct.	Wary and helpful.
Presumption of the Returns	
An undeniable degree of profits and benefits with high disappointment is the likelihood.	Unassuming and nonstop with a low likelihood of disappointment.
Level of Risk	
The risk and likelihood of disappointment are high in speculation.	The gamble level is moderate in contributing.
Similitude	
The reason for speculating is additionally to acquire high benefits.	The principal point of putting is to acquire benefits later on.
Time Horizon or Duration	
Speculations are like shortcuts and take less time to give outcomes. But these outcomes can go one way or another.	Venture takes significant stretches to give results.
Examples	
Betting, momentum contributing, development stocks, foreign monetary standards, digital forms of money.	The financial exchange, saving accounts, Government securities, factor contributing, shared assets, and so on.

1.1.7 Types of Investment

1. **Stocks** Buying shares in a company to earn money from dividends and stock price increases.

2. **Bonds** Lending money to a company or government in exchange for regular interest payments and getting your money back later.

3. **Real Estate** Buying property to earn rental income or sell at a higher price.

4. **Mutual Funds** Pooling money with other investors to buy a diversified mix of stocks and bonds, managed by professionals.

5. **ETF's(Exchange-Traded Funds)** Similar to mutual funds but traded on stock exchanges like individual stocks.

6. **Savings Accounts** Bank accounts that pay interest on your deposited money.

7. **Certificates of Deposit (CDs)** Bank accounts with a fixed interest rate and fixed term, usually offering higher interest than regular savings accounts.

8. **Commodities** Investing in physical goods like gold, oil, or agricultural products.

9. **Cryptocurrencies** Digital currencies like Bitcoin that can be used for transactions or held as an investment.

10. **Real Assets** Investing intangible items like art, collectibles, or precious metals.

Let's Sum Up

In this Section serves as an introduction to the world of investment, distinguishing it from speculation. It covers the fundamental principles of investment, emphasizing the importance of making informed decisions based on thorough research and analysis. Learners explore the various types of investors, including retail investors, institutional investors, and high net worth individuals (HNWIs), each with distinct goals and strategies. The module highlights the differences between investment and speculation, where investment focuses on long-term growth and stability, while speculation involves higher risk and seeks short-term profits based on market fluctuations and rumors.

SECTION 1.1 INTRODUCTION TO INVESTMENT

Check Your Progress – Quiz – 1

1. Which of the following best defines investment?
   A) Short-term trading based on market rumors.
   B) Long-term commitment aimed at generating returns.
   C) Speculative betting on market volatility.
   D) Aggressive pursuit of quick profits.
2. What distinguishes speculation from investment?
   A) Speculation focuses on stable returns; investment seeks high profits.
   B) Investment involves extensive research; speculation relies on market rumors.
   C) Speculation is long-term; investment is short-term.
   D) Investment has high risk; speculation has low risk.market rumors.
3. Who are institutional investors?
   A) Individual investors trading on their own behalf.
   B) Banks and financial institutions managing large sums of money.
   C) Speculators betting on short-term market movements.
   D) Venture capitalists investing in startups.
4. Which investment avenue typically involves ownership in a company?
   A) Government bonds.
   B) Real estate.
   C) Stocks.
   D) Savings accounts.
5. What is a key factor influencing investment choices?
   A) Market rumors.
   B) Short-term volatility.
   C) Economic conditions.
   D) Speculative tips.

SECTION 1.2 INVESTMENT AVENUES AND PORTFOLIO MANAGEMENT

1.2.1 Investment Avenues

There are a large number of investment avenues for savers in India. Some of them are marketable and liquid while others are non marketable. Some of them are highly risky while some others are almost riskless. The investor has to choose proper avenues from among them depending on his preferences, needs and ability to assume risk.

The investment avenues can be broadly categorized under the following heads

1. Corporate securities
2. Deposits in banks and non-banking companies
3. UTI and other mutual fund schemes
4. Post office deposits and certificates
5. Life insurance polices
6. Provident fund schemes
7. Government and semi-government securities.

Corporate Securities

Corporate securities are the securities issued by joint stock companies in the private sector. These include equity shares, preference shares and debentures. Equity shares have variable divided and hence belong to the high risk-high return category, while preference shares and debentures have fixed returns with lower risk.

Deposits

Among the non-corporate investments, the most popular are deposits with banks such as savings accounts and fixed deposits. Savings deposits have low interest rates whereas fixed deposits have higher interest rates varying with the period of maturity.

Interest is payable quarterly or half-yearly. Fixed deposits may also be

recurring deposits where in savings are deposited at regular intervals. Some banks have reinvestment plans where in the interest is reinvested as it gets accrued. The principal and accumulated interests are paid on maturity.

Joint stock companies also accept fixed deposits from the public. The maturity period varies from three to five years. Fixed deposits in companies have high risk since they are unsecured, but they promise higher returns than bank deposits.

Fixed deposit in non-banking financial companies (NBFCs) is another investment avenue open to savers. NBFCs include leasing companies, investment companies, chit funds, etc. Deposits in NSFCs carry higher returns with higher risk compared to bank deposits.

UTI and Other Mutual Fund Schemes

Mutual funds offer various investment schemes to investors. UTI is the oldest and the largest mutual fund in the country. Unit Scheme 1964, Unit Linked Insurance Plan 1971, Master Share, Master Equity Plans, Master gain, etc. are some of the popular schemes of UTI. A number of commercial banks and financial institutions have set up mutual funds. Recently mutual funds have been set up in the private sector also.

Post Office Deposits and Certificates

The investment avenues provided by post offices are generally non-marketable. Moreover, the major investments in post office enjoy tax concessions also. Post office accepts savings deposits as well as fixed deposits from the public. There is also recurring deposit scheme which is an instrument of regular monthly savings.

Six-year National Savings Certificates (NSC) are issued by post office to investors. The interest on the amount invested is compounded half-yearly and to payable along with the principal at the time of maturity which is six years from the date of issue. Indira Vikas Patra and Kissan Vikas Patraare savings certificates issued by post officers.

Life Insurance Policies

The Life Insurance Corporation (LIC) offers many investment schemes to investors.Theseschemeshavetheadditionalfacilityoflifeinsurancecover.SomeoftheschemesofLICare whole Life Polices, Convertible Whole Life Assurance Polices, Endowment Assurance Polices, Jeevan Saathi, Money BackPlan, Jeevan Dhara, Marriage Endowment Plan etc.

Provident Fund Schemes

Provident fund schemes are compulsory deposit schemes applicable to employees in the public and private sectors. There are three kinds of provident funds applicable to different sectors of employment, namely Statutory Provident Fund, Recognized Provident Fund and Unrecognized Provident Fund.

In addition to these, there is a voluntary provident fund scheme which is open to any investor whether employed or not. This is known as the Public Provident Fund (PPF). Any member of the public can join the scheme which is operated by the post offices and the State Bank of India.

Government and Semi-Government Securities

The government and semi-Government bodies like the public sector undertakings borrow money from the public through the issue of government securities and public sector bonds. These are less risky avenues of investment because of the credibility of the government and government undertakings.

1.2.2 FACTORS INFLUENCING THE INVESTMENT CHOICES

Investment choices are influenced by various factors that shape how individuals and institutions decide where to allocate their money. One major factor is risk tolerance, which dictates whether an investor is comfortable with high-risk, high-reward options like stocks and crypto currencies, or prefers safer investments like bonds and savings accounts.

The specific goals of the investment also play a crucial role. Long-term goals, such as saving for retirement or buying a house, might lead to choosing stocks and real estate, which have the potential for significant growth over time. Conversely,

short-term goals may favor more liquid and secure options like savings accounts or short-term bonds to ensure the money is readily available when needed.

The time horizon, or the length of time an investor plans to hold an investment, impacts the type of assets chosen. Longer time horizons allow for investments in more volatile assets like stocks, as there is more time to recover from potential losses. Shorter time horizons require more stable investments to preserve capital.

An investor's financial situation also affects their investment choices. Those with a strong financial position might be able to take on more aggressive investments, while those with less financial stability may need to stick to conservative options to avoid undue risk.

Market conditions and economic outlook are important considerations as well. Bull markets, characterized by rising prices, might encourage riskier investments, whereas bear markets, with falling prices, might lead to safer choices. Positive economic forecasts might prompt investments in growth stocks, while negative forecasts could steer investors toward more secure assets.

Diversification needs are another key factor. To reduce risk, investors often spread their money across different types of assets, such as a mix of stocks, bonds, and real estate. Liquidity requirements, or the need to quickly convert investments into cash, might make more liquid investments like savings accounts or ETFs more attractive.

Tax considerations also influence investment decisions. Tax-efficient investments, such as retirement accounts or municipal bonds, might be preferred based on an investor's tax situation. Interest rates play a role too, with high rates making bonds more attractive and low rates favoring stocks and real estate.

Inflation expectations affect investment choices as well. High inflation expectations might lead to investments in assets that typically outpace inflation, like stocks or real estate. Lastly, the investor's knowledge and expertise can determine their comfort level with different types of investments. Greater knowledge might enable more complex investments, while limited knowledge might keep an investor in simpler, more familiar options.

1.2.3 MEANING OF PORTFOLIO MANAGEMENT

Portfolio management involves the strategic selection and continuous adjustment of securities within a portfolio to align with an investor's objectives and risk tolerance. Marko Wiz highlighted that while investors seek high returns, they also aim to mitigate risk. Scientific portfolio management is based on this principle, where the expected return of a portfolio is influenced by the collective attributes of its securities and their interrelationships, not just individual securities' riskiness. A portfolio manager, responsible for managing others' investments, focuses on profitability, growth, and risk minimization. The process includes planning, selecting, constructing, reviewing, and evaluating securities, aiming to achieve a balanced mix of safety, liquidity, and profitability. Effective timing in portfolio revision is crucial, aiming to sell during market peaks and buy during troughs to avoid purchasing at high prices and selling at low prices, thereby optimizing investment outcomes.

Active Portfolio Management

Active investing is the opposite of passive portfolio management - the objective is to beat the market or a specific market index/ benchmark like the Nifty50, BSE500 or Nifty Small cap 100 - the exact benchmark will depend on the active management strategy that is used. Active portfolio managers are hands-on, they decide what investments need to be added and removed from a portfolio. They user search ,data, conduct fundamental/technical analysis and what they know about the market to find good opportunities and change what's included in the portfolio.

1.2.4 Advantages and Disadvantages of Active Portfolio Management

Advantages of Active Portfolio Management

- **Potential for Higher Returns** Active managers exploit market in efficiencies, select high-performing securities, and time their trades to be at the market
- **Tailored Strategies** Based on the investor’s specific investment goals, risk tolerance, and overall market trends, Active managers can create customized portfolios that suit the investor

- **Flexibility** Active managers can quickly adapt to changing market conditions, reallocate assets away from riskier to safer assets or vice versa, and accordingly select securities and assets

- **Risk Management** Quicker response time from active managers, means they can respond to market conditions faster than passive managers and can even, reduce risk by re-adjusting allocations to more conservative investments. All of this may help minimize losses during market downturns.

- **Tax Considerations** Active managers can time selling assets and securities that are in their portfolio to reduce capital gains or employ loss-harvesting strategies for getting tax benefits.

Disadvantages of Active Portfolio Management

- **Higher Costs** Actively managed portfolios often have higher trading costs due to frequent transactions.

- **Limited Flexibility in Mutual Funds** Actively managed mutual funds may have constraints that limit the manager's ability to pivot or adapt to market changes.

1.2.5 Active Portfolio Management Strategy

Active portfolio management involves undertaking detailed research and analysis, of securities and ongoing monitoring of market conditions - all of this provides significant in terms of what they actively focus on buying and selling securities. Active portfolio management focuses on generating alpha returns by not just outperforming the benchmark index, but also capitalizing on mispriced securities or market inefficiencies to generate excess return or alpha

1. Fundamental Analysis

Fundamental analysis requires evaluating a company's financial health and growth potential by analyzing their financial statements, competitive advantages, corporate governance issues etc. The aim is to come up with an intrinsic value of the asset which can then be compared against the market value to determine if an

assertor a security is undervalued, par or overvalued. Under-valued stocks can be buying investment opportunities and over-valued stocks can be good selling investment opportunities. However, this approach is not just time-consuming, but it really depends on the inputs such as the quality of the information available that goes into deriving the intrinsic value.

2. Technical Analysis

Technical analysis focuses on analyzing historical price and volume data to identify patterns and trends. It is useful for short-term investment strategies and can signal buying or selling opportunities. The focus is on identifying patterns in the charts and the data and not on any information that is concerned with the fundamentals of the business or broader macro economic trends.

1.2.6 Passive Portfolio Management

Passive portfolio management is all about making a portfolio that looks similar to ascertain market index or benchmark. Main goal is to copy how the market performs and not necessarily to do better than it. Managers of passive portfolios don't track how individual investments are doing; they don't continuously monitor and change the constituents of a portfolio. The idea is simple-keep it the same as what's present in the index or the benchmark we are following.

1.2.7 Advantages and Disadvantages of Passive portfolio management

Advantages of Passive Portfolio Management

- **Low Costs** Passive management typically involves lower fees and expenses compared to active managements in trades are limited in nature and analysis is only to the extent of what is comprised in the benchmark index so transaction costs are minimal.
- **Consistency** Passive portfolios provide consistent exposure to the broader market,reducing the impact of market fluctuations on the portfolio's performance.

- **Tax Efficient** Less trading also means less short term capital gains are incurred which means, passive portfolios are more tax-efficient than active portfolios

- **Diversification** Since investing in passive strategies involves adding constituents that are the same as the bench mark or the market index, it inherently provides higher diversification benefits

- **Accessibility** Index funds and exchange-traded funds (ETFs) both use passive management strategies that are widely available, easily accessible and have lower minimum investment requirements-a slow as Rs.500 for some SIPs.

Disadvantages of Passive portfolio management

- **Not built for Outperformance** Passive funds aim to match the benchmark index's return but will in most cases never outperform it since the passive portfolio just copies the index

- **Lack of Customization** Each passive fund is built targeting a specific index like the Nifty 50 which looks at the top50stocksinNiftyorNiftySmallcap100whichlooks at the top 100 small caps stocks in the Nifty. As such, investor's specific needs and preferences cannot be catered to with an index as there is no room for customization.

1.2.8 Passive Portfolio Management Strategy

Passive portfolio management involves selecting index-based funds or exchange – traded funds (ETFs) that replicate the performance of a particular index. These funds mirror the asset allocation of the chosen index and require minimal ongoing management. The goal is to achieve market-like returns, making it suitable for investors seeking long-term growth with lower costs. Let's go through a few of them-

1. Index Investing

Index investing involves mirroring a particular market index, such as the Nifty50, BSE 300 etc. Investors get exposure to the market's performance at a low

cost. However, there is limited or no chance for outperformance and investors do not have any way to customize these indices.

2. Strategic Asset Allocation

StrategicAssetAllocationisachievedbydiversifyingacrossdifferentassetclassess uchas bonds, stocks, and cash to mitigate risk and achieve more stable returns. Tailoring to individual risk tolerance and investment goals allows for better risk management. This is a longer term strategy that again focuses on limited trading - however it does require ongoing monitoring and adjustments, and may lack potential for higher returns.

3. Buy-And-Hold Investing

Buy-and-hold is a long-term investment strategy that focuses on buying and holding quality assets with the objective of limited/ minimal trading. The benefit is that it reduces transaction costs and taxes. By holding quality assets for longer time periods, we are relying on letting compounding returns provide long term benefits. However, the strategy can be impacted if the selected assets underperform.

Let's Sum Up

In this section you may understand the various avenues through which investments can be made and the strategies involved in managing investment portfolios effectively. It covers different asset classes, including equities (stocks), fixed income securities (bonds), real estate, and alternative investments like commodities and cryptocurrencies. Learners explore the principles of portfolio management, including asset allocation (strategic distribution of investments across different asset classes), diversification (spreading investments to manage risk), and the differences between active and passive portfolio management. The module emphasizes the importance of aligning investment strategies with financial goals, risk tolerance, and time horizon. Real-life examples illustrate how different investment vehicles and management strategies can be applied to achieve optimal investment outcomes.

Section 1.2 Investment Avenues and Portfolio Management

Check Your progress – Quiz - 2

1. What is the primary goal of portfolio management?
   A) Maximizing short-term gains.
   B) Minimizing risk.
   C) Achieving stable returns.
   D) Diversifying across speculative assets.
2. Which investment vehicle pools funds from multiple investors and is managed by professionals?
   A) Stocks.
   B) Bonds.
   C) Real estate.
   D) Mutual funds.
3. What distinguishes passive portfolio management from active portfolio management?
   A) Passive management involves frequent trading; active management does not.
   B) Active management aims to match market returns; passive management seeks to outperform the market.
   C) Passive management requires extensive research; active management does not.
   D) Active management focuses on long-term gains; passive management is short-term.
4. Which investment avenue typically provides fixed income and is considered relatively lower risk?
   A) Stocks.
   B) Mutual funds.
   C) Real estate.
   D) Government bonds.
5. What is the purpose of asset allocation in portfolio management?
   A) Maximizing short-term profits.
   B) Minimizing long-term gains.
   C) Spreading risk across different types of assets.
   D) Focusing investments in high-risk ventures.

SECTION 1.3.FACTORS INFLUENCING INVESTMENT DECISIONS

1.3.1. Static Asset Allocation

With this approach, you won't be chasing trends to time the market. Instead, the goal is to create and maintain a portfolio with an appropriate mix of assets to reach your goals. Of course, the appropriate mix of assets will vary widely based on your unique investment goals and risk tolerance.

A common strategic asset allocation includes a 60/40 portfolio. In this asset allocation strategy, you would have 60% of your assets in stocks and 40% in bonds.

No matter the mix of assets, you'll choose a strategy that you want to stick to for the long-term. So, if the market goes up and down, you don't plan to make adjustments to your strategy along the way. But you may rework your strategy if your risk tolerance changes.

Beyond a portfolio with asset allocations that include a long-term outlook, a strategic asset allocation also requires rebalancing to maintain the strategy. Without regular rebalancing, it is all too easy for the target asset allocations to move away from your goals.

Static asset allocation involves setting a target mix of asset classes (such as stocks, bonds, and cash) based on an investor's risk tolerance, financial goals, and time horizon. Once established, this allocation is maintained without frequent changes, except for periodic rebalancing to bring the portfolio back to its original target allocation.

Long-Term Focus Designed to align with long-term financial objectives, such as retirement planning or wealth preservation.

Low Maintenance Requires minimal ongoing adjustments once the initial allocation is set, reducing transaction costs and administrative efforts.

Risk Management Aims to mitigate risk through diversification across different asset classes.

Stability Provides stability and predictability in portfolio performance overtime, as it follows a predetermined allocation strategy.

1.3.2 Tactical Asset Allocation

Tactical asset allocation involves making active adjustments to the asset mix within a portfolio based on short-term market forecasts or changes in economic conditions. Unlike statical location, tactical allocation allows for deviations from the strategic asset allocation in response to perceived opportunities or risks in the market.

Market Timing Involves the ability to capitalize on short-term market inefficiencies or trends.

Flexibility Offers flexibility to overweight or underweight certain asset classes based on current market conditions or economic outlook.

Active Management Requires ongoing monitoring and analysis of market data and economic indicators to make informed investment decisions.

Potential for Higher Returns By adjusting allocations based on market conditions, tactical allocation seeks to enhance returns compared to a static allocation approach.

3.1.3 Tactical VS Static Asset Allocation

Objective Static allocation focuses on maintaining a predetermined asset mix over the long term to meet financial goals, while tactical allocation aims to exploit short-term market opportunities or mitigate risks.

Approach Static allocation is passive and based on a strategic asset allocation plan, where as tactical allocation involves active decision-making and adjustments based on current market conditions.

Risk and Reward Static allocation provides stability and reduces the risk of making incorrect market timing decisions but may potentially miss out on short-term opportunities. Tactical allocation offers potential for higher returns but involves higher

risk due to market timing and the possibility of incorrect forecasts.

Implementation Statical location requires less frequent monitoring and adjustments, making it suitable for investors with a long-term investment horizon. Tactical allocation requires active management and monitoring, making it more suitable for investors comfortable with making strategic adjustments based on market conditions.

1.3.4 FACTORS AFFECTING INVESTMENT DECISIONS IN PORTFOLIO MANAGEMENT

Economic Factors

Interest Rates Influences borrowing costs and investment returns across various asset classes.

Inflation Affects the purchasing power of returns, influencing decisions on asset allocation.

Economic Growth Determines overall market conditions and sector performance.

Market Factors

Market Trends Current trends in stock, bond, and commodity markets influence investment decisions.

Volatility Market volatility affects risk appetite and the choice of investments.

Liquidity The ease of buying and selling assets affects portfolio composition

Financial Factors

Risk Tolerance Personal risk tolerance determines the mix of high-risk and low-risk assets.

Return Expectations Desired returns influence asset allocation and investment strategies.

Financial Goals Short-term and long-term financial objectives guide investment decisions.

Regulatory and Political Factors

Regulatory Changes in tax laws, regulations, and policies impact investment strategies.

Political Stability Political stability affects market confidence and investment climate.

Psychological Factors

Investor Sentiment Market sentiment and psychology influence investment decisions.

Behavioral Biases Cognitive biases like loss aversion and herd mentality impact decision-making.

Technological Factors

Technological Advancements Innovations in financial technology (FinTech) influence investment strategies and market accessibility.

Information Accessibility Availability of real-time market information affects investment decisions.

Environmental, Social, and Governance (ESG) Factors

Sustainability ESG criteria influence investment decisions based on environmental, social, and governance factors.

Corporate Responsibility Investments in companies with ethical practices and sustainability initiatives.

Demographic Factors

Age and Life Stage Investment decisions vary based on life stages, such as retirement planning or wealth accumulation.

Income Level Income influences investment capacity and risk tolerance.

Global Factors

Global Market Conditions International economic trends impact global investment decisions. Currency

Exchange Rates Fluctuations in currency exchange rates affect international investment returns.

Let's Sum Up

In this section focuses on the factors that influence investment decisions and the strategies for mitigating risks while maximizing returns. It explores economic indicators (such as GDP growth, inflation rates, and interest rates) and their impact on investment opportunities. Learners examine the role of market sentiment, investor psychology, and behavioral finance in shaping investment decisions. The module covers risk management techniques, including diversification, hedging, and the importance of understanding individual risk tolerance. Ethical considerations in investing, such as socially responsible investing (SRI) and environmental, social, and governance (ESG) criteria, are also discussed. Real-world case studies provide insights into how investors navigate fluctuating market conditions and make informed decisions based on both quantitative analysis and qualitative factors.

Section 1.3 Factors Influencing Investment Decisions

Check Your Progress – Quiz – 3

1. What role do economic indicators play in investment decisions?
   A) They provide short-term market predictions.
   B) They influence market sentiment but not actual investment choices.
   C) They help assess economic health and potential investment opportunities.
   D) They are irrelevant to long-term investment strategies.
2. Which factor refers to the willingness of an investor to accept the possibility of loss in pursuit of potential returns?
   A) Risk tolerance.
   B) Market volatility.

C) Speculative tips.
D) Economic indicators.

3. Why do investors consider diversification important in portfolio management?
   A) To concentrate investments in high-risk assets.
   B) To maximize short-term gains.
   C) To minimize overall risk.
   D) To reduce long-term returns.
4. What is a characteristic of ethical investing?
   A) High-risk tolerance.
   B) Profit maximization.
   C) Social responsibility.
   D) Short-term focus.
5. Which investment strategy focuses on long-term growth and stability rather than short-term gains?
   A) Speculation.
   B) Day trading.
   C) Investment.
   D) Market timing.

1.4 UNIT SUMMARY

This unit provides a comprehensive exploration of investment principles and portfolio management strategies essential for both individual and institutional investors. Beginning with fundamental concepts such as the distinction between investment and speculation, the unit progresses to examine various types of investors and the diverse avenues available for investment—from stocks and bonds to real estate and alternative assets like cryptocurrencies. The significance of portfolio management is underscored, emphasizing both active and passive strategies, alongside considerations of asset allocation and risk management. Throughout, real-life case studies illustrate the practical application of these concepts, offering insights into decision-making processes amid fluctuating economic conditions and evolving market dynamics.

1.5 Glossary

1. **Asset Allocation** The process of dividing an investment portfolio among different asset classes (e.g., stocks, bonds, cash) to manage risk and achieve specific investment objectives.
2. **Diversification** Spreading investments across different assets or asset classes to reduce risk and enhance potential returns.
3. **Risk Tolerance** The degree of variability in investment returns that an investor is willing and able to withstand.
4. **Return on Investment (ROI)** The gain or loss generated from an investment relative to its cost.
5. **Liquidity** The ease with which an investment can be bought or sold without impacting its price.
6. **Volatility** The degree of variation in the price of an investment over time.
7. **Fundamental Analysis** Evaluating an investment based on its intrinsic value and underlying factors such as financial statements, management, and competitive position.
8. **Technical Analysis** Analyzing investment opportunities based on statistical trends, trading volume, and historical price movements.
9. **Market Capitalization** The total value of a company's outstanding shares of stock, calculated by multiplying the current share price by the number of shares outstanding.
10. **Yield** The income return on an investment, usually expressed as a percentage, based on dividends or interest received relative to the investment's cost.

1.6 Self-Assessment

1. What factors should you consider when determining your risk tolerance before making investment decisions?
2. Explain the difference between strategic asset allocation and tactical asset

allocation in portfolio management.

3. How does diversification help reduce risk in an investment portfolio? Provide examples.
4. What are the key differences between investment and speculation? Give examples of each.
5. Describe the role of fundamental analysis and technical analysis in evaluating investment opportunities.
6. Why is it important to consider liquidity when selecting investments? How does liquidity affect investment decisions?
7. Discuss the potential benefits and drawbacks of active portfolio management compared to passive portfolio management.
8. What are some common investment avenues available to retail investors? Provide examples of each.
9. How do economic factors such as inflation, interest rates, and GDP growth impact investment decisions and portfolio performance?
10. What steps can an investor take to effectively manage risk in their investment portfolio?

1.7 Case study

Amazon.com: In the late 1990s, Amazon.com emerged as a pioneering online bookstore founded by Jeff Bezos. An investor recognizing the potential of e-commerce and Amazon's innovative business model decided to invest in the company's IPO in 1997. Initially facing skepticism due to its lack of profitability and aggressive expansion plans, Amazon persevered by diversifying its offerings beyond books into electronics, apparel, and cloud computing services (AWS). The investor's long-term perspective paid off as Amazon transformed into a global retail behemoth and cloud computing giant. By 2020, Amazon's stock had surged significantly, reflecting its dominant market position and continuous innovation under Bezos' leadership.

Question How did Amazon's strategic expansions beyond online retail contribute to its long-term success as an investment?

Coca-Cola Investment: Since its inception in the late 19th century, Coca-Cola has maintained its status as a global leader in the beverage industry. An investor who

recognized Coca-Cola's enduring brand strength and global distribution network decided to invest during a period of economic downturn in the early 20th century. Despite challenges such as changing consumer preferences and regulatory pressures, Coca-Cola's consistent investment in marketing, product diversification (including bottled water and energy drinks), and strategic acquisitions (like Costa Coffee) fuelled its resilience and growth. The investor's faith in Coca-Cola's ability to adapt and innovate through market fluctuations paid dividends as the company continued to deliver stable returns and dividends over the decades.

Question How did Coca-Cola's brand management and product diversification strategies contribute

In 2017, amidst the hype surrounding cryptocurrencies, an investor decided to allocate a portion of their portfolio to Bitcoin, the pioneering digital currency. Recognizing Bitcoin's potential as a decentralized digital asset and store of value, the investor navigated the volatility and regulatory uncertainties inherent in the emerging crypto market. Bitcoin's limited supply and growing adoption as a digital payment method and alternative investment asset bolstered its appeal. Despite dramatic price swings, the investor's long-term perspective and belief in Bitcoin's disruptive potential as a hedge against traditional financial systems paid off. By 2021, Bitcoin's price had surged, validating the investor's conviction and demonstrating the growing institutional acceptance of cryptocurrencies as a legitimate asset class.

Question What were the key factors driving Bitcoin's price volatility, and how did they impact investor sentiment and decision-making?

1.8 Answers for check your progress

Section 1.1	Introduction to Investment
1.	B) Long-term commitment aimed at generating returns.
2.	B) Investment involves extensive research; speculation relies on
3.	B) Banks and financial institutions managing large sums of money.
4.	C) Stocks.
5.	C) Economic conditions.

Section 1.2	Investment Avenues and Portfolio Management
1.	C) Achieving stable returns.
2.	D) Mutual funds.
3.	B) Active management aims to match market returns; passive management seeks to outperform the market.
4.	D) Government bonds.
5.	C) Spreading risk across different types of assets.
Section 1.3	**Factors Influencing Investment Decisions**
1.	C) They help assess economic health and potential investment opportunities.
2.	A) Risk tolerance.
3.	C) To minimize overall risk.
4.	C) Social responsibility.
5.	C) Investment.

1.10 Reference and Suggested Readings

- Prasanna Chandra “InvestmentAnalysisandPortfolioManagement”,6th Edition, McGraw Hill, Noida, UP, 2021
- The Intelligent Investor" by Benjamin Graham, Harper Business 2006
- A Random Walk Down Wall Street" by Burton G. Malkiel W. W. Norton & Company, 2019
- Common Stocks and Uncommon Profits" by Philip Fisher, Wiley, 2003

UNITI II – VALUATION OF SECURITIES
Bond: Introduction – Reasons for issuing Bonds – Features of Bond – Types of Bonds – Determinants of bond safety –Bond Prices, Yields and Interest Rates – Measuring Price Volatility of Bonds–Macaulay Duration and Modified Duration. Preference Shares: Introduction – Features of Preference Shares – Preference Shares Yield – Holding Period Return – Yield to Call –Concept of Present Value – Equity Share Valuation Models.

Essential Concepts of Bonds and Preference Shares, Valuation, and Yield Analysis

UNIT OBJECTIVES

This unit aims to provide a comprehensive understanding of bonds and equity shares, covering their features, types, valuation, and the factors affecting their prices and yields. By the end of this unit, students should be able to explain the reasons for

issuing bonds, understand the different types of bonds and their safety determinants, and grasp the concepts of bond pricing, yields, and interest rates. Additionally, students will learn about measuring price volatility through Macaulay Duration and Modified Duration, and will gain insights into preference shares, including their features, yield calculations, and valuation models. The unit will also cover the concept of present value and the valuation models for equity shares.

Section 2.1 Valuation of Securities: An Introduction to Bonds

2.1.1 What Is Bond?

A bond is a fixed-income instrument and investment product where individuals lend money to a government or company at a certain interest rate for an amount of time. The entity repays individuals with interest in addition to the original face value of the bond.

https://endowus.com/insights/why-invest-bonds

Bonds are used by companies, municipalities, states, and sovereign governments to finance projects and operations. Owners of bonds are debtholders, or creditors, of the issuer. Bond details include the end date when the principal of the loan is due to be paid to the bond owner and usually include the terms for variable or fixed interest payments made by the borrower.

A bond is referred to as a fixed-income instrument since bonds traditionally pay a fixed interest rate or coupon to debt holders. Bond prices are inversely correlated with interest rates when rates go up, bond prices fall, and vice-versa.

Bonds have maturity dates at which point the principal amount must be paid back in full or risk default.

2.1.2 How Bonds Work

Bonds are debt instruments and represent loans made to the issuer. Bonds allow individual investors to assume the role of the lender. Governments and corporations commonly use bonds to borrow money to fund roads, schools, dams, or other infrastructure.12 Corporations often borrow to grow their business, buy property and equipment, undertake profitable projects, for research and development, or to hire employees.1

Bonds are fixed-income securities and are one of the main asset classes for individual investors, along with equities and cash equivalents. The borrower issues a bond that includes the terms of the loan, interest payments that will be made, and the maturity date the bond principal must be paid back. The interest payment is part of the return that bondholders earn for loaning their funds to the issuer.3 The interest rate that determines the payment is called the coupon rate.4

The initial price of most bonds is typically set at par or $1,000 face value per individual bond. The actual market price of a bond depends on the credit quality of the issuer, the length of time until expiration, and the coupon rate compared to the general interest rate environment. The face value of the bond is what is paid to the lender once the bond matures.

Markets allow lenders to sell their bonds to other investors or to buy bonds from other individuals—long after the original issuing organization raised capital. A bond investor does not have to hold a bond through to its maturity date.

2.1.3 Features of a Bond for Investor

When an Investor is buying bonds, there are a few things which may be given consideration before investing in them. Given below are such important points to remember while investing in any bond

Secured & Unsecured Bonds Unsecured Bonds, also known as debentures are mostly the bonds issued by companies with a good reputation, high credit rating and

the credibility of the company. The returns on such bonds are based on the profit and the success of the company. If the company makes a profit, then the amount along with interest is returned to the investor, else there may be difficulty in regaining the invested amount as well. The secured bonds offer some kind of security to the investor. These bonds are mostly considered to be Government bonds.

Taxation Looks for bonds which exempt tax. Few corporate bonds levy tax on their bonds and bonds issued by Government, municipality bonds and few other do not impose a tax on the profit earned.

Preference of Liquidation In case a Company gets in loss and is in debt, the money gained by selling the assets of the company is given in a certain order of preference. This is called preference of liquidation. The regained amount is distributed in ascending order of time in which the investments were made. Starting with the oldest Investors and then to the new ones.

Date of Maturity Ensure that you check the maturity period of the bond and invest in something where you can earn more with a shorter time duration

Coupon Rate The rate of interest at which a bond is issued and the Company is liable to pay the Investor is called the coupon rate. Research and look for Bond options which offer high coupon rate

2.1.4 Characteristics of Bonds

Face value or Par Value The value of the bond at maturity and the reference amount the bond issuer uses when calculating interest payments.

Coupon Rate The rate of interest the bond issuer will pay on the face value of the bond, expressed as a percentage.4

Coupon Dates The dates on which the bond issuer will make interest payments.

Maturity Date The date on which the bond will mature and the bond issuer will pay the bondholder the face value of the bond.

Issue Price The price at which the bond issuer originally sells the bonds. In many

cases, bonds are issued at par.

2.1.5 Bond Categories

There are four primary categories of bonds sold in the markets. However, you may also see foreign bonds issued by global corporations and governments on some platforms.

Corporate Bonds Companies issue corporate bonds rather than seek bank loans for debt financing because bond markets offer more favorable terms and lower interest rates.

Municipal Bonds Issued by states and municipalities. Some municipal bonds offer tax-free coupon income for investors.

Government Bonds are issued by the Government of the corresponding country. Treasury with a year or less to maturity are called “Bills,” bonds issued with one to 10 years to maturity are called “notes,” and government bonds issued with more than 10 years to maturity are called “bonds.” The entire category of bonds issued by a government treasury is often collectively referred to as "treasuries."

Agency Bonds Issued by government-affiliated organizations such as Fannie Mae or Freddie Mac are considered agency bonds.1

2.1.6 Main Reasons for Issuing Bonds are as follows

Governments have no choice but to borrow when they are unable to meet their expenses from current revenue. Corporations, on the other hand, have a wider choice in the matter of financing their operations e.g., retained earnings, new equity issues, etc. But they still prefer to go in for borrowing for the following reasons

1. **To Reduce the Cost of Capital:** Bonds are the cheapest source of financing. A corporation is willing to incur the risk of borrowing in order to reduce the cost of capital by financing a portion of its assets with securities bearing a fixed rate of return in hope of increasing the ultimate return to the equity holder.
2. **To Gain the Benefit of Leverage:** The presence of debt and/or preference shares in the company’s financial structure means that it is using

financial leverage. When financial leverage is used, changes in earnings before interest and tax (EBIT) translate into the larger changes in earnings per share.

However, leverage is a two-edged sword as EBIT can rise or fall. If it falls, and financial leverage is used, the equity holders endure negative changes in EPS that are larger than the relative decline in EBIT. For example, if a company can borrow at 10% and put the funds to works to earn more than 10%, the earnings on the equity holders are increased and vice versa.

3. **To Effect Tax Saving:** Unlike dividends on equity, the interest on bonds is deductible in figuring up corporate income for tax purposes. Hence, the EPS increases if the financing is through bonds rather than with preference or equity shares.
4. **To Widen the Sources of Funds:** By issuing bonds, the corporation can attract funds from individual investors and especially from those investing institutions which are reluctant or not permitted to purchase equity shares.
5. **To Preserve Control:** An increase in debt does not diminish the voting power of present owners since bonds ordinarily carry no voting right. However, a manager must be concerned with the effect of fixed cost securities on both EPS and the price earnings ratio. An increase in risk has a depressing influence on a price- earnings ratio, while an increase in growth will tend to increase the price-earnings ratio.

Fixed cost securities affect both risk and growth. If the risk effect outweighs the growth effect, then the price-earnings ratio will decline. If the growth effect outweighs the risk effect, then the price earnings ratio will increase.

2.1.7 Bond Prices and Interest Rates

A bond's price changes daily where supply and demand determines that observed price. If an investor holds a bond to maturity they will get their principal back plus interest. However, a bondholder can sell their bonds in the open market, where the price can fluctuate. a bond’s price varies inversely with interest rates. When interest rates go up, bond prices fall to have the effect of equalizing the interest rate on the bond with prevailing rates, and vice versa.5

The issuer of a fixed-rate bond promises to pay a coupon based on the face

value of the bond. For a $1,000 par, 10% annual coupon bond, the issuer will pay the bondholder $100 each year.5 If prevailing market interest rates are also 10% at the time that this bond is issued, an investor would be indifferent to investing in the corporate bond or the government bond since both would return $100. However, if interest rates drop to 5%, the investor can only receive $50 from the government bond but would still receive $100 from the corporate bond.

Investors bid up to the price of the bond until it trades at a premium that equalizes the prevailing interest rate environment—in this case, the bond will trade at $2,000 so that the $100 coupon represents 5%. Likewise, if interest rates soared to 15%, then an investor could make $150 from the government bond and would not pay $1,000 to earn just $100. This bond would be sold until it reached a price that equalized the yields, in this case to a price of $666.67.

Yield-to-Maturity (YTM)

The yield-to-maturity (YTM) is the total return anticipated on a bond if the bond is held until the end of its lifetime. Yield to maturity is considered a long-term bond yield but is expressed as an annual rate.

YTM is the internal rate of return of an investment in a bond if the investor holds the bond until maturity and if all payments are made as scheduled.6 YTM evaluates the attractiveness of one bond relative to other bonds of different coupons and maturity in the market. The formula for YTM involves solving for the interest rate.

Yield to Maturity Formula

$$YTM = \sqrt[n]{\frac{Face\ Value}{Present\ Value}} - 1$$

Investors can measure the anticipated changes in bond prices given a change in interest rates with the duration of a bond. Duration represents the price change in a bond given a 1% change in interest rates.7 This practical definition is the modified duration of a bond. Bonds with long maturities, and also bonds with low coupons have the greatest sensitivity to interest rate changes.

2.1.8 How to Invest in Bonds

While there are some specialized bond brokers, most online and discount brokers offer access to bond markets, and investors can buy them like stocks.

Treasury bonds and TIPS are typically sold directly via the federal government and can be purchased via its Treasury Direct website. Investors can also buy bonds indirectly via fixed-income ETFs or mutual funds that invest in a portfolio of bonds. Investors can also take a look at Investopedia's list of the best online stock brokers.

https://www.thefixedincome.com/blog/investing-in-india/how-to-invest-in-corporate-bonds/

2.1.9 Bond Variations

The bonds available for investors come in many different varieties, depending on the rate or type of interest or coupon payment, by being recalled by the issuer, or because they have other attributes.

Zero-Coupon Bonds (Z-bonds) Do not pay coupon payments and instead are issued at a discount to their par value that will generate a return once the bondholder is paid the full face value when the bond matures. U.S. Treasury bills are zero-coupon bonds.8

Convertible Bonds Debt instruments with an embedded option that allows bondholders to convert their debt into stock (equity) at some point, depending on certain conditions like the share price.9

Callable Bonds Have an embedded option, but it is different than what is found in a convertible bond. A callable bond can be “called” back by the company before it matures. A callable bond is riskier for the bond buyer because the bond is more likely to be called when it is rising in value.10

Puttable Bonds Allows the bondholders to put or sell the bond back to the company before it has matured. This is valuable for investors who are worried that a bond may fall in value or if they think interest rates will rise and they want to get their principal back before the bond falls in value. A puttable bond usually trades at a higher

value than a bond without a put option but with the same credit rating, maturity, and coupon rate because it is more valuable to the bondholders.

Traditional Bond A bond in which the entire principal can be withdrawn at a single time after the bond's maturity date is over is called a Traditional Bond.

Fixed-Rate Bonds When the coupon rate remains the same through the course of the investment, it is called Fixed-rate bonds.

Floating Rate Bonds When the coupon rate keeps fluctuating during the course of an investment, it is called a floating rate bond.

Puttable Bond When the investor decides to sell their bond and get their money back before the maturity date, such type of bond is called a Puttable bond.

Mortgage Bond The bonds which are backed up by the real estate companies and equipment are called mortgage bonds.

Serial Bond When the issuer continues to pay back the loan amount to the investor every year in small instalments to reduce the final debt, such type of bond is called a Serial Bond.

Extendable Bonds The bonds which allow the Investor to extend the maturity period of the bond are called Extendable Bonds.

Climate Bonds Climate Bonds are issued by any government to raise funds when the country concerned faces any adverse changes in climatic conditions.

War Bonds War Bonds are issued by any government to raise funds in cases of war.

Inflation-Linked Bonds Bonds linked to inflation are called inflation linked bonds. The interest rate of Inflation linked bonds is generally lower than fixed rate bonds

What Determines a Bond's Coupon Rate?

Two features of a bond—credit quality and time to maturity—are the principal determinants of a bond's coupon rate. If the issuer has a poor credit rating, the risk of default is greater, and these bonds pay more interest. Bonds that have a very long maturity date also usually pay a higher interest rate. This higher compensation is because the bondholder is more exposed to interest rate and inflation risks for an extended period.

How Bonds Are Rated?

Credit ratings for a company and its bonds are generated by credit rating agencies like Standard and Poor's, Moody's, and Fitch Ratings. The very highest quality bonds are called "investment grade" and include debt issued by the U.S. government and very stable companies, such as many utilities.1213 Bonds that are not considered investment grade but are not in default are called "high yield" or "junk" bonds. These bonds have a higher risk of default in the future and investors demand a higher coupon payment to compensate them for that risk.14

What Is Duration?

Bonds and bond portfolios will rise or fall in value as interest rates change. The sensitivity to changes in the interest rate environment is called "duration." The use of the term duration in this context can be confusing to new bond investors because it does not refer to the length of time the bond has before maturity. Instead, duration describes how much a bond's price will rise or fall with a change in interest rates.

2.1.10 Understanding Bond Prices and Yields

When it comes to the world of investing, bonds are often viewed as a safer alternative to the volatile stock market. However, understanding the relationship between bond prices and interest rates is crucial for both seasoned investors and beginners. This article delves into the intricate relationship between bond prices and interest rates, providing practical insights and examples to help you navigate the bond market more effectively.

Inverse Relationship with Interest Rates

Bond prices and interest rates have an inverse relationship

When interest rates rise, bond prices fall because existing bonds with lower yields become less attractive compared to new bonds issued at higher rates.

When interest rates fall, bond prices rise as existing higher-yielding bonds become more desirable.

Factors Influencing Bond Prices

Central Bank Policies Interest rates set by central banks (like the Federal Reserve in the US or RBI in India) influence bond yields directly.

Yield Curve Reflects expectations for future interest rates, economic growth, and inflation, impacting bond demand and pricing.

Inflation Expectations Higher inflation expectations lead to higher interest rates, reducing bond prices.

Market Demand High demand lowers bond yields, increasing prices.

Global Events like COVID-19 can cause central banks to adjust rates, affecting bond prices.

2.1.11 Current Trends in the Bond Market

Recent trends show fluctuating bond yields due to economic recoveries and central bank policies post-pandemic.

In India, rate hikes by the RBI led to lower bond prices and higher yields recently.

Expert Insights Experts note volatility in bond markets due to active interest rate policies by central banks. Global markets are adjusting to higher interest rate environments post-pandemic. Strategies for Investors

Duration Strategy Longer duration bonds are more sensitive to interest rate changes.

Laddering Strategy Spreading investments across bonds with different maturities can mitigate interest rate risk.

Bond Basics Bonds are debt securities where investors lend money to issuers in exchange for periodic interest payments (coupon payments) and repayment of the principal at maturity.

Impact of Interest Rates on Bond Prices

Bonds traded on secondary markets can be priced at a premium (above par value), at par (equal to par value), or at a discount (below par value).

When market interest rates rise, existing bonds with lower coupon rates become less attractive, causing their prices to fall. Conversely, when interest rates decline, existing

bonds with higher coupon rates become more attractive, driving up their prices.

Impact of Inflation Expectations

Inflation and Interest Rates Higher inflation expectations often lead to higher interest rates set by central banks, making existing bonds less valuable (lower prices).

Fed Policy Federal Reserve decisions on interest rates can significantly impact bond prices and yields.

Market Dynamics

Investors assess bonds based on current and future economic conditions, adjusting prices accordingly. Bonds with higher coupons are more attractive when market rates are lower; vice versa for higher market rates.

2.1.12 Introduction to Bond Volatility

1. Understanding Bond volatility

Bond volatility refers to the degree of fluctuation in the price of a bond over a given period. It is a crucial metric for investors as it helps assess the potential risks and returns associated with bond investments.

2. Factors Influencing bond Volatility

a. **Interest Rate Changes** Bond prices and interest rates have an inverse relationship. When interest rates rise, bond prices tend to fall, leading to increased volatility.

b. **Credit Quality** Bonds with lower credit ratings are generally more volatile as they carry higher default risk.

c. **Time to Maturity** Longer-term bonds are typically more sensitive to interest rate changes, resulting in higher volatility.

d. **Market Conditions** Economic factors, market sentiment, and geopolitical events can significantly impact bond volatility.

3. Measuring Bond Volatility

Various metrics and techniques are employed to measure bond volatility, including

a. **Duration** measures the sensitivity of a bond's price to changes in interest rates. Higher duration implies greater volatility.

b. **Convexity** accounts for the curvature of the bond's price-yield relationship, providing a more accurate measure of volatility.

c. **Historical Volatility** This metric analyzes past price movements to estimate future volatility, offering insights into potential risks.

4. Examples Illustrating Bond Volatility

To emphasize key ideas, let's consider a hypothetical scenario Suppose there is a bond with duration of 5 years. If interest rates increase by 1%, the bond's price may decrease by approximately 5%, showcasing its volatility.

Additionally, let's say two bonds have the same credit rating, but one has a longer maturity. In a volatile market, the bond with the longer maturity is likely to experience more significant price fluctuations.

2. Understanding Bond Price Volatility

Understanding bond price volatility is a crucial aspect when it comes to analyzing the dynamics of the bond market. It involves assessing the potential fluctuations in bond prices over a given period of time. Bond price volatility is influenced by various factors, such as changes in interest rates, credit risk, and market sentiment.

a. **Impact of Interest rates** One of the primary drivers of bond price volatility is changes in interest rates. When interest rates rise, the prices of existing bonds tend to fall, as investors demand higher yields to compensate for the increased opportunity cost. Conversely, when interest rates decline, bond prices generally rise, as investors are willing to accept lower yields.

b. **Credit Risk considerations** Another factor that affects bond price volatility is credit risk. Bonds with higher credit risk, such as those issued by companies with lower credit ratings, tend to exhibit higher price volatility compared to bonds with lower credit risk. This is because investors demand a higher yield to compensate for the increased likelihood of default.

c. **Market Sentiment and economic Conditions**Bond price volatility can also be influenced by market sentiment and overall economic conditions. During periods of economic uncertainty or market instability, investors may seek the relative safety of bonds, leading to increased demand and potentially lower

volatility. Conversely, during periods of economic growth and optimism, investors may shift their focus towards riskier assets, resulting in higher bond price volatility.

To illustrate these concepts, let's consider an example. Suppose there is a sudden increase in interest rates due to a change in monetary policy. As a result, the prices of existing bonds decline, reflecting the inverse relationship between bond prices and interest rates. This decline in bond prices indicates higher volatility in the bond market.

3. A Key Metric for Bond Volatility

a. Definition and Interpretation

Duration represents the weighted average time until a bond's cash flows (coupon payments and principal repayment) are received. It quantifies the bond's sensitivity to interest rate fluctuations.

Longer duration implies greater price sensitivity to rate changes. For instance, a bond with a duration of 7 years will experience a roughly 7% price change for every 1% change in interest rates.

Intuitively, this makes sense Longer-dated bonds have more future cash flows, so their prices react more significantly to rate shifts.

b. Macaulay Duration vs. Modified Duration

Macaulay duration calculates the average time to receive cash flows, considering both coupon payments and the final principal repayment. It's expressed in years.

Modified duration adjusts Macaulay duration for small rate changes. It's the percentage change in bond price for a 1% change in yield.

Modified duration is more practical for assessing price changes due to interest rate shifts.

c. Duration and Convexity

While duration provides a linear approximation of bond price changes, it has limitations. Specifically, it assumes that yield changes are small and linear.

Convexity accounts for the curvature in the bond price-yield relationship.

It measures how duration changes as yields fluctuate.A positive convexity value indicates that bond prices increase more than predicted by duration when yields fall (and vice versa).

Examples

Consider a 10-year, 5% coupon bond priced at $1,000 with a yield of 4%. Its Macaulay duration is approximately 8.6 years.

If yields rise to 5%, the bond's price decreases by around 8.6% (8.6 years × 1% yield change).

However, convexity comes into play The actual price drop may be slightly less due to the bond's curvature.

Conversely, if yields fall to 3%, the bond's price increases by approximately 8.6%.

Practical Implications

Investors use duration to manage interest rate risk. For example, a portfolio manager can adjust duration by buying or selling bonds. Immunization involves matching the portfolio's duration with the investor's time horizon to minimize risk. Zero-coupon bonds have the highest duration, making them extremely sensitive to rate changes.

Callable bonds have lower effective durations due to potential early redemption.

Limitations and Considerations

Duration assumes parallel shifts in the entire yield curve, which may not always hold. It doesn't account for credit risk, liquidity risk, or other factors affecting bond prices. For non-constant cash flows (e.g., mortgage-backed securities), modified duration may not be accurate.

4. Another Metric for Bond Price Volatility

1. What Is Convexity?

Convexity is a concept borrowed from mathematics and geometry. In the context of bonds, it refers to the curvature of the bond price-yield relationship. Unlike duration, which provides a linear approximation of price changes, convexity accounts for the non-linear behavior of bond prices as yields fluctuate.

Picture a bond's price-yield graph, and you'll notice that it's not a straight line; it's a curve. Convexity quantifies this curvature.

2. Why Does Convexity Matter?

Price Sensitivity Convexity matters because it refines our understanding of bond price sensitivity. While duration gives us a good estimate of the percentage change in bond price for a 1% change in yield, it's not perfect. Convexity steps in to correct this limitation.

Bond Price Volatility When yields change, bond prices don't move linearly. Convexity captures the second-order effect, telling us whether bond prices will overshoot or undershoot their expected values based on duration alone.

Risk Management Investors and portfolio managers use convexity to manage risk. It helps them fine-tune their hedging strategies and optimize their portfolios.

3. Calculating Convexity

Convexity is calculated as the second derivative of the bond price with respect to yield. Mathematically

$$\text{Convexity} = \frac{1}{P} \cdot \frac{\partial^2 P}{\partial y^2}$$

Where

P is the bond price.

$\frac{\partial^2 P}{\partial y^2}$ represents the second derivative of the bond price with respect to yield.

4. Interpreting Convexity

- **Positive Convexity** Most bonds exhibit positive convexity. This means that when yields decrease, bond prices rise more than predicted by duration alone. Conversely, when yields increase, bond prices fall less than expected.
- **Negative Convexity** Some bonds, like callable bonds, exhibit negative convexity. In these cases, the bond price-yield relationship is concave. When

yields drop, the bond issuer may call the bond, limiting the upside potential. Negative convexity introduces reinvestment risk.

5. Example

Imagine a 10-year, 5% coupon bond with a face value of $1,000. Its duration is 7 years, and its convexity is 60. Let's explore scenarios

If yields decrease by 1%, the bond price increases by approximately $70 (duration effect) plus an additional $18 (convexity effect).

If yields increase by 1%, the bond price decreases by $70 (duration effect) minus $18 (convexity effect).

6. Convexity and Portfolio Management

- **Immunization Strategies** Convexity helps portfolio managers immunize their portfolios against interest rate changes. By balancing duration and convexity, they can minimize price volatility.
- **Callable Bonds** Convexity highlights the risk associated with callable bonds. As yields fall, the issuer may call the bond, depriving investors of potential gains.

Convexity is the unsung hero of bond analytics. It corrects duration's linear approximation, providing a more accurate picture of bond price movements. Whether you're a fixed-income analyst, a bond trader, or a risk manager, understanding convexity is essential for navigating the complex world of bond markets.

5. Impact on Bond Volatility

1) Yield to Maturity (YTM) plays a crucial role in determining the volatility of bonds. YTM represents the total return an investor can expect to receive if the bond is held until maturity. It takes into account the bond's coupon rate, current market price, and the time remaining until maturity.

2) When YTM increases, the bond's price decreases. This inverse relationship is due to the fact that as YTM rises, the bond becomes less attractive compared

to other investment opportunities with higher yields. Consequently, investors may sell their existing bonds, leading to a decrease in their prices.

3) Conversely, when YTM decreases, the bond's price increases. This occurs because a lower YTM makes the bond more appealing to investors seeking fixed income investments. As demand for the bond rises, its price increases.

4) The impact of YTM on bond volatility can be further understood through an example. Let's consider a bond with a fixed coupon rate of 5% and a face value of $1,000. If the YTM is 5%, the bond will be priced at its face value. However, if the YTM increases to 6%, the bond's price will decline below its face value. On the other hand, if the YTM decreases to 4%, the bond's price will rise above its face value.

5) It's important to note that the relationship between YTM and bond price volatility is not linear. Small changes in YTM can have a significant impact on the bond's price, especially for bonds with longer maturities. This is because the present value of future cash flows is more sensitive to changes in YTM for longer-term bonds.

6) Understanding the impact of YTM on bond volatility is crucial for investors and financial analysts. It helps them assess the potential risks and returns associated with bond investments. By analyzing the relationship between YTM and bond prices, investors can make informed decisions regarding their bond portfolios.

6. Analyzing Past Price Fluctuations

1. Understanding Historical volatility

Historical volatility, often referred to as statistical volatility or realized volatility, measures the degree of price fluctuation experienced by an asset over a specific period. For bonds, historical volatility provides crucial information about the stability and risk associated with their prices. Unlike implied volatility (derived from option prices), historical volatility is based on actual observed data.

Example Consider a 10-year government bond. If its price has been consistently stable over the past year, the historical volatility would be relatively low. Conversely, if

the bond's price has exhibited wild swings, the historical volatility would be higher.

2. Calculation Methods

Several methods exist to calculate historical volatility. The most common approach involves computing the standard deviation of daily or weekly returns. Here are two widely used methods

Close-to-Close Volatility

This method considers the percentage change in bond prices from one closing price to the next. The formula for close-to-close volatility is

$$\text{Volatility} = \sqrt{\frac{1}{N-1} \sum_{i=1}^{N} (r_i - \bar{r})^2}$$

Where r_i represents the daily return, $\bar{r}$ is the average return, and N is the number of observations.

High-Low Volatility

This approach uses the difference between the highest and lowest prices within a given period. It captures intraday fluctuations and is particularly useful for short-term analysis.

Example Suppose we calculate the close-to-close volatility for a corporate bond over the past month. If the resulting value is 2%, it implies that the bond's daily returns have, on average, deviated by 2% from the mean.

3. Interpreting Historical Volatility

Risk Assessment Higher historical volatility indicates greater risk. Investors should consider this when making investment decisions. Bonds with low historical volatility are often favored by risk-averse investors.

Trading Strategies Traders can use historical volatility to optimize entry and exit points. For instance, a high-volatility bond might be suitable for short-term trading, while a low-volatility bond could be part of a long-term portfolio.

Portfolio Diversification Historical volatility helps diversify portfolios. Combining assets with different volatility profiles can reduce overall risk.

4. Limitations and Caveats

Sample Period Historical volatility heavily depends on the chosen observation window. Longer periods smooth out short-term fluctuations, while shorter periods may exaggerate volatility.

Non-Stationary Bond markets evolve, and historical volatility may not capture sudden structural changes (e.g., financial crises).

Assumption of Normality Calculations assume normally distributed returns, which may not hold during extreme market conditions.

Example During the 2008 financial crisis, historical volatility underestimated the risk of mortgage-backed securities due to their non-normal returns.

5. Volatility Clusters

Historical volatility often exhibits clustering, where periods of high volatility follow each other. This phenomenon challenges the assumption of constant volatility and highlights the importance of adaptive models.

Example The European debt crisis led to prolonged periods of heightened volatility in European government bonds.

7. Assessing Future Price Expectations

Assessing Future Price Implied volatility is a critical concept in the world of finance, particularly when it comes to assessing future price expectations for financial instruments such as bonds. It provides valuable insights into market sentiment, risk assessment, and pricing dynamics. In this section, we delve into the nuances of implied volatility, exploring its definition, calculation methods, and practical implications.

Calculation Methods

1. Understanding Implied volatility

Implied volatility represents the market's expectation of future price fluctuations for a specific asset. It is derived from option prices and reflects the uncertainty surrounding an underlying security's future performance.

Options Connection Implied volatility primarily arises from options trading. When investors buy or sell options, they implicitly express their views on the asset's future volatility. High implied volatility suggests greater uncertainty, while low implied volatility indicates relative stability.

Volatility Smile and skew Implied volatility is not uniform across strike prices. The volatility smile (for equity options) or skew (for bond options) illustrates how implied volatility varies with different strike prices. Typically, out-of-the-money options have higher implied volatility due to tail risk concerns.

2. Calculation Methods

Black-Scholes Model The black-Scholes model provides a theoretical framework for calculating implied volatility. By comparing observed option prices with model-derived prices, traders can back out the implied volatility. However, this assumes constant volatility, which may not hold in reality.

Market-Based Approaches Market participants often rely on implied volatility data directly from option prices. Historical volatility, realized volatility, and implied volatility surfaces (IV surfaces) are used to estimate future volatility.

Implied Volatility index (VIX) The VIX, often referred to as the "fear gauge," measures implied volatility for S&P 500 index options. It reflects market expectations of short-term volatility and serves as a sentiment indicator.

3. Practical Implications

Risk Assessment Implied volatility informs risk management decisions. Traders adjust position sizes based on the perceived level of volatility. High implied volatility

may lead to wider stop-loss levels.

Option Pricing Implied volatility directly impacts option prices. As implied volatility rises, option premiums increase. Traders can exploit mispricing by comparing implied volatility across different strikes and maturities.

Event Risk Implied volatility tends to spike during significant events (earnings announcements, geopolitical developments, etc.). Traders can use this information to anticipate market reactions.

Bond market In the bond market, implied volatility affects bond option pricing. Investors use bond options to hedge against interest rate changes or credit risk. High implied volatility may signal uncertainty about future interest rates or creditworthiness.

4. Examples

Scenario 1 Consider a corporate bond with an embedded call option. If implied volatility is low, the call option premium will be relatively cheap. Investors may find it attractive to buy the bond and benefit from potential price appreciation.

Scenario 2 During a financial crisis, implied volatility for government bond options spikes. Traders anticipate heightened market uncertainty, leading to wider bid-ask spreads and higher option premiums.

8. Quantifying Risk in Bond Volatility

1. VaR Definition and Importance

VaR, or Value at Risk, is a widely used risk management measure in the financial industry. It quantifies the potential loss that an investment portfolio or a specific security may experience over a given time horizon, with a certain level of confidence. VaR provides valuable insights into the potential downside risk associated with bond volatility.

2. Calculation Methodologies

There are various methodologies to calculate VaR, including historical simulation, parametric models, and monte Carlo simulation. Each approach has its

strengths and limitations, and the choice of methodology depends on the specific characteristics of the bond portfolio and the desired level of accuracy.

3. Factors Influencing VaR

Several factors influence VaR in bond volatility. These include the duration of the bond, yield curve movements, credit risk, and market liquidity. Understanding how these factors interact and impact VaR is crucial for effective risk management.

4. VaR Interpretation

VaR is typically expressed as a dollar amount or a percentage of the portfolio's value. For example, a VaR of $1 million at a 95% confidence level means that there is a 5% chance of experiencing a loss greater than $1 million over the specified time horizon. It helps investors and risk managers assess the potential downside risk and make informed decisions.

5. VaR Limitations

While var is a useful risk measure, it has certain limitations. It assumes that market conditions remain relatively stable and that historical patterns will repeat in the future. VaR also does not capture tail risk or extreme events that may occur outside the historical data range. Therefore, it is important to complement VaR with other risk measures and stress testing techniques.

6. Example

To illustrate the concept of VaR in bond volatility, let's consider a hypothetical bond portfolio. Suppose the portfolio has a VaR of $500,000 at a 99% confidence level over a one-month time horizon. This implies that there is a 1% chance of experiencing a loss greater than $500,000 in the next month. By understanding VaR, investors can assess the potential risk associated with their bond investments and adjust their strategies accordingly.

9. Techniques for Measuring Bond Price Volatility

When examining the techniques for measuring bond price volatility, it is essential to consider various perspectives and insights. Here, I will provide a comprehensive overview without explicitly stating the section title.

1. Historical Volatility One commonly used technique is historical volatility, which measures the price fluctuations of a bond over a specific period. By analyzing past price movements, investors can gain insights into the bond's volatility and make informed decisions.

2. Implied Volatility Another approach is implied volatility, which is derived from options prices. It reflects market participants' expectations of future bond price movements. Implied volatility can be a valuable tool for assessing market sentiment and predicting potential changes in bond prices.

3. Duration is a measure of a bond's sensitivity to changes in interest rates. It helps investors understand how bond prices may fluctuate in response to interest rate movements. Longer duration bonds tend to have higher price volatility compared to shorter duration bonds.

4. Convexity complements duration by capturing the curvature of the bond price-yield relationship. It provides additional insights into how bond prices may change in response to interest rate fluctuations. Higher convexity implies greater price volatility.

To illustrate these concepts, let's consider an example. Suppose we have two bonds with similar durations but different convexities. Bond A has a higher convexity than Bond B. If interest rates decrease, bond A's price may increase more than Bond B's price due to its higher convexity, resulting in higher volatility.

By incorporating these techniques and understanding their nuances, investors can gain a comprehensive understanding of bond price volatility. Remember, these insights are crucial for making informed investment decisions in the bond market.

2.1.13 Macaulay Duration

Macaulay duration is the weighted average of the time to receive the cash flows from a bond. It is measured in units of years. Macaulay duration tells the weighted average time that a bond needs to be held so that the total present value of the cash flows received is equal to the current market price paid for the bond. It is often used in

bond immunization strategies.

Macaulay duration calculates the weighted average time it takes to receive the present value of a bond's cash flows, relative to its market price. This is done by summing the products of each cash flow's present value and its time period, then dividing by the bond's market price.

Formula for Macaulay Duration:

$$\text{Macaulay Duration} = \frac{\sum_{t=1}^{n} PV(CF_t) * t}{\text{Market Bond Price}} = \frac{\sum_{t=1}^{n} \frac{t * C}{(1+Y)^t} + \frac{n * M}{(1+Y)^t}}{\text{Market Bond Price}}$$

PV(CF): Present value of cash flow at time period t

t: = Time period

C: = Periodic coupon payment

n: = Number of periods to maturity

M: = Maturity value

Y: = Periodic yield

For example, a 2-year bond with a $1,000 face value pays a 6% semi-annual coupon and has a 5% annual interest rate. Its market price is $1,018.81.

The Macaulay duration, calculated by weighting each cash flow's time by its present value, is 1.915 years. This means the bondholder must hold the bond for 1.915 years for the present value of cash flows to equal the bond's purchase price.

Time Periods (t)	Discount Factor	Cash Flow (CF_t)	$PV(CF_t)$	Weight	Weighted Average of Time
0.5	0.976	$ 30	$ 29.268	0.029	0.014
1	0.952	$ 30	$ 28.554	0.028	0.028
1.5	0.929	$ 30	$ 27.858	0.027	0.041
2	0.906	$ 1,030	$ 933.129	0.916	1.832
		$ 1,120	**$ 1,018.810**	**1**	**1.915**

Factors Influencing Macaulay Duration

Coupon Rate: A higher coupon lowers Macaulay duration since more cash is paid early.

Maturity: Longer maturities increase Macaulay duration as the principal is received later.

Yield to Maturity (YTM): Higher YTM decreases duration.

A zero-coupon bond's Macaulay duration equals its maturity, while coupon bonds have shorter durations due to periodic payments.

Macaulay Duration vs. Modified Duration:

Macaulay duration measures the weighted average time to receive the bond's cash flows, whereas modified duration measures the bond's price sensitivity to interest rate changes. Modified duration is calculated by dividing Macaulay duration by 1 plus the periodic interest rate. For example, with a Macaulay duration of 1.915 and a 2.5% semi-annual interest rate, the modified duration is 1.868, indicating a 1.868% price change for every 1% change in interest rates.

While Macaulay duration only applies to bonds with fixed cash flows, modified duration can also be used for bonds with variable cash flows, such as callable or puttable bonds.

Bond Immunization:

Macaulay duration can be used for duration matching in portfolio management to protect against interest rate changes. By matching the durations of assets and liabilities, changes in interest rates affect both sides equally but in opposite directions, keeping the portfolio's overall value stable. However, this strategy is more effective for small rate changes and may be less reliable with large fluctuations.

Key Differences

Since the Macaulay duration measures the weighted average time an investor must hold a bond until the present value of the bond's cash flows is equal to the amount paid for the bond, it is often used by bond managers looking to manage bond portfolio risk with immunization strategies.

In contrast, the modified duration identifies how much the duration changes for each percentage change in the yield while measuring how much a change in the interest rates impacts the price of a bond. Thus, the modified duration can provide a risk measure to bond investors by approximating how much the price of a bond could decline with an increase in interest rates. It's important to note that bond prices and interest rates have an inverse relationship with each other.

Let's Sum Up

Bonds serve as key financial instruments that companies, governments, and other entities issue to raise capital from investors. They are characterized by fixed income payments, typically in the form of interest, and have a defined maturity date when the principal amount is repaid. Bonds vary widely in terms of structure, including government bonds, corporate bonds, and municipal bonds, each with distinct features such as coupon rates, maturity periods, and levels of risk. The safety of bonds is influenced by factors like credit ratings, issuer financial health, and collateralization. Bond prices fluctuate inversely with interest rates, impacting yields and investor returns. Measures like Macaulay duration and modified duration are used to assess bond price volatility, providing insights into sensitivity to interest rate changes and aiding risk management strategies.

Section 2.1 Understanding Bonds Features, Types, and Price Volatility

Check Your Progress – Quiz - 1

1. What type of bonds is typically backed by the full faith and credit of the issuing government?
    a. Corporate bonds
    b. Municipal bonds
    c. Treasury bonds
    d. Agency bonds
2. Which factor primarily determines the safety of a bond?
    a. Coupon rate
    b. Maturity period
    c. Credit rating
    d. Yield to call
3. What happens to bond prices when interest rates increase?
    a. Prices remain unchanged
    b. Prices decrease
    c. Prices increase
    d. No impact on prices
4. Which measure accounts for the linear sensitivity of bond prices to changes in interest rates?
    a. Convexity
    b. Macaulay duration

c. Yield to maturity
d. Modified duration

5. What does a higher credit rating indicate for a bond?

a. Lower risk of default
b. Higher volatility
c. Longer maturity
d. Lower coupon rate

SECTION 2.2 AN OVERVIEW OF PREFERENCE SHARES

2.2.1. INTRODUCTION OF PREFERENCE SHARES

Preferred shares sit between regular stocks and bonds, providing firms and their investors with ample benefits. The distribution of these shares is much higher than common stocks. Their popularity is because only preferred shareholders own this particular stock. Companies can raise more capital using preferred shares because some investors demand more regular dividends and better bankruptcy protections than common shares provide.

As the global bear market continues, more and more investors are turning to preferred stock for high long-term returns while more and more companies are launching different types of preferred stock on the market.

2.2.2 Meaning of Preference Shares

Preference shares are those that receive preference over other equity shares when it comes to dividend payments. Preference shareholders own preference shares and are the first to receive payouts in the event that the business decides to distribute any dividends to its shareholders. As a result, another approach to describe preference stock is as an investment whose holders have the right to receive dividends for the duration of the firm. The same shareholders may also request capital payback if the business performs poorly.

2. 2.3 Types of Preference Shares

1. **Convertible Preference Shares** Convertible preference shares can readily be converted into equity shares.
2. **Non-Convertible Preference Shares** Non-convertible preference shares cannot be converted into common shares.
3. **Redeemable Preference Shares** You can redeem or repurchase this preference share type from the issuing company at a specified price and date. This stock benefits the company by serving as a buffer against inflation.

4. **Non-Redeemable Preference Shares** Non-redeemable preference shares are advantageous for companies because they act as lifelines against inflation. You cannot repurchase these shares from the issuing company at a specified date.

5. **Participating Preference Shares** These shares enable shareholders to claim a portion of the company's excess earnings after dividends are paid to other shareholders at the time of liquidation. However, these shareholders receive a fixed dividend and participate in the company's surplus with the holders of the shares.

6. **Non-Participating Preference Shares** These shares do not offer the owners the opportunity to receive dividends from the company's surplus profits, but they do receive fixed dividends from the company.

7. **Cumulative Preference Shares** Cumulative preference shares give owners the right to receive cumulative dividends from the company, even if it is not profitable. These dividends are arrears in years when the company is not profitable and are paid in full in the following year when the company is profitable.

8. **Non-Cumulative Preference Shares** In the case of non-cumulative preference shares, investors cannot collect dividends in the form of arrears. Dividends are paid out of the company's profits for the current year. Therefore, if a company does not profit in a year, shareholders will not receive a dividend for that year, nor can they receive dividends on future profits or years.

9. **Adjustable Preference Shares** The dividend rate for adjustable preference shares is not fixed and changes as per current market rates.

2.2.4 Features of Preference Shares

Several features of preference shares have led ordinary investors to achieve exceptional returns even during a sluggish economic performance. The following are the most attractive features of preference shares.

1. **Dividend payouts** Preference shares allow owners to receive dividend distributions, while other shareholders may receive dividends later or not at all.

2. **Asset preferences** Considering a company's assets during liquidation, preferred shareholders have priority over non-preferred shareholders. The "preference share" meaning is reflected in the term itself, as the shareholder gets preferential treatment.

3. **They are convertible into common stock** Preference shares are easily convertible into common stock. If a shareholder wishes to change their holdings, the set of shares is converted into a certain number of preferred shares. Some companies that offer preferred shares advise investors that the shares can be converted after a certain date, while others may require approval and consent from the company's board of directors before conversion.

4. **Voting rights** Preference shareholders can vote on specific events, such as any resolution to be taken by the company. However, this is only possible in a small percentage of cases. Generally, the purchase of shares in a company does not confer voting rights in the company's management.

2.2 5 Why Should You Consider Investing in Preference Shares?

There are several reasons why certain stocks are preferred over others. If you are an investor and choose to invest in these stocks, it is a great way to future-proof your investment and reap the benefits of preference shares.

For example, if the company files for bankruptcy, all preferred stockholders will have the first and privileged access to the assets under the hatchet. Such benefits certainly incentivize people with a low-risk appetite to invest at certain times. Moreover, if the company's regular stock performs exceptionally well, holders of preferred stock can convert portions of their holdings into common stock and profit.

2.2 6 What are the risks associated with these Preference Shares?

Like other financial products, these shares also involve certain risks. In times of significant market volatility, there is uncertainty about how much dividend the stock

will generate. Those with a lower risk tolerance may not want to take too many risks with this particular investment opportunity. In addition, some preference shares may initially offer higher yields because they are tied to PAT (after-tax earnings). However, the associated risks can be significant.

These shares are typically issued by companies with substantial market capitalizations and can pay high dividends to a broad subscriber base over a long period. While this may appear to be a risk-mitigating element, it can be quite effective in practice.

2.2.7 What Is the Holding Period Return/Yield?

Holding period return is the total return received from holding an asset or portfolio of assets over a period of time, known as the holding period. It is generally expressed as a percentage and is particularly useful for comparing returns on investments purchased at different periods in time.

Preference Shares Yield

Preference shares are a type of equity that offers a fixed dividend to shareholders before any dividends are paid to common shareholders. The yield on preference shares is an important measure of the return an investor can expect.

Fixed Dividend Rate Preference shares typically pay a fixed dividend rate, which is set when the shares are issued.

Priority in Dividends Preference shareholders have a higher claim on assets and earnings than common shareholders, especially in the event of liquidation.

Yield Calculation

Current Yield is the annual dividend payment divided by the market price of the preference share.

Current Yield = Annual Dividend / Market Price of Preference Share

Holding Period Return (HPR)

Holding Period Return (HPR) measures the total return received from holding an asset or investment over a period of time. It includes all dividends received and any capital gains or losses.

Total Return Sum of capital gains (or losses) and dividends received during the holding period. Holding Period The length of time the investment is held.

HPR Calculation

$$HPR = \frac{(P_1 - P_0) + D}{P_0}$$

Where

P_0 = Initial purchase price of the share.

P_1 = Selling price of the share at the end of the holding period.

D = Dividends received during the holding period.

Yield to Call (YTC)

Yield to Call (YTC) is a measure of the yield of a callable preference share or bond assuming that the issuer will call (redeem) it before its maturity date. Callable shares can be redeemed by the issuer at a set price after a certain date.

Call Price The price at which the issuer can repurchase the preference shares before maturity.

Call Date The date after which the issuer can call the shares.

Fixed Income Preference shares often have fixed dividends, similar to bonds, making YTC a useful measure.

YTC Calculation

YTC = Annual Dividend + (Call Price – Purchase Price) / Years to Call

(Call Price + Purchase Price) / 2

Annual Dividend The fixed dividend paid annually.

Call Price The price at which the issuer will call the share.

Purchase Price The initial price paid for the preference share.

Years to Call Number of years until the call date.

These concepts are crucial for investors in preference shares to evaluate the potential returns and risks associated with their investments

Let's Sum Up

Preference shares are a type of equity that provides shareholders with preferential treatment regarding dividends and asset distribution in the event of liquidation. They offer a fixed dividend rate and are less risky compared to common shares. The yield on preference shares can be calculated using methods such as current yield, yield to call, and holding period return. Preference shares combine characteristics of both equity and debt, making them a hybrid financial instrument. They are typically used by companies to raise capital without diluting voting rights. The valuation of preference shares involves understanding the concept of present value and calculating the expected returns over the holding period.

SECTION 2.2 AN OVERVIEW OF PREFERENCE SHARE

Check Your Progress – Quiz – 2

1. What type of equity gives preferential treatment regarding dividends?
   A. Common shares
   B. Preference shares
   C. Convertible bonds
   D. Debentures
2. Which feature is associated with preference shares?
   A. Voting rights
   B. Fixed dividend rate
   C. High volatility
   D. No dividends

3. What is the yield to call?
    A. The annual dividend payment
    B. The return assuming the shares are held until the call date
    C. The initial purchase price of the shares
    D. The market price at the time of sale
4. What makes preference shares a hybrid instrument?
    A. They have voting rights
    B. They combine characteristics of equity and debt
    C. They are traded on the stock exchange
    D. They pay variable dividends
5. How can the yield on preference shares be calculated?
    E. Market share analysis
    F. Yield to maturity
    G. Current yield and holding period return
    H. Price-to-earnings ratio

SECTION 2.3 VALUATION OF SECURITIES

2.3.1. Present Value Definition

Present Value (PV) is today's value of money you expect from future income and is calculated as the sum of future investment returns discounted at a specified level of rate of return expectation.

This concept is used in the valuation of stocks, bond pricing, financial modeling, and analysis of various investment options. The investor calculates a present value from the future cash flow of investment to decide whether that investment is worth investing in today. The expected cash flow of the future is discounted at a discount rate, which is the expected rate of return calculated inversely with future cash flow. Inflation reduces the value of money in hand since the price of goods and services rises due to inflation, which means the amount worth today might not be equally worth tomorrow. PV calculations make sure the inflationary impact is calculated from either the inflation rate or the expected rate of returns.

How to Find Present Value?

PV = Future Value / $(1+i)^n$

i = interest rate

n = investment period

- Step 1 – Put expected future value of the investment in a formula
- Step 2 – Put Expected rate of return on your investment
- Step 3 – Number of the period you are investing

Present Value

$$\text{Present Value} = \frac{\text{Future Value}}{(1 + i)^n}$$

2.3.2. Importance of Present values

1) **Important for analysis** For every business, it is important to understand future cash inflow or outflow from business; PV calculation becomes necessary when you expect a certain level of future cash flow.

2) **Fundamental concept** To calculate the value of various investments like bonds, stocks, bank deposits, insurance, and **pension funds**, you need PV calculations.

3) **Time-value of money** level of interest rate, inflation, and periods helps in making an investment return you expect in the future from your investment. What is the current value of future worth that helps make investment decisions?

4) **Inflation effect** They make sure that the inflation effect on money is calculated over time by considering either the inflation rate or discounting the expected rate of return from future cash flow.

2.3.3. Benefits of Present Values

Investment Decision This method helps in making investment decisions since it calculates the current value of future cash flows in investment. If the investor does not have enough to invest from which he expects future cash flow,

he would prefer to select other investment options.

Purchasing Power Money worth today is more than the money worth tomorrow, which means a value of $100 today might not be equal to $100 after a year because inflation reduces the value of money. Present considers inflation and provides details on whether today's investment is enough for future cash flow.

Discount Rate The rate of return on investment is called a discount rate. In other words, a combination of the time value of money, which reduces over a period, and interest rate, which raises the value of your investment. A discount rate is used to calculate the PV of the investment in case of a settlement by discounting future value.

2.3.4. Limitations of Present Values

No guaranteed expected return We calculate the PV by assuming interest rate over investment, but in reality, many investments cannot guarantee the rate of returns according to expectation, e.g., in the case of bank deposits, banks can change interest rates, which depends on other economic factors as well. Except for government bonds where risk is less and expected returns are given, no other investment can provide exact present value.

Inflation vs. Interest If the inflation rate is higher than the interest rate on investments, then investment becomes worthless. Suppose the value of money you hold today is higher than tomorrow people prefer to spend it today than invest in tomorrow.

2.3.5 Difference between Present Value vs Future Value

Basics	Present Value	Future Value
Definition	The current Value of Future Cash flow is called the Present Value	Future cash flow resulting after a certain period on today's investments is known as Future Value
When	It focuses on value at the	Future Value focuses on Value

	beginning of a period	at the end of the period
Rate	Interest rates and discount rates both need to consider in the calculation of PV	Only the interest rate is considered while calculating future value.
Decision	It is important to make a decision today regarding a particular investment.	Future Value provides a number that will receive in the future, which does not affect decision-making today.
Methods	Discounted	Compounding to get resulted amount on a future date
Views	It is required to get a certain future value.	Future value provides the value of the current investment in the future.

Present value calculation helps make many investment decisions for the business and individuals; However, the exact value cannot be calculated because of changing interest rates on many investments and inflationary effects; this calculation still helps in estimating individuals' money worth in terms of their future expectations.

Since the present value is calculated at the beginning of the period while making investment decisions, it includes some assumptions regarding inflation and the rate of returns on investment, which should be realistic and proper analysis; a comparison of various investment options is necessary to find the right plan to invest in.

2.3.6 The Comparables Approach to Equity Valuation

The main purpose of equity valuation is to estimate the value of a firm or its security. A key assumption of any fundamental value technique is that the value of the security (in this case an equity or a stock) is driven by the fundamentals of the firm's underlying business at the end of the day.

There are a number of different methods of valuing a company with one of the primary ways being the comparable (or comparables) approach. Before we explore what this valuation method entails, let's compare it to other valuation methods.

2.3.7 Equity Valuations

Comparables Approach A company's equity value should bear some resemblance to other equities in a similar class. This entails comparing a company's equity to competitors or other firms in the same sector,

Discounted Cash Flow A company's equity value is determined by the future cash flow projections using net present value. This approach is most useful if the company has strong data to support future operating forecasts.

Precedent Transactions A company's equity depends on historical prices for completed M&A transactions involving similar companies. This approach is only relevant if similar entities have been recently valued and/or sold.

Asset – Based Valuation. A company's equity value is determined based on the fair market value of net assets owned by the company. This method is most often used for entities with a going concern, as this approach emphasizes outstanding liabilities determining net asset value.

Book – Value Approach. A company's equity value is determined based on its previous acquisition cost. This method is only relevant for companies with minimal growth that might have undergone a recent acquisition.

2.3.8 Comparables Approach An Overview

One of the more popular equity valuation approaches is the comparables approach. This strategy evaluates similar companies and compares relevant valuation metrics. The comparables approach is often one of the easier valuations to perform as long as the company was being valued as public company comparables.

The comparables valuation can simply be determined by comparing a firm to its key rivals, or at least those rivals that operate similar businesses.1 Discrepancies in the value between similar firms could spell opportunity. The hope is that it means the equity is undervalued and can be bought and held until the value increases. The opposite could hold true, which could present an opportunity for shorting the stock or positioning one's portfolio to profit from a decline in its price

2.3.9 Types of Comp Models

The comparables Common market multiples include the following enterprise-value-to-sales (EV/S), enterprise multiple, price-to-earnings (P/E), price-to-book (P/B), and price-to-free-cash-flow (P/FCF).

To get a better indication of how a firm compares to rivals, analysts can also look at how its margin levels compare. For instance, an activist investor could make the argument that a company with averages below peers is ripe for a turnaround and subsequent increase in value should improvements occur.

Precedent vs. Comparables Approach

A different valuation approach called the precedent approach looks at market transactions where similar firms, or at least similar divisions, have been bought out. These companies would have been acquired by other rivals, private equity firms, or other classes of large, deep-pocketed investors.

The primary difference between the precedent approach and the comparables approach is the nature of the business being compared to. The precedent approach relies on prior sales and dispositions. Meanwhile, the comparables approach relies on operating information and financial performance. While the precedent approach focuses on similar sales, the comparables approach focuses on similar operations.

When performing the comparables approach, it's valuable to not only select similar companies in the same sector but to compare performance against industry average. Although our sample size is small in this example, let's compare Eastman Chemical Company to other companies in addition to the average of our sample.

Market Capitalization Of the companies selected, Eastman is among the smallest in terms of market cap. This is valuable information when comparing dollar figures like net income, net margin, and free cash flow. This also sets the precedent that Eastman may have less operational efficiencies than Dow Chemical, Dupont, or Air Products & Chemicals.

Enterprise Value The enterprise value of Eastman is almost 50% higher than its market cap. The closest comparable is Huntsman, whose enterprise value is roughly 25% higher than its market cap. This indicates that Eastman may have higher debt or lower cash value than the nearest comparable sample.

Price/Earnings Ratio Of our sample of 5 companies, Eastman's P/E ratio is fairly similar to the average. This is important to note when comparing other ratios. Because

Eastman is among the higher P/E ratios, the market is pricing in expectations that there will be further company growth (at least compared to the companies with lower P/E ratios such as Huntsman or Dow Chemical).

Price/Revenue Ratio Unlike the P/E ratio, Eastman is below our sample average for the P/R ratio. This indicates the market expects less revenue growth compared to other firms. By comparison, this means the market is anticipating expense savings or operational efficiencies due to the difference in expectations regarding P/E and P/R.

Price/Book Ratio Again, Eastman appears to be on target with our sample average. This is indicates the company's stock is not trading at too high of a premium compared to the industry average.

Net Margin As expected, Eastman has yet to capture many economies of scale that the larger companies have been able to capture. It's net margin is the lowest of the group and below the sample average, indicating that this small company is operating on the smallest margins. This indicates that while Eastman has some favorable metrics, it is likely still operating with inefficiencies due to its size.

Free Cash Flow The industry average does get skewed by Dow Chemical's large free cash flow (which appears to be a potentially unlikely outlier). Still, it is encouraging to see Eastman's free cash flow similar to (and even larger than) some bigger companies like DuPont and Air Products. This may that Eastman may have cash on hand to invest in its infrastructure for future growth.

Overall, Eastman has a relatively fair price compared to similar industry leaders Its valuation will likely be negatively impacted by its low net margin compared to other companies; however, Eastman has free cash flow to address operational inefficiencies.

2.3.10 Important Considerations

It is important to note that it can be difficult to find truly comparable companies and transactions to value an equity. This is the most challenging part of a comparables analysis. For instance, in the example above, only Huntsman Chemical is relatively close in size to Eastman. The other three industry leaders are nearly three times the operational size and likely have the scale and magnitude to operate differently.

Additionally, using trailing and forward multiples can make a big difference in an analysis. If a firm is growing rapidly, a historical valuation will not be overly accurate. What matters most in valuation is making a reasonable estimate of future market multiples. If profits are projected to grow faster than rivals, the value should be higher.1 It is also worth noting that different valuation approaches may yield different findings. **For example,** the discounted cash flow approach looks solely at the company being valued and ignores market factors or competitor data. On the flip side, the stock market can become overvalued at times, which would make a comparable approach less meaningful, especially if comps are overvalued.

What Is the Comparables Approach?

The comparables approach to equity valuation relies on similar companies and their operating performance. Using financial information of other companies, you can analyze how a company compares to competitors and peers within the same sector. Depending on how a company sizes up, this is one approach to determining whether the company is overvalued, undervalued, or valued appropriately.

How Do I Perform Equity Valuation?

There are many equity valuation methods. Some rely strictly on an entity's operations and financial records (i.e. discount cash flow, asset-based approach, book-based approach). Other approaches rely more heavily on what has been occurring in broader markets (i.e. comparables approach or precedent approach). In general, it's best to combine methods and analyze a company using different valuation methods to extract broad information across various data sets.

What Is the Disadvantage to the Comparables Approach?

The comparables approach for equity valuation relies on public data of similar companies. The entity being compared but have equivalent companies, and those equivalent companies must have publicly disclosed information. If either of those criteria are not met, it may be difficult if not impossible to adequately compile comparables information.

Let's Sum Up

Equity share valuation involves determining the present value of future cash flows expected from the shares. This includes understanding various valuation models such as the Dividend Discount Model (DDM), the Price/Earnings (P/E) ratio, and the Free Cash Flow to Equity (FCFE) model. The Dividend Discount Model values shares based on the expected dividends and the required rate of return. The P/E ratio compares a company's current share price to its earnings per share, providing insight into how the market values the company's earnings. The FCFE model calculates the value of equity by estimating the cash flow available to shareholders after accounting for expenses, taxes, and debt payments. These models help investors make informed decisions about buying, holding, or selling equity shares.

Section 2.3 Valuation of Equity Shares

Check Your Progress – Quiz – 3

1. What does the Dividend Discount Model (DDM) value?
    a) Bond yields
    b) Preferred dividends
    c) Future dividends
    d) Asset prices
2. What does the P/E ratio compare?
    a) Share price to market value
    b) Earnings per share to dividends
    c) Share price to earnings per share
    d) Net income to revenue
3. Which model calculates the value of equity by estimating cash flow available to shareholders?
    a) Dividend Discount Model (DDM)
    b) Price/Earnings (P/E) ratio
    c) Free Cash Flow to Equity (FCFE) model
    d) Net Present Value (NPV) model
4. What is the concept of present value based on?
    a) Future cash flows and discount rate

b) Current market prices
c) Past financial performance
d) Asset depreciation

5. Why is equity share valuation important for investors?
   a) To understand market trends
   b) To determine the value of dividends
   c) To make informed decisions about buying, holding, or selling shares
   d) To calculate bond yields

2.4 Unit Summary

This unit explores the fundamental aspects of bonds and preference shares. It begins with an overview of bond issuance reasons, features, types, and determinants of safety, emphasizing the inverse relationship between bond prices and yields influenced by interest rates. The unit then delves into measuring bond price volatility using Macaulay duration and modified duration, alongside exploring the concept and features of preference shares, including their yield calculations and valuation models. Understanding these concepts equips learners with essential skills in financial analysis and investment decision-making.

2.5 Glossary

Bond A debt security issued by governments or corporations.

Preference Share Hybrid equity-debt security with priority dividend rights.

Yield to Maturity (YTM) Total return expected if held until maturity.

Macaulay Duration Weighted average time until bond's cash flows are received.

Modified Duration Adjusted measure of bond price sensitivity to interest rate changes.

Dividend Yield Annual dividend divided by preference share's market price.

Discounting Calculating present value of future cash flows using a discount rate.

2.6 Self-Assessment

1) Define Macaulay duration and explain its significance in bond price volatility.
2) What are the key features of zero-coupon bonds, and why are they attractive to investors?
3) Compare government bonds and corporate bonds in terms of risk and return.
4) How does the yield to call differ from the yield to maturity for preference shares?
5) Explain the concept of discounting and its application in present value calculations.
6) Discuss the factors that influence bond prices and yields.
7) How can investors use modified duration to manage interest rate risk in bond portfolios?
8) What role does credit rating play in determining the safety of bonds?
9) Describe the components of a dividend discount model (DDM) for equity share valuation.
10) Why do investors prefer preference shares over common equity shares in certain situations?

2.7 Case study

Case Study 1 Government Bonds US Treasury Bonds
US Treasury bonds are issued by the United States government to finance its operations and manage national debt. They are considered one of the safest investments globally due to the government's creditworthiness and ability to levy taxes to repay debt. During the global financial crisis of 2008, investors flocked to US Treasury bonds as a safe-haven investment, driving bond prices up and yields down. This inverse relationship between bond prices and yields reflects the bond market's response to economic uncertainty. **Question How do changes in US Treasury bond yields during economic crises impact global markets and what strategies do investors asdopt?**
Corporate Bonds Apple Inc. Bonds

Apple Inc., one of the world's largest technology companies, occasionally issues corporate bonds to raise capital for expansion, acquisitions, and research and development. In 2020, Apple issued bonds with various maturities and coupon rates. These bonds were attractive to investors seeking higher yields compared to government bonds, reflecting Apple's strong creditworthiness and stable financial position. **Question What factors differentiate the risk profiles of bonds from tech giants like Apple vs smaller firms, and how does this affect investors choices?**
Municipal Bonds City of Detroit Municipal Bonds
Municipal bonds are issued by state and local governments to finance public projects such as infrastructure improvements, schools, and hospitals. In 2013, the City of Detroit filed for bankruptcy, significantly impacting investors holding Detroit municipal bonds. The city's financial distress led to uncertainty about bond repayment, causing bond prices to plummet and yields to rise sharply. **Question What are the key factors should bond investors consider when assessing the credit risk of municipal bonds from economically-challeged areas, and how can diversification help mitigate these risks?**

2.8 Answers for check your progress

Section 2.1	**Valuation of Securities: An Introduction to Bonds**
1)	c) Treasury bonds
2)	c) Credit rating
3)	b) Prices decrease
4)	b) Macaulay duration
5)	a) Lower risk of default
Section 2.2	**An overview of Preference shares**
1)	b) Preference shares
2)	b) Fixed dividend rate
3)	b) The return assuming the shares are held until the call date
4)	b) They combine characteristics of equity and debt

5)	c) Current yield and holding period return
Section 2.3.	**Valuation of Equity Shares**
1)	c) Future dividends
2)	c) Share price to earnings per share
3)	c) Free Cash Flow to Equity (FCFE) model
4)	a) Future cash flows and discount rate
5)	c) To make informed decisions about buying, holding, or selling shares

2.10 Reference and Suggested Readings

- RustagiRP(2022),"InvestmentAnalysisandPortfolioManagement",5thEdition,Sulta n Chand & Sons, New Delhi
- Bhalla V.K. (2019), "Investment Management", 19th Edition, S.Chand& Co. Ltd., New Delhi
- Fixed Income Analysis" by Frank J. Fabozzi, Frank J. Fabozzi, Wiley, 2015

UNIT III – FUNDAMENTAL ANALYSIS AND TECHNICAL ANALYSIS
Fundamental Analysis Objectives – Economic Analysis, Industry Analysis, Company Analysis –Technical Analysis Meaning – Assumptions – Pros and cons of technical analysis – Differences between fundamental analysis and technical analysis – Dow Theory – Types of Charts–Chart Patterns–Trend Analysis – Support Line and Resistance Line Volume Analysis – Indicators and Oscillators – Simple Moving Average – Exponential Moving Average – Relative Strength Index – Bollinger Band – Elliott Wave Theory.

THEORIES OF FUNDAMENTAL ANALYSIS AND TECHNICAL ANALYSIS

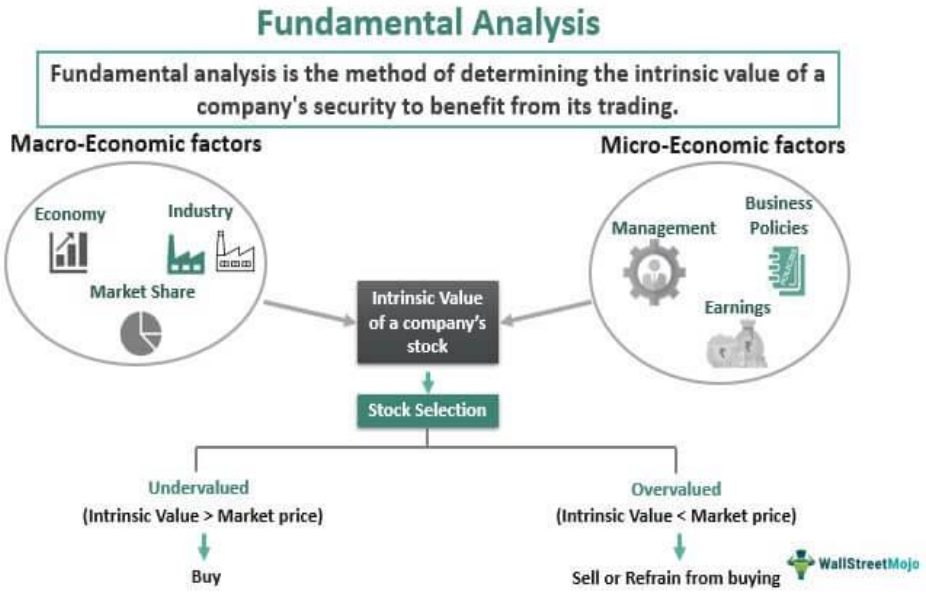
Unit Objectives

The unit aims to provide a comprehensive understanding of both fundamental and technical analysis in financial markets. It covers economic, industry, and company analysis to evaluate the intrinsic value of securities. The unit also delves into the principles of technical analysis, including chart patterns, trend analysis, and various technical indicators, helping in making informed trading decisions.

Section 3.1 Navigation of Fundamental Analysis

3.1 1 What is meant by Fundamental Analysis?

Fundamental analysis (FA) refers to the process of studying any security's intrinsic value with the object of making profits while trading in it. The primary purpose of fundamental analysis is to determine whether the security or stock is undervalued or overvalued and thereby make an informed decision to buy, hold, or sell it in order to maximize the potential for gains.



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Fundamental Analysis in simple terms in the art of evaluating any business to its basics and getting an accurate picture of how financially healthy and sustainable it is. It involves studying a company's potential for future growth by considering various micro and macroeconomic factors. This analysis assists in deriving at an intrinsic value of stock that aids investment decisions.

3.1.2 Understanding Fundamental Analysis Basics

Fundamental analysis assesses a company's potential based on financial and non-financial data to obtain the fair value of its security, stock, bond, or derivative. It is a powerful tool for investors and stakeholders to understand the growth prospects and financial health of a company. Therefore, it is one of the most effective ways to evaluate investments.

It involves examining every aspect of a company's operations through its balance sheet, past performance, financial reports, even market goodwill, management, and consumer behavior to arrive at the intrinsic value of its securities.

The analysis begins from macroeconomic factors such as the economy and industry performance and goes down to microeconomic factors like management, strategic initiatives, and business policies. Note that the analysis can also start at the microeconomic level and then move to macro components.

On conducting Fundamental analysis, if an investor deduces that a stock's intrinsic value is greater than its market price, it means the stock is undervalued. In that scenario, the investor buys such stock and holds it until the market price reaches the intrinsic value. Then, the investor makes a sizeable profit on selling at intrinsic market price.

Similarly, an investor may decide to sell or refrain from buying an overvalued security. Being overvalued means that the stock's intrinsic value is less than its market price. Thus, FA may guide investors to manage risks and make informed investing decisions by ascertaining the intrinsic value of a stock. Financial ratios calculated using data from the financial statements are the primary tool of FA.

Blindly investing in stocks without conducting FA may result in major losses, as revealed by the dot-com bubble in 2008-09. Thus, investors should employ fundamental analysis to make conclusions about companies and their securities. However, in practice, it should be used in conjunction with another process called technical analysis.

The technical analysis involves closely observing the stock price movements to predict the future and make investment decisions. It depends on past trends, stock charts, and price history to look for stocks that may perform better in the long run. Hence, technical analysis can be called the fundamental analysis of the stock market.

3.1.3 Types of Fundamental Analysis

Fundamental Analysis is used in many areas and is classified into two types –

1. Qualitative analysis

Qualitative analysis involves the study of a company's goodwill, consumer behavior, demand, and company recognition in broader markets. It aims to unearth answers to questions like how it is perceived, how management decisions or announcements create a buzz in the market, and how it is different from its substitutes. In addition, its brand value and other common factors depict its socio and economic position in the market.

2. Quantitative analysis

Quantitative analysis is inclined towards statistics, reports, and data. It is solely based on its financial statements, quarterly performance, balance sheets, debt, cash flow, etc. It involves analyzing numbers, ratios, and values to understand the price of the shares and the company's overall financial health.

There are certain qualitative fundamentals that analysts should always consider when analyzing a company. These include the following

- **The Business Model** What exactly does the company do? This isn't always straightforward. If a company's business model is based on selling fast-food chicken, is it making its money that way? Or is it coasting on royalty and franchise fees?
- **Competitive Advantage** A company's long-term success is primarily driven by its ability to maintain its competitive advantage. Competitive advantages, such as Coca-Cola Co's (KO) brand name and Microsoft Corporation's (MSFT) long domination of the personal computer operating system, create a moat around a business, allowing it to keep competitors at bay and enjoy growth and profits.
- **Management Team** Some think management is the most important criterion for investing in a company. This makes sense Even the best business model is doomed if the company's leaders fail to execute the plan properly. While it's hard for retail investors to meet and truly evaluate managers, you can look at the corporate website and check the resumes of the top brass and the board members. How well did they do in previous jobs? Have they been unloading a lot of their stock shares lately?
- **Corporate Governance and Board Structure** These are provided by the policies within an organization indicating the relationships and responsibilities among management, directors, and stakeholders. These policies are defined and determined in the company charter, its bylaws, and corporate laws and regulations. You want to do business with a company that is run ethically, fairly, transparently, and efficiently. Note whether management respects shareholder rights and shareholder interests. Ensure their communications to

shareholders are transparent and understandable. If you don't get it, if there are major issues you know surround the company and they aren't addressed, it's not a sign that they have good answers for you.

- **Industry Trends** It's also important to consider a company's industry its customer base, market share among firms, industry wide growth, competition, regulation, and business cycles. Learning how the industry works will give an investor a deeper understanding of a company's financial health.

- **Stakeholder Satisfaction** Employees, managers, customers, suppliers, investors, and other stakeholders should all have positive views on the company and its prospects. Without that, a company's brand equity and image can suffer, which can lead to fewer sales, lower profits, and flagging share prices.

3.1.4 Quantitative Fundamentals to Consider Financial Ratios

Financial statements are how a company discloses information about its financial performance. Here are some of the most important financial ratios with their formulas

Key Financial Ratios		
Category	**Ratio**	**Formula**
Profitability	Gross profit margin	(Revenue - Cost of Goods Sold) / Revenue
Higher margins and returns generally indicate a more profitable and efficient business.	Operating profit margin	Operating Income / Revenue
	Net profit Margin	Net Income / Revenue
	Return on assets (ROA)	Net Income / Average Total Assets
	Return on	Net Income / Average

	equity (ROE)	Shareholders' Equity
Liquidity	Current ratio	Current Assets / Current Liabilities
A higher ratio suggests that the company has enough liquidity to cover its near-term liabilities.	Quick ratio	(Cash + Marketable Securities + Accounts Receivable) / Current Liabilities
Solvency	Debt-to-equity ratio	Total Liabilities / Total Shareholders' Equity
These ratios measure a company's ability to meet its long-term debt obligations. Lower debt ratios and higher interest coverage ratios generally indicate a more financially stable company.	Debt-to-assets ratio	Total Liabilities / Total Assets
	Interest coverage ratio	Operating Income / Interest Expense
Efficiency	Asset turnover ratio	Revenue / Average Total Assets
These ratios measure how effectively a company manages its assets to generate sales. Higher turnover ratios suggest that the company is using its assets more efficiently to generate revenue.	Inventory turnover ratio	Cost of Goods Sold / Average Inventory
	Receivables turnover ratio	Revenue / Average Accounts Receivable
Valuation	P/E	Market Price per Share / Earnings per Share

Lower ratios may indicate that the stock is undervalued, while higher ratios may suggest that it is overvalued.	Price-to-book (P/B) ratio	Market Price per Share / Book Value per Share
	Price-to-sales (P/S) ratio	Market Price per Share / Revenue per Share
	Dividend yield	Annual Dividends per Share / Market Price per Share

3.1.5 Components of Fundamental Analysis

Fundamental analysis is a method of evaluating a security (such as a stock) by examining the underlying factors that affect its intrinsic value. It involves analyzing various aspects of the economy, industry, and specific company performance to assess the investment's potential for growth and profitability. Here's a breakdown of the three main parts of fundamental analysis

1. Economic Analysis

Economic analysis involves studying the overall economic environment to understand how macroeconomic factors influence investments.

- Macroeconomic Indicators Analysts examine factors such as GDP growth, inflation rates, interest rates, and unemployment levels. These indicators provide insights into the general health of the economy and its potential impact on businesses.
- Government Policies Analysis of fiscal policies (government spending and taxation) and monetary policies (interest rates and money supply) helps assess their effects on business operations and consumer behavior.
- Global Economic Trends Consideration of global economic conditions and geopolitical events that may impact markets and industries.

2. Industry Analysis

Industry analysis focuses on evaluating the specific industry or sector in which a company operates.

- **Market Structure** Assessment of the industry's competitive landscape, including the number and size of competitors, barriers to entry, and market concentration.
- **Industry Trends** Identification of trends such as technological advancements, regulatory changes, consumer preferences, and market demand shifts that affect industry growth prospects.
- **Industry Lifecycle** Understanding whether the industry is in a growth, maturity, or decline phase, which impacts profitability and investment opportunities.
- **Comparative Analysis** Comparison of financial metrics and performance ratios of companies within the same industry to identify strengths, weaknesses, and competitive positioning.

3. Company Analysis

Company analysis involves evaluating the financial health, management quality, and competitive position of a specific company.

- **Financial Statements** Examination of financial statements (income statement, balance sheet, cash flow statement) to assess profitability, liquidity, debt levels, and overall financial stability.
- **Management Quality** Evaluation of the company's leadership, corporate governance practices, strategic decisions, and alignment of management interests with shareholder value.
- **Business Model** Understanding the company's core business operations, revenue sources, cost structure, and scalability.

- **Valuation** Estimation of the company's intrinsic value using valuation metrics such as price-to-earnings ratio (P/E ratio), price-to-book ratio (P/B ratio), and discounted cash flow (DCF) analysis.

3.1.6 Importance of Fundamental Analysis

Fundamental analysis helps investors make informed decisions by providing a comprehensive view of a company's financial health, growth potential, and intrinsic value relative to its market price. By analyzing economic, industry, and company-specific factors, investors can assess risks, identify opportunities, and determine whether a security is overvalued, undervalued, or fairly priced in the market.

Understanding these three main parts of fundamental analysis is essential for investors seeking to build a well-rounded investment strategy based on thorough research and analysis of key factors influencing investment decisions.

3.1.7 Limitations of Fundamental Analysis

Though fundamental analysis can provide investors with insights into the future of a company, it does come with some downsides. Keep these items in mind when performing fundamental analysis

- **Its Time-Consuming** Fundamental analysis involves a detailed examination of financial statements, economic data, industry reports, and company-specific factors. This process requires collecting extensive data, performing complex calculations, and interpreting various financial metrics - which all times time (which leads into the next downside....).

- **It's A Lagging Indicator** In addition to being a slow process, fundamental analysis often acts as a **lagging indicator** because it relies on financial data that reflects past performance. By the time changes in a company's fundamentals become apparent in its financial statements, the stock price might have already adjusted.

- **Relies on Historical Data** Similarly, fundamental analysis is based largely on historical financial information. While this data provides a basis for

estimating future performance, it may not fully capture future risks or opportunities, as past performance is not an indicator of what's to come in the future.

- **Subject to Accounting Practices** The accuracy of fundamental analysis depends on the integrity and transparency of a company's financial statements. Keep in mind that things like management estimates, depreciation, or other **GAAP-compliant** requirements can (perhaps improperly) impact the fundamental analysis.

- **Difficult to Value Intangibles** Intangible assets like patents, trademarks, brand reputation, and human capital are increasingly important in today's economy. However, these assets are challenging to quantify and may not be fully reflected in a company's financial statements. Consider how some investors would have believed in Apple simply because of Steve Jobs; that notion is not captured in fundamental analysis.

- **Economic Assumptions** Fundamental analysis often involves assumptions about future economic conditions such as interest rates, inflation, and economic growth. Again, these are always changing and may not materialize as expected.

- **Overlooked Short-Term Opportunities** Fundamental analysis is geared towards long-term investment decisions, focusing on a company's intrinsic value and potential for growth over time. This long-term focus might cause investors to miss short-term trading opportunities that technical analysis can identify such as price patterns, volume spikes, or momentum indicators.

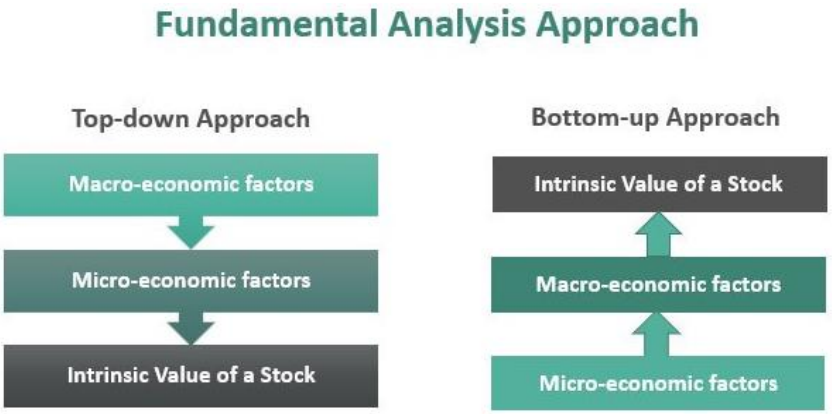
3.1.8 Steps to do Fundamental Analysis

1. Top-down approach

In this approach, experts start from macroeconomic factors assessing the **economy** and industry first. Then, they come down to market conditions and ultimately to evaluating a company's progress, management, and other microeconomic factors.

2. Bottom-up approach

This approach is the vice versa of the top-down course. It starts with studying the company, digging up its record and performance, and then slowly moving upwards to macroeconomic factors like industry conditions and a country's economy.



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A step-by-step execution is initiated to perform a fundamental analysis of stocks, securities, or companies. The critical aspects of it are –

1. Economic, industry, and company analysis

Fundamental Analysis considers the industry's structure, economy, industry dynamics, aspects of broader markets, and all the other macroeconomic factors.

The experts study the products, commodities, services rendered, and substitutes available along with cost structure and revenue model and composition and the company's future goals and objectives.

2. Evaluation of financial statements

Every company report is studied closely – the balance sheets, income statement, cash flow, price to book value of equity, the net market value of assets, and other vital ratios with revenue.

3. Study of non-financial aspects

Besides a company's financial statement, non-financial matters like competition, management, business policies, etc., also influence a company.

Therefore, in the FA of stocks, experts also look for factors that can influence or undermine the company's performance.

4. **Use of FA tools**

Investors and analysts use financial ratios to determine a company's financial standing. It is used along with the available financial data from past reports to measure future growth, stability, and investment.

5. **Recommendation**

Based on the study, investment decisions are taken. Analysts advise investors to buy, sell, or hold security after carefully assessing its intrinsic value and financial stability.

Fundamental Analysis Examples

The disintegration of the auto-giant General Motors stocks in 2009 is one of the glaring examples of the risks of ignoring fundamental analysis. Unfortunately, investors who missed the fundamentals bore the brunt of the massive collapse of the GM stock that led to GM filing bankruptcy protection.

A 2018 research study by Raúl Navas, Ana Paula Matias Gama, and Sónia R. Bentes investigates the significance of FA in understanding the worth of a company. The study concludes that the investors can use FA scores to create a portfolio that is likely to yield them remarkable returns within a year or two. The research also adds to the understanding of mispriced stocks in the European capital market.

Let's Sum Up

This section focuses on evaluating the economic environment, industry dynamics, and company-specific financial health. Key concepts include financial statement analysis, ratio analysis, and management assessment.

Section 3 1 Fundamental Analysis

Check Your Progress – Quiz – 2

1. Which of the following is a key component of fundamental analysis?
   a) Moving Average
   b) Candlestick Patterns

c) Economic Indicators
d) Relative Strength Index (RSI)

2. In company analysis, which financial statement provides a snapshot of a company's assets, liabilities, and shareholders' equity at a specific point in time?
   a) Income Statement
   b) Balance Sheet
   c) Cash Flow Statement
   d) Statement of Retained Earnings
3. Which ratio is commonly used to assess a company's profitability relative to its total equity?
   a) Current Ratio
   b) Debt-to-Equity Ratio
   c) Return on Equity (ROE)
   d) Price-to-Earnings (P/E) Ratio
4. What does the Price-to-Earnings (P/E) ratio indicate?
   a) The proportion of a company's earnings paid out as dividends
   b) The market value of a company's equity
   c) How much investors are willing to pay per dollar of earnings
   d) The company's debt levels compared to its equity
5. Which economic indicator is most commonly used to measure the overall economic performance of a country?
   a) Unemployment Rate
   b) Inflation Rate
   c) Gross Domestic Product (GDP)
   d) Consumer Confidence Index

SECTION 3.2 AN OVERVIEW OF TECHNICAL ANALYSIS

3.2.1 What is Technical Analysis?

Technical analysis is the analysis of the price movements in a market or of an instrument over a period of time, which could range from short term to long term, to reveal investor trends.

Investor sentiments and behaviour dictate prices which are set at the meeting point of demand and supply at any given point in time.

To conduct technical analysis, one does not need to know the instrument or the market in depth but needs the data of a freely-traded instrument or market because price movements betray investor behaviour and can reveal the best time to buy or sell for investors. Analysts focus on the following indicators while doing technical analysis

- Price trends
- Oscillators
- Moving averages
- Chart patterns
- Momentum and volume indicators
- Resistance and support levels

The impact of supply and demand on changes in price, volume, and implied volatility is examined using technical analysis tools. It operates under the presumption that, when combined with suitable investing or trading rules, historical trading activity and price changes of security can serve as valuable predictors of the security's future price movements.

3.2.2 Assumptions of Technical Analysis

Technical analysis theory is based on the following three assumptions

The market discounts everything Analysts believe that the impact of all the factors ranging from fundamentals to wider market psychology is already incorporated in the stock price.

Price moves in trends According to technical analysts, prices will exhibit trends even in non-uniform market movements and this does not depend upon the time frame in consideration.

History repeats itself According to technical analysts, History is likely to repeat itself. This is attributed to the usually predictable market psychology which affects price in a repetitive nature.

3.2.3 Components of Trend Lines

a) Trend Lines

The assumption underlying technical analysis is that prices trend. As a result,

the employment of trend lines is critical for trend identification as well as trend confirmation.

A straight line is a trend line. It joins two or more price points and then continues into the future to serve as a support or resistance line. Trend lines are particularly beneficial for stock technical analysis.

b) Support and Resistance

Support and resistance are essentially price marks on a chart. These points are predicted to generate the greatest amount of buying or selling.

In technical analysis, the support price is the price at which there are more buyers than sellers. In the technical market, the resistance price is the price at which more sellers are expected than buyers.

c) Volume

Volume in technical stock analysis refers to the number of shares of a stock that are traded on a certain day or period of time.

Volume is critical since it validates previously determined trend directions. Volume is an important input. While studying stock charts, consider both price and volume.

3.2.4 Advantages and Limitations of Technical Analysis

Pros of Technical Analysis	Cons of Technical Analysis
It helps identify trends in the market, i.e. whether they are bullish, bearish, etc.	It can be subjective and may give conflicting signals.
It provides entry and exit signals, which lets an investor identify when to enter and exit trades.	Since technical analysis is based only on price and volume data, it may not consider fundamental factors.

It helps in managing risk, which ultimately limits the losses.	It may not work in all types of market conditions and may give false signals.
Since technical analysis is based on objective data and mathematical calculations, it provides a clear approach.	For using technical analysis, it may require some skill and experience. New traders may find it difficult to use.

3.2.5 Fundamental Analysis vs. Technical Analysis

Fundamental analysis contrasts starkly with **technical analysis,** which attempts to forecast prices by analyzing historical market data such as price and volume. Technical analysis uses price trends and action, often plotted on charts, to create indicators and identify patterns. Some indicators develop patterns that have names resembling their shapes, such as the "head and shoulders" pattern.

A major distinction is where "value" comes from. For technical analysts, the market sets prices, and hence, the changes there give a company its value. For fundamental analysts, there is an intrinsic value that the market can often miss.

Fundamental vs. Technical Analysis

Fundamental Analysis

- Estimates the intrinsic value of a company from its operations
- Considers a company's financial statements and qualitative factors
- Longer-term focus (months/years)
- Best for buy-and hold investing

Technical Analysis

- Looks at price and market trends to uncover market psychology
- Considers historical prices and chart patterns
- Shorter-term focus (days/weeks)
- Best for short-term or swing trading

Let's Sum Up

Technical analysis involves evaluating securities by analyzing statistical trends from trading activity, such as price movement and volume. It is based on the idea that

historical price movements can indicate future price trends. Technical analysts use various charts, patterns, and indicators to make informed trading decisions.

SECTION 3. 2 AN OVERVIEW OF TECHNICAL ANALYSIS

Check Your Progress

1. What type of chart is characterized by "candlesticks" that show the open, high, low, and close prices for a security over a specific period?
    a) Line Chart
    b) Bar Chart
    c) Candlestick Chart
    d) Point and Figure Chart
2. The Relative Strength Index (RSI) is used to identify which of the following?
    a) Trend direction
    b) Market volume
    c) Overbought or oversold conditions
    d) Price-to-earnings ratio
3. Which of the following statements is true about the Simple Moving Average (SMA)?
    a) It gives more weight to recent prices.
    b) It is calculated by taking the average of closing prices over a specific period.
    c) It is used to identify market volume.
    d) It only considers opening prices.
4. Bollinger Bands consist of
    a) Three lines a middle band and two outer bands.
    b) Two lines a resistance line and a support line.
    c) Four lines two resistance lines and two support lines.
    d) A single line representing average price.
5. According to Dow Theory, how many phases are there in a primary trend?
    a) One
    b) Two
    c) Three
    d) Four

SECTION 3.3 ADVANCED TECHNICAL TOOLS

3.3.1 Dow Theory

Charles Dow (1851–1902) is considered to be the father of technical analysis

- The Dow theory on stock price movement is a form of technical analysis. The theory was derived from 255 wall street journal editorials written by Charles h. Dow , journalist, founder and first editor of *the Wall Street journal* and co-founder of Dow jones and company.
- As larger corporations began to emerge in the 1890s, Dow created the Dow Jones Industrial Average (DJIA). When it was created In 1896, it included 12 corporations. Dow would make a note of the closing price of all 12 corporations, add them up, and divide by 12 to come up with the average.
- The original index of rail stocks had two non-rail stocks, Dow replaced these two non-rail stocks with rail stocks, and the Dow Jones Railroad Average (DJRA) was born. In 1970, when the average was changed to the Dow Jones Transportation Average (DJTA), the rail stocks were replaced by airline and trucking stocks.
- When industrial output is up, the railways are busy and both indices should be up. When industrial output is down, the railways will be less busy and both indices should be lower.
- **Hypothesis-** Dow Theory is based on the hypothesis that the stock market does not perform on a random basis. Rather, it is guided by some specific trends.

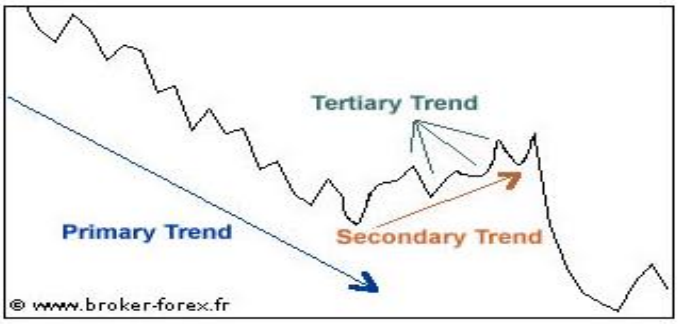
Dow Theory is based on six principles

- **Price of assets incorporates all information(** profit potential and competitive edge)
- **Three primary kinds of market trends (bull and bear market**)
- **The primary trends have three phases** accumulation, public participation, and excess stages distribution, public participation, and panic stages.

- **Market indices must correlate with each other** both indices signal the same upward or downward trend, traders can confirm that a new market trend
- **Market trends should correlate with corresponding volumes** bull market, market volume should increase accordingly. In a bear market, market volume should decrease over time.
- **The trend persists until a clear reversal occurs**

3.3.2 Three types of specific trends have been named in Dow Theory

- **PRIMARY TREND-** primary movement or major trend may last from less than a year to several years. It can be bullish or bearish.
- **SECONDARY TREND-** primary movement or major trend may last from less than a year to several years. It can be bullish or bearish.
- **MINOR TREND-** day to day trend or movements in prices over few days. It is of very short duration.



https://www.forex-central.net/charles-dow-theory.php

3.3.3 Charting Basic Tools

- Motive of identifying price trends based on historical data.
- Trend used to forecast future behaviour.
- Used for either a particular security or market in general.
- Both price and volume data are studied simultaneously for both (security as well as the market).

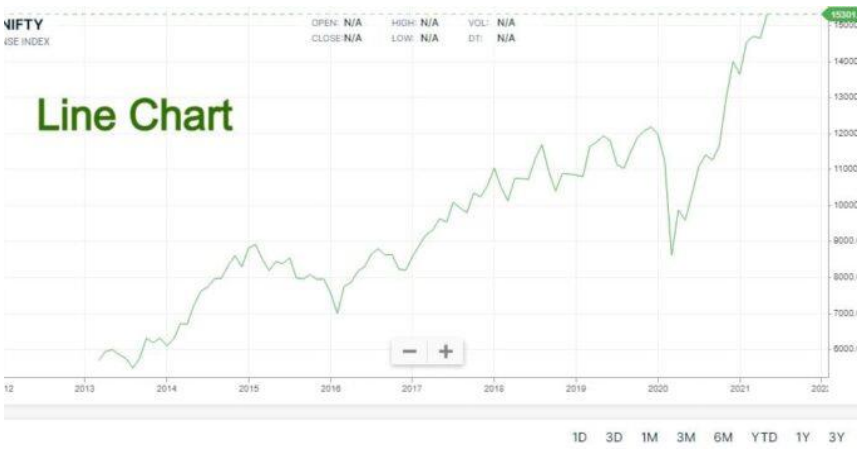
Price charts

- **The opening price** It is the price at which the first trade is executed when the markets open up for trading at 9.15 AM.
- **The lowest point** It is the lowest price at which a trade is executed in a trading session.
- **The highest point** It is the highest price at which a trade is executed in a trading session.
- **The closing price** When the markets close for trading, the price at which the final trade for the day is executed is known as the closing price.

Line Chart

Line chart is used to depict the trends in the price of a particular stock or index over a certain period of time. This kind of chart is very useful when it comes to determining the overall trend of a stock. With one look at a line chart, you can identify the price or volume movements of that stock.

Firstly, to plot a line chart, the prices of a stock at different points in time are marked by dots along the horizontal and vertical axis. Here, the horizontal axis represents the time frame and the vertical axis represents the price of the stock. Once that is done, the dots are then connected using a line.



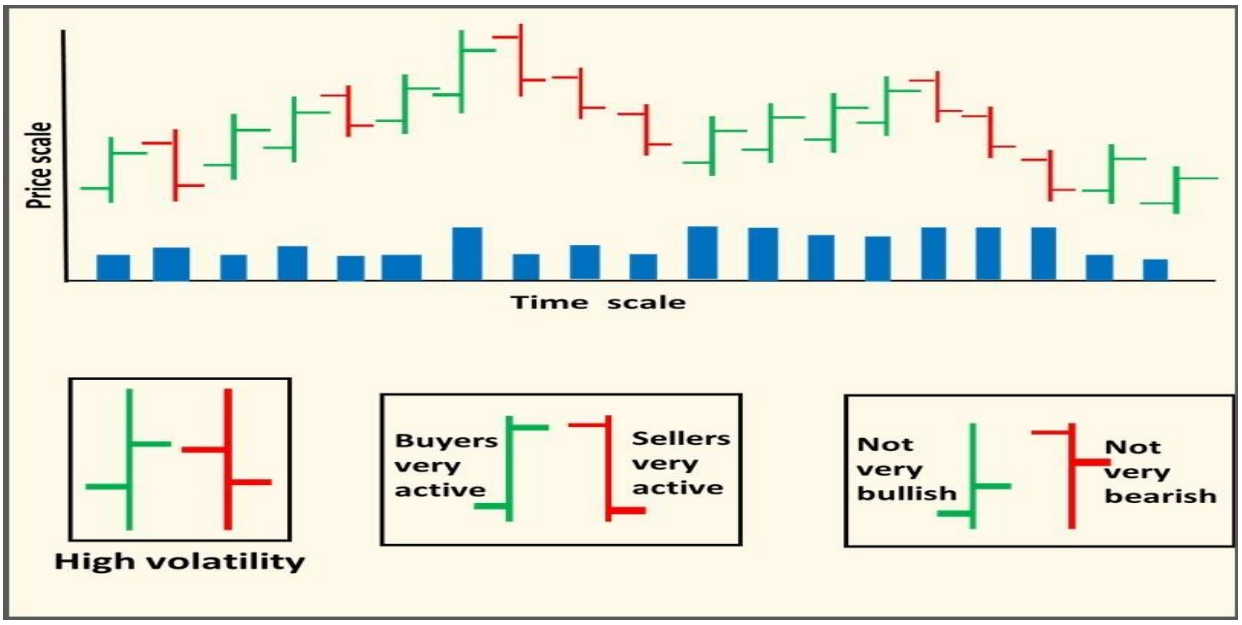
https://www.stockamj.com/line-chart-in-stock-market/

Bar Chart

A bar chart is more useful to a trader involved in technical analysis.

It depicts these four price points of a stock for a particular period of time easily.

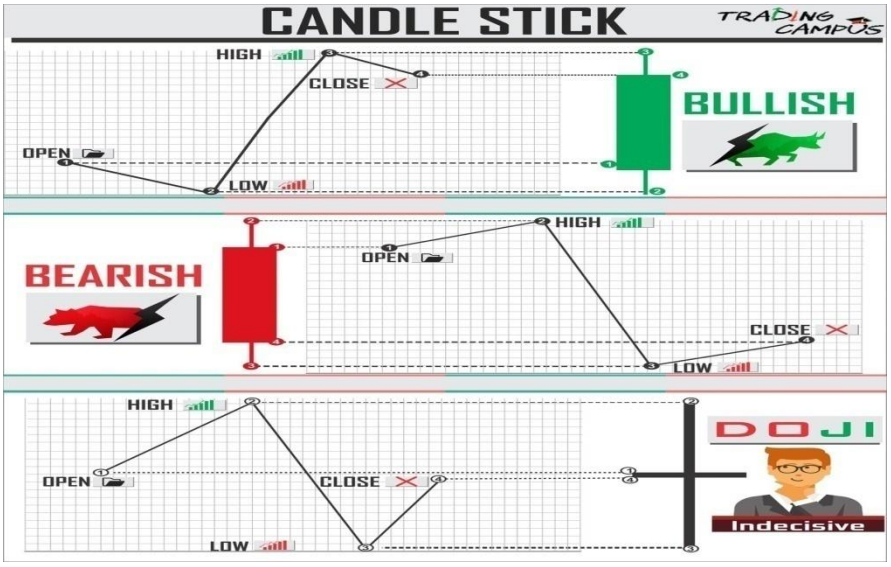
This is a popular technique of showing the price variation and volume on a particular day.



https://www.youtube.com/watch?v=oLW4BYRaTqw

Candlestick

A candlestick looks similar to a bar chart, except that it uses a rectangular body to depict the opening and closing prices of a stock instead of the two horizontal protrusions.



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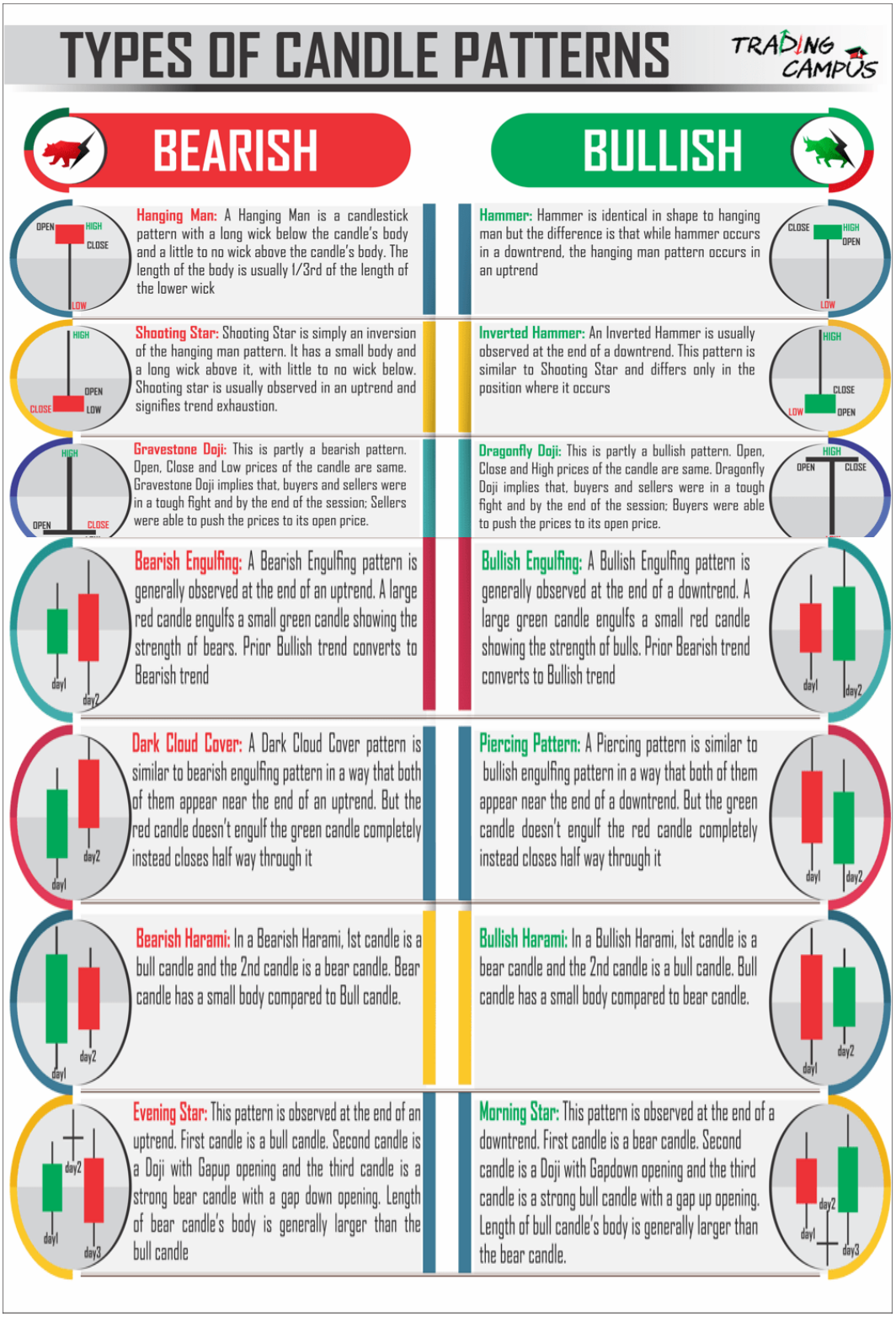

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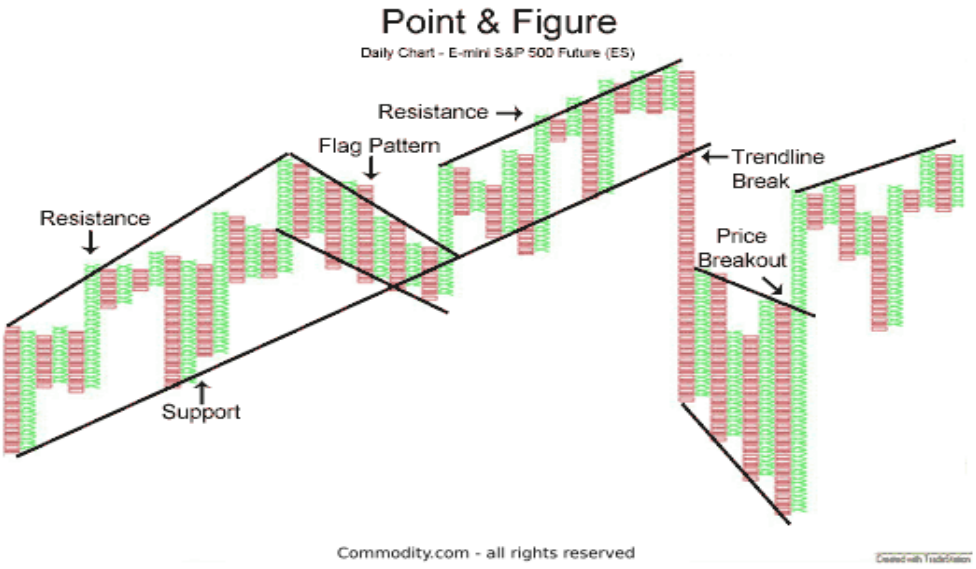
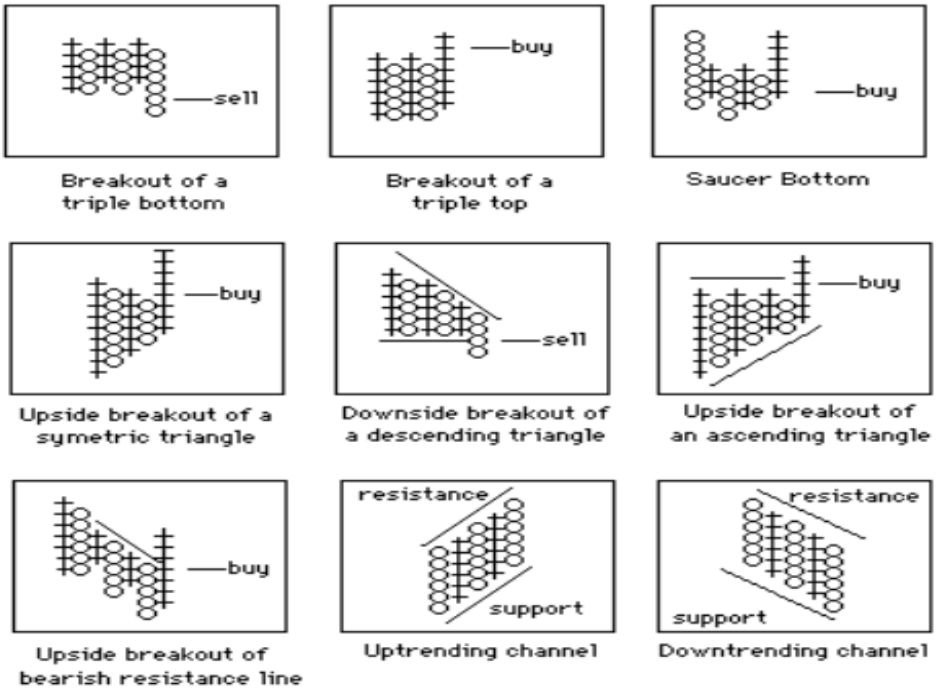
Point and Figure chart

- The point and figure chart is not well known or used by the average investor but it has had a long history of use dating back to the first technical traders.

- This type of chart reflects price movements and is not as concerned about time and volume in the formulation of the points.
- In order to prepare this type of graph ,the analyst has to decide as to what is a significant price change .
- It uses a chart with "X"s and "O"s for predicting financial asset prices. The "X"s are used to indicate rising prices and "O"s to indicate falling prices

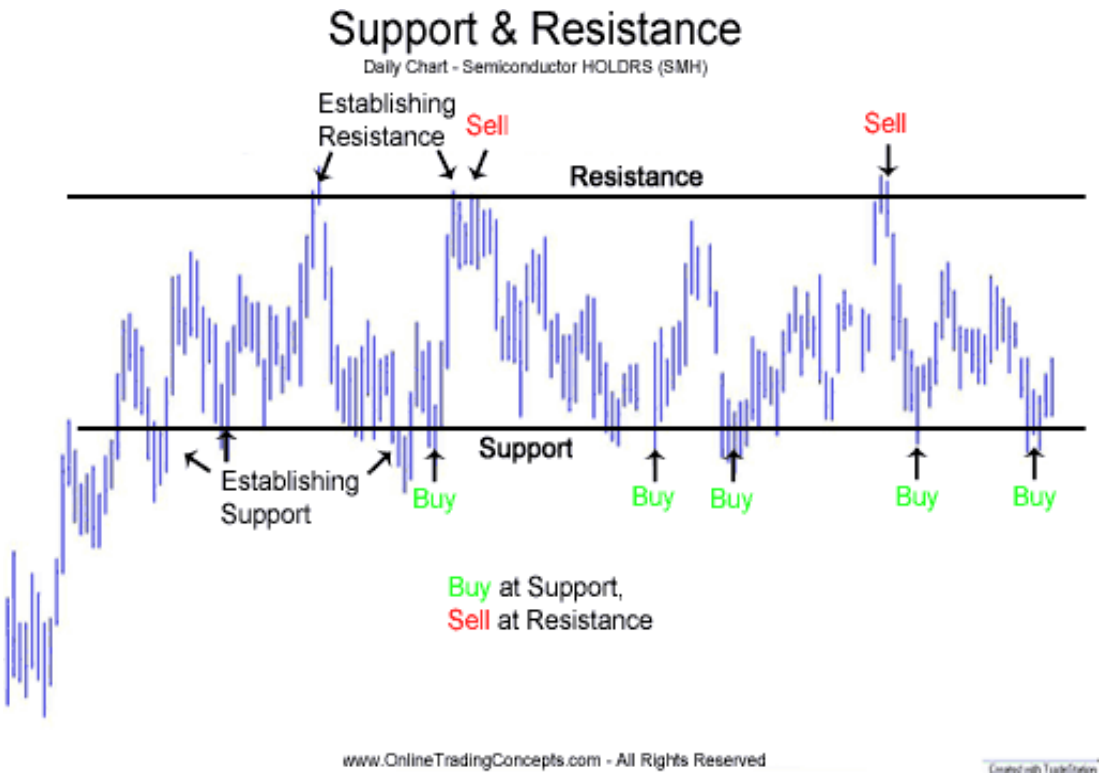


https://commodity.com/technical-analysis/point-figure/



Support and Resistance Levels

- Support is the price level at which demand is thought to be strong enough to prevent the price from declining further.
- The logic dictates that as the price declines towards support and gets cheaper, buyers become more inclined to buy and sellers become less inclined to sell.
- Resistance is the price level at which selling is thought to be strong enough to prevent the price from rising further.
  - The logic dictates that as the price advances towards resistance, sellers become more inclined to sell and buyers become less inclined to buy.



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Reversal Patterns and Continuation Patterns

- The reversal patterns are those which indicate a reversal of existing trend.
- It can further be classified as bullish patterns or bearish patterns.
- The continuation patterns suggest that there is only a pause in the market and the old trend will continue again after the pause.

ELLIOT WAVE THEORY

- Developed by Ralph Nelson Elliot.
- Theory states that the long term major patterns may consist of five successive steps or five waves.

Types of market

- Bull market
- Bear market

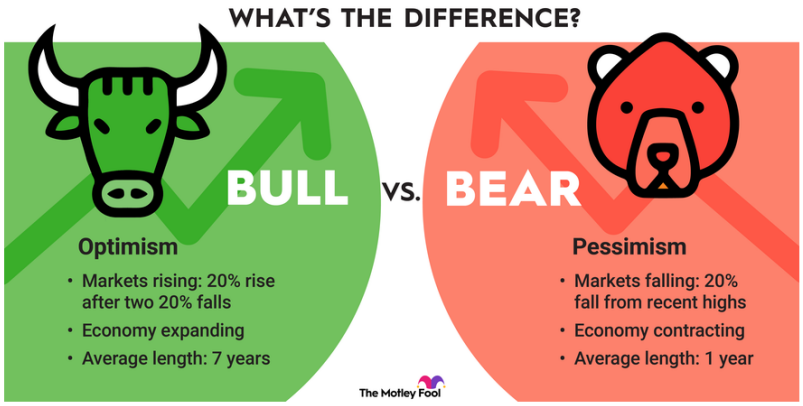
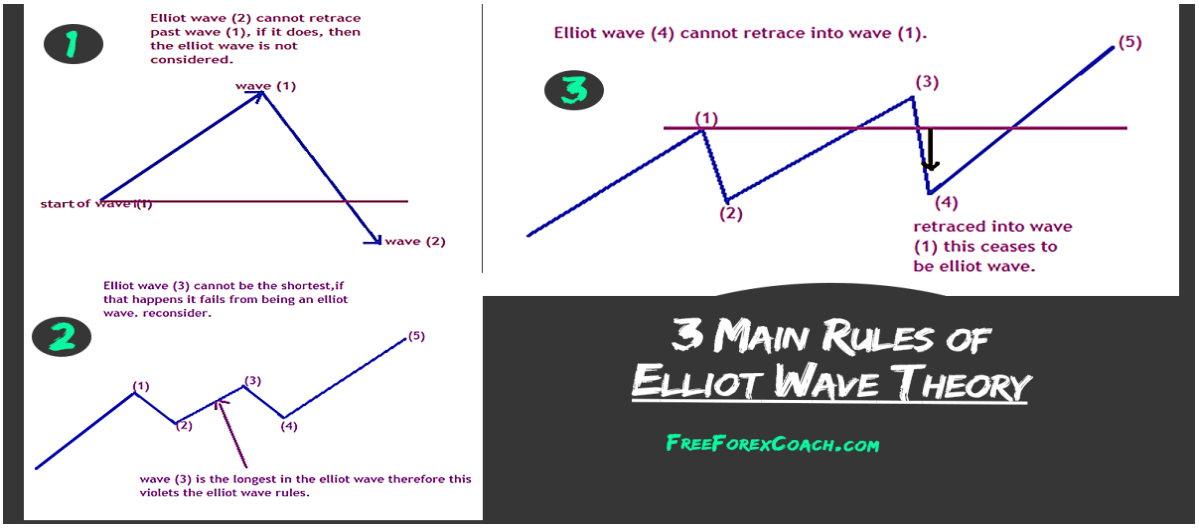


Image source: The Motley Fool

https://www.fool.com/investing/how-to-invest/bull-vs-bear-market/

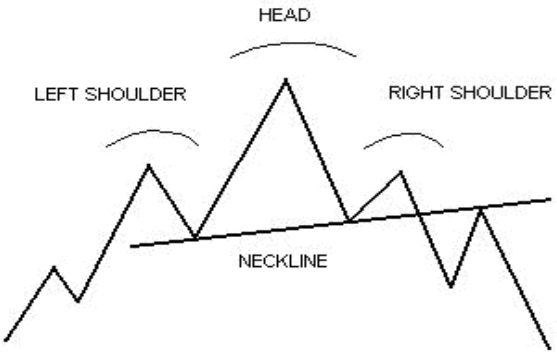


https://images.app.goo.gl/gxMNZ2yUiFYZNg5cA

Head and Shoulder

- The head-and-shoulders top signals to chart users that a security's price is likely to make a downward move, especially after it breaks below the neckline of the pattern.

- Due to this pattern forming mostly at the peaks of upward trends, it is considered to be a trend-reversal pattern, as the security heads down after the pattern's completion.

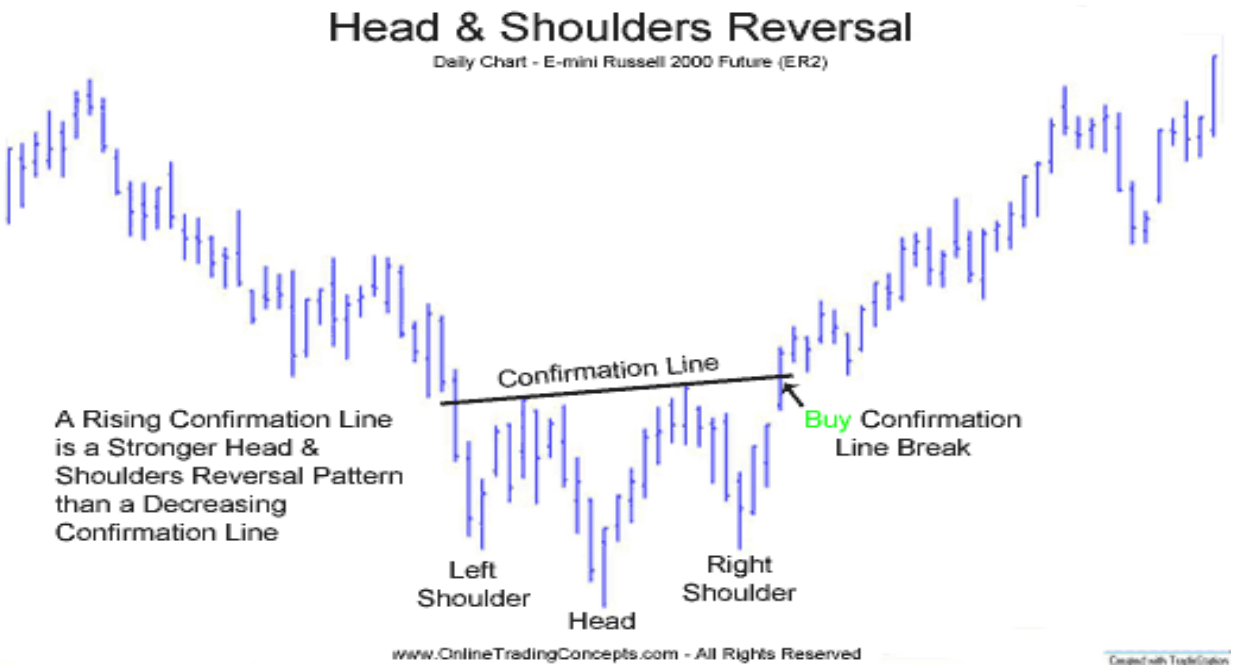


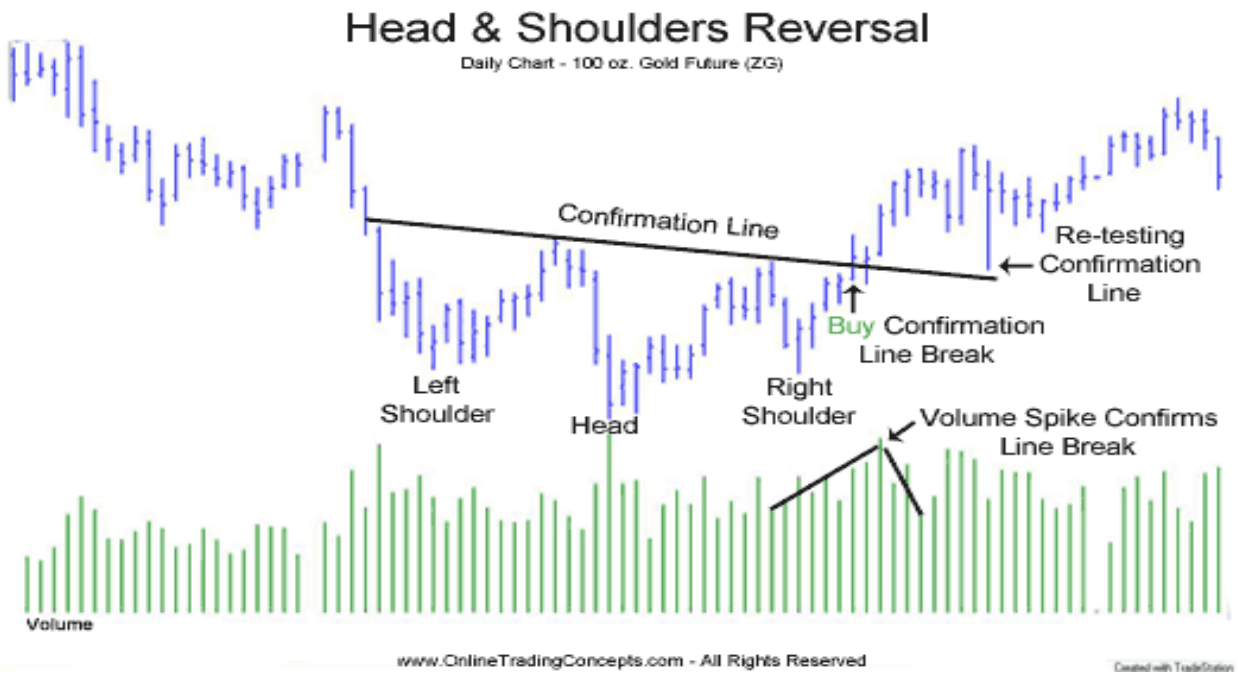
HEAD AND SHOULDERS
AS A REVERSAL PATTERN IN AN UPTREND
(BEARISH)

https://images.app.goo.gl/BA8AcEQowzAx1KRv6

https://images.app.goo.gl/BA8AcEQowzAx1KRv6INVERTED

- The inverted head-and-shoulders pattern is the exact opposite of the head-and-shoulders top, as it signals that the security is set to make an upward move.
- Often coming at the end of a downtrend, the inverse head and shoulders is considered to be a reversal pattern, as the security typically heads higher after the completion of the pattern.





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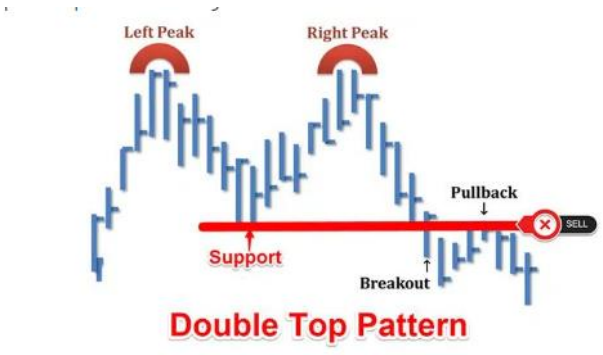
Double Tops and Bottoms

These two reversal patterns illustrate a security's attempt to continue an existing trend. Upon several attempts to move higher, the trend is reversed and a new trend begins. These chart patterns formed will often resemble what looks like a **"W" (for a double bottom) or an "M" (double top).**

Double Top

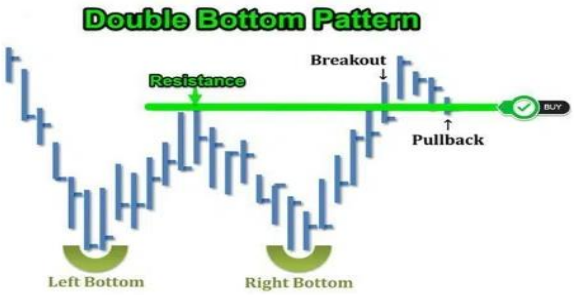
- The double-top pattern is found at the peaks of an upward trend and is a clear signal that the preceding upward trend is weakening and that buyers are losing interest.
- Upon completion of this pattern, the trend is considered to be reversed and the security is expected to move lower.



https://fxscouts.com/forex-education/charts-double-tops-and-double-bottoms/

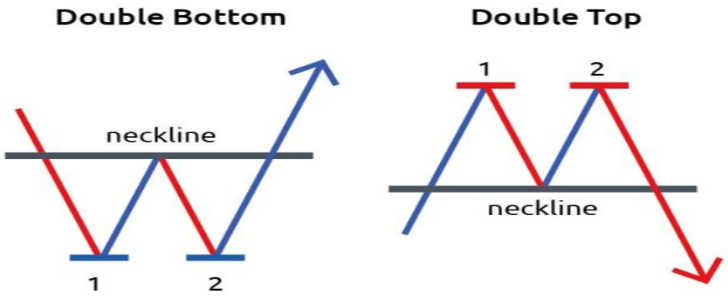
Double Bottom

- A double bottom appears when a share hits a low, comes higher, again pulls back.
- A double bottom appears at the end of a bearish trend and indicates the start of the bullish trend.



https://fxscouts.com/forex-education/charts-double-tops-and-double-bottoms/

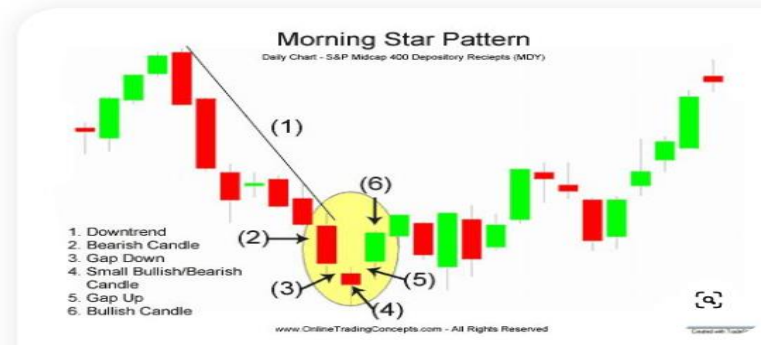
Strategies



https://www.brokerxplorer.com/article/how-to-use-double-bottom-and-double-top-strategy-3854

Gaps

- Gaps occur when a price opens much higher (gap higher) or lower (gap lower) than the previous day's close.
- Once a gap occurs, the new price represents an important price level. Gaps higher create support that should allow the stock to move higher and gaps lower create resistance that should pressure the stock lower.
- Until the gap is violated, we should assume the trend will continue in the gap's direction.



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Breakaway Gaps

- They occur when the price action is breaking out of their trading range or congestion area.
- A *congestion area* is just a price range in which the market has traded for some period of time, usually a few weeks or so.
- To break out of these areas requires market enthusiasm and, either, many more buyers than sellers for upside breakouts or more sellers than buyers for downside breakouts.

Runaway Gaps

- Runaway gaps are also called measuring gaps, and are best described as gaps that are caused by increased interest in the stock.
- For runaway gaps to the upside, it usually represents traders who did not get in during the initial move of the up-trend and while waiting for a retracement in price, decided it was not going to happen.
- Increased buying interest happens all of a sudden, and the price gaps above the previous day's close. This type of runaway gap represents an almost panic state in traders.

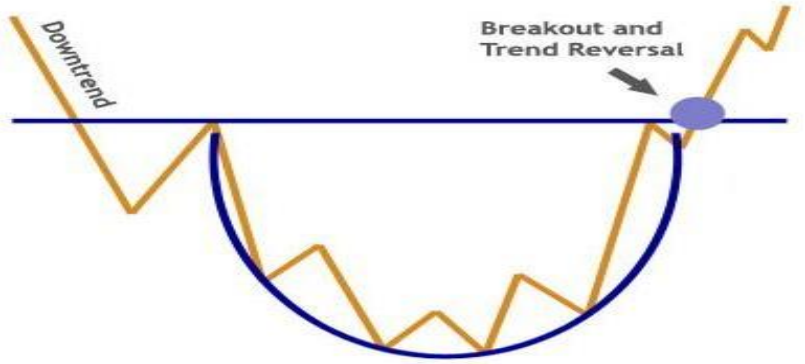
Exhaustion Gaps

- Exhaustion gaps are those that happen near the end of a good up- or downtrend. They are many times the first signal of the end of that move.
- They are identified by high volume and large price difference between the previous day's close and the new opening price. They can easily be mistaken

for runaway gaps if one does not notice the exceptionally high volume.

Rounding Bottom

- ❖ The Rounding Bottom is a long-term reversal pattern that is best suited for weekly charts.
- ❖ It is also referred to as a saucer bottom, and represents a long consolidation period that turns from a bearish bias to a bullish bias.



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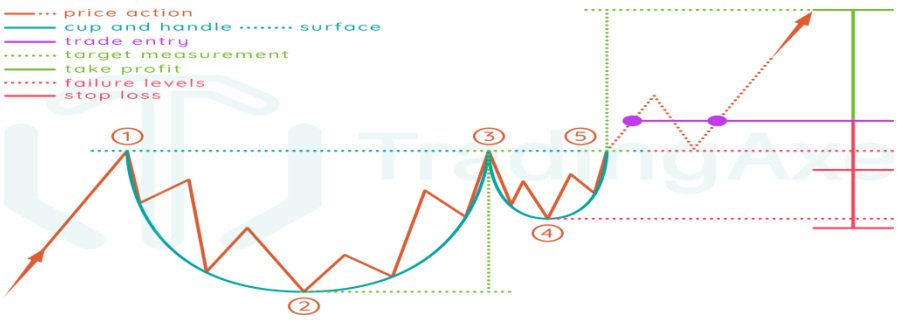
Cup with Handle

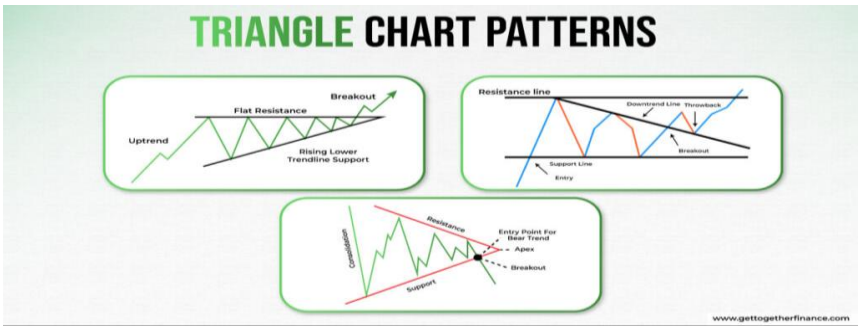
- The Cup with Handle is a bullish continuation pattern that marks a consolidation period followed by a breakout.
- As its name implies, there are two parts to the pattern the cup and the handle.
- The cup forms after an advance and looks like a bowl or rounding bottom.
- As the cup is completed, a trading range develops on the right hand side and the handle is formed.
- A subsequent breakout from the handle's trading range signals a continuation of the prior advance.



https://tradingaxe.com/learn/how-to-trade-cup-and-handle-chart-pattern

Triangles

- A triangle is formed when each succeeding peak is lower than the previous peak Or each succeeding bottom is higher than the previous bottom
- The series of peaks and bottoms are joined by a line which converges and form a shape of triangle.



https://www.gettogetherfinance.com/blog/triangle-chart-patterns/

Flags

- A flag pattern appears when a bully rally or a bear phase is interrupted by a consolidation pattern appearing as a rectangle or a parallelogram.
- As the flag formation indicates a pause before continuation of earlier trend, the prices move in the same direction after the flag as before.

https://www.gettogetherfinance.com/blog/flag-pattern/

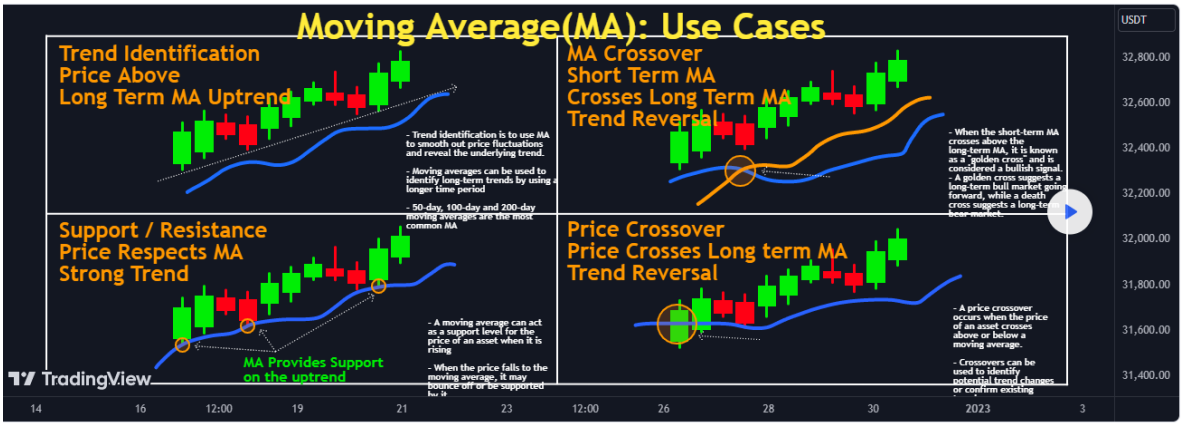
Indicator Analysis

- It's a mathematical examination of price and volume information over a given period.
- To predict where and in which direction the price may move in near future
- Attempts to establish a mathematical relationship of current price past prices.

Moving Average

- It refers to average level of closing prices calculating on regular basis

❖ A sequence of averages is calculated by ranges on daily basis



https://www.tradingview.com/chart/BTCUSDT/vUYD7bpG-Moving-Average-MA-Use-Cases/

Relative Strength Index

❖ Developed J. Welles wilder, the relative strength index (RSI) is a momentum oscillator that measures the speed and change of price movements.

- **Rsi** = 100 - 100/(1 + rs*)

Where RS = average of x days' up closes / average of x days' down closes.

https://en.wikipedia.org/wiki/Relative_strength_index

Crossover

❖ Crossover is the point on a stock chart when a security and an indicator intersect.

❖ Crossovers are used by technical analysts to aid in forecasting the future movements in the price of a stock.

3.3.4 Weakness of Technical Analysis

- Experience careful identification and interpretation of pattern requires a lot of experience.
- Biasness must be free from biasness of technical analyst
- Quickness in identification of a pattern the technical analyst must be a quick identifier of the pattern.
- Long term perspective emphasis in the technical analysis should always be on the long term pattern.
- Not suitable in case of new listings
- Cannot forecast new phenomenon (like 2008 financial crisis).

3.3.5 Technical Indicators to Build a Trading Toolkit

Traders use technical indicators to gain insight into the supply and demand of securities and market psychology. Together, these indicators form the basis of technical analysis. Metrics, such as trading volume, provide clues as to whether a price move will continue. In this way, indicators can be used to generate buy and sell signals.

Seven of the best indicators for day trading are

- On-balance volume (OBV)
- Accumulation/distribution (A/D) line
- Average directional index
- Aroon oscillator
- Moving average convergence divergence (MACD)
- Relative strength index (RSI)
- Stochastic oscillator

You don't need to use all of them, rather pick a few that you find helpful in making better trading decisions. Learn more about how these indicators work and how they can help you day trade successfully.

Tools of the Trade

The tools of the trade for day traders and technical analysts consist of charting tools that generate signals to buy or sell, or which indicate trends or patterns in the

market. Broadly speaking, there are two basic types of technical indicators

1. **Overlays** Technical indicators that use the same scale as prices are plotted over the top of the prices on a stock chart. Examples include moving averages and Bollinger Bands® or Fibonacci lines.
2. **Oscillators** Rather than being overlaid on a price chart, technical indicators that oscillate between a local minimum and maximum are plotted above or below a price chart. Examples include the stochastic oscillator, MACD, or RSI. It will mainly be these second kinds of technical indicators that we consider in this article.

Traders often use several different technical indicators in tandem when analyzing a security. With literally thousands of different options, traders must choose the indicators that work best for them and familiarize themselves with how they work.

They may also combine technical indicators with more subjective forms of technical analysis, such as looking at chart patterns, to come up with trade ideas. Technical indicators can also be incorporated into automated trading systems given their quantitative nature.

1. On-Balance Volume

Use the on-balance volume to measure the positive and negative flow of volume in a security over time. The indicator is a running total of up volume minus down volume. Up volume is how much volume there is on a day when the price rallies.

Down volume is the volume on a day when the price falls. Each day, volume is added or subtracted from the indicator based on whether the price went higher or lower.

When OBV rises, it shows that buyers will step in and push the price higher. When OBV falls, the selling volume outpaces the buying volume, which indicates lower prices. In this way, it acts like a trend confirmation tool. If price and OBV are rising, that helps indicate a continuation of the trend.

Traders who use OBV also watch for divergence. This occurs when the indicator and price are going in different directions. If the price is rising but OBV is falling, that could indicate that the trend is not backed by strong buyers and could

soon reverse.

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2. Accumulation/Distribution Line

One of the most commonly used indicators to determine the money flow in and out of a security is the accumulation/distribution line. Similar to OBV, this indicator also accounts for the trading range for the period and where the close is in relation to that range in addition to the closing price of the security for the period.

If a stock finishes near its high, the indicator gives volume more weight than if it closes near the midpoint of its range. The different calculations mean that OBV will work better in some cases and A/D will work better in others.

If the indicator line trends up, it shows buying interest, since the stock closes above the halfway point of the range. This helps confirm an uptrend. On the other hand, if A/D falls, that means the price is finishing in the lower portion of its daily range, and thus volume is considered negative. This helps confirm a downtrend.

Traders using the A/D line also watch for divergence. If the A/D starts falling while the price rises, this signals that the trend is in trouble and could reverse. Similarly, if the price trends lower and A/D starts rising, that could signal higher prices to come.

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3. Average Directional Index

The average directional index is a trend indicator used to measure the strength and momentum of a trend.

When the ADX is above 40, the trend is considered to have a lot of directional strength, either up or down, depending on the direction the price is moving. When the ADX indicator is below 20, the trend is considered to be weak or non-trending.

The ADX is the main line on the indicator, usually colored black. There are two additional lines that can be optionally shown. These are DI+ and DI-. These lines are often colored red and green, respectively. All three lines work together to show the direction of the trend as well as the momentum of the trend.

- ADX above 20 and DI+ above DI-. That's an uptrend.
- ADX above 20 and DI- above DI+. That's a downtrend.
- ADX below 20 is a weak trend or ranging period, often associated with the DI- and DI+ rapidly crisscrossing each other.

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4. Aroon Indicator

The Aroon oscillator is a technical indicator used to measure whether a security is in a trend, and more specifically if the price is hitting new highs or lows over the calculation period—typically 25.

The indicator can also be used to identify when a new trend is set to begin. The Aroon indicator comprises two lines an Aroon Up line and an Aroon Down line.

When the Aroon Up crosses above the Aroon Down, that is the first sign of a possible trend change. If the Aroon Up hits 100 and stays relatively close to that level while the Aroon Down stays near zero, that is positive confirmation of an uptrend.

The reverse is also true. If Aroon Down crosses above Aroon Up and stays near 100, this indicates that the downtrend is in force.

Image by Sabrina Jiang Â© Investopedia 2020

Always make sure you practice with a trading demo account before you decide to use your own capital. This ensures that you understand how technical analysis (or any other strategy you decide to take) can be applied to real-life trading.

5. MACD

The moving average convergence divergence indicator helps traders see the trend direction, as well as the momentum of that trend. It also provides a number of trade signals. When the MACD is above zero, the price is in an upward phase. If the MACD is below zero, it has entered a bearish period.

The indicator is composed of two lines the MACD line and a signal line, which moves slower. When MACD crosses below the signal line, it indicates that the price is falling. When the MACD line crosses above the signal line, the price is rising.

Looking at which side of zero the indicator is on aids in determining which signals to follow. For example, if the indicator is above zero, watch for the MACD to cross above the signal line to buy. If the MACD is below zero, the MACD crossing below the signal line may provide the signal for a possible short trade.

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6. Relative Strength Index

The relative strength index has at least three major uses. The indicator moves between zero and 100, plotting recent price gains versus recent price losses. The

RSI levels therefore help in gauging momentum and trend strength.

The most basic use of an RSI is as an overbought and oversold indicator. When the RSI moves above 70, the asset is considered overbought and could decline.

When the RSI is below 30, the asset is oversold and could rally. However, making this assumption is dangerous; therefore, some traders wait for the indicator to rise above 70 and then drop below before selling, or drop below 30 and then rise back above before buying.

Divergence is another use of the RSI. When the indicator is moving in a different direction than the price, it shows that the current price trend is weakening and could soon reverse.

A third use for the RSI is support and resistance levels. During uptrends, a stock will often hold above the 30 level and frequently reach 70 or above. When a stock is in a downtrend, the RSI will typically hold below 70 and frequently reach 30 or below.

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7. Stochastic Oscillator

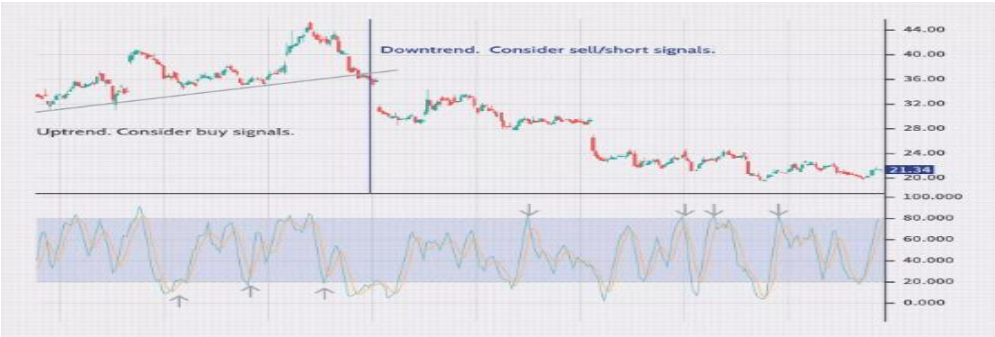
The stochastic oscillator measures the current price relative to the price range over a number of periods. Plotted between zero and 100, the idea is that the price should make new highs when the trend is up. In a downtrend, the price tends to

make new lows. The stochastic tracks whether this is happening.

The stochastic moves up and down relatively quickly as it is rare for the price to make continual highs, keeping the stochastic near 100, or continual lows, keeping the stochastic near zero. Therefore, the stochastic is often used as an overbought and oversold indicator. Values above 80 are considered overbought, while levels below 20 are considered oversold.

Consider the overall price trend when using overbought and oversold levels. For example, during an uptrend, when the indicator drops below 20 and rises back above it, that is a possible buy signal.

But rallies above 80 are less consequential because we expect to see the indicator move to 80 and above regularly during an uptrend. During a downtrend, look for the indicator to move above 80 and then drop back below to signal a possible short trade. The 20 level is less significant in a downtrend.



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Let's Sum Up

In this section explores advanced tools and theories such as Dow Theory, Elliott Wave Theory, and volume analysis to understand and predict market trends. Technical analysis tools are utilized in financial markets to analyze historical price and volume data, aiding traders in predicting future price movements and making informed trading decisions. Common tools include moving averages for trend identification, the Relative Strength Index (RSI) and Stochastic Oscillator for momentum analysis, Bollinger Bands for volatility assessment, Fibonacci retracements for identifying support and resistance levels, and candlestick patterns for visualizing price action

Section 3.3 Advanced Technical Tools

Check Your Progress – Quiz – 3

1. Which tool is used to measure the average price of a security over a specific number of periods, giving equal weight to all prices?

   a) Relative Strength Index (RSI)

   b) Exponential Moving Average (EMA)

   c) Simple Moving Average (SMA)

   d) Bollinger Bands

2. What does the Exponential Moving Average (EMA) emphasize more compared to the Simple Moving Average (SMA)?

   a) Past performance

   b) Historical highs and lows

   c) Recent price changes

   d) Market volume

3. Which tool uses a range of price movements to create upper and lower bands around a moving average, helping to identify overbought and oversold conditions?

   a) Bollinger Bands

   b) Fibonacci Retracement

   c) Moving Average Convergence Divergence (MACD)

   d) Stochastic Oscillator

4. The Relative Strength Index (RSI) is categorized as which type of technical analysis tool?

   a) Trend indicator

   b) Volume indicator

   c) Momentum oscillator

   d) Volatility indicator

5. Which of the following indicators consists of two lines that oscillate between 0 and 100, helping to identify potential reversal points by comparing closing prices to the range of prices over a period?

   a) Moving Average Convergence Divergence (MACD)

   b) Relative Strength Index (RSI)

   c) Stochastic Oscillator

   d) Bollinger Bands

3.4 Unit Summary

Evaluates the intrinsic value of a security by examining economic, industry, and company-specific factors. It involves **economic analysis**, which looks at broader indicators like GDP and inflation; **industry analysis**, which assesses market demand and competition; and **company analysis**, which reviews financial statements and business models to gauge a company's health and future prospects. The goal is to identify undervalued or overvalued securities for informed investment decisions. Technical Analysis uses statistical analysis of market activity, such as price and volume, to predict future price movements. It operates on assumptions that market prices reflect all information, move in trends, and repeat historical patterns. Tools and techniques include various charts (line, bar, candlestick), chart patterns (head and shoulders, triangles), and indicators (SMA, EMA, RSI, Bollinger Bands). Advanced concepts like **Dow Theory** and **Elliott Wave Theory** help forecast market direction. Technical analysis provides timely trading signals but can be less effective in unpredictable markets. Understanding both analysis types helps investors choose strategies aligned with their goals and market conditions.

3.5 Glossary

GDP (Gross Domestic Product) GDP is the total monetary value of all finished goods and services produced within a country's borders in a specific time period. It is a broad measure of a nation’s overall economic activity and health.

Price-to-Earnings (P/E) Ratio The P/E ratio is a valuation metric that compares a company's current share price to its per-share earnings. It helps investors determine the market value of a stock relative to the company's earnings.

Candlestick Chart A candlestick chart is a type of financial chart used to describe price movements of a security, derivative, or currency. Each 'candlestick' typically shows one day and has a body that represents the opening and closing prices, with wicks showing the high and low prices.

Simple Moving Average (SMA) SMA is an average of a selected range of prices, typically closing prices, by the number of periods in that range. It smooths out price data to help identify trends.

Exponential Moving Average (EMA) EMA is similar to the SMA but gives more weight to recent prices, making it more responsive to new information. It is used to identify the direction of the current trend.

Relative Strength Index (RSI) RSI is a momentum oscillator that measures the speed and change of price movements on a scale of 0 to 100. It is used to identify overbought or oversold conditions in a market.

Bollinger Bands Bollinger Bands consist of a middle band (usually a 20-day SMA) and two outer bands set two standard deviations away. They help to identify volatility and overbought or oversold conditions.

Dow Theory Dow Theory is a framework for understanding market trends and their reversals based on the analysis of stock market index movements. It relies on six main tenets, including the belief that the market reflects all available information and trends persist until a clear reversal occurs.

Elliott Wave Theory Elliott Wave Theory posits that market prices move in predictable cycles or waves, which can be identified and used to predict future price movements. These waves are classified as impulse waves (which move with the trend) and corrective waves (which move against the trend).

Volume Analysis Volume analysis involves examining the number of shares or contracts traded in a security or market during a given period. It is used to confirm trends and identify potential reversals.

3.6 Self-Assessment Questions

1. What is the primary objective of fundamental analysis?
2. How do economic indicators influence stock prices?
3. Explain the significance of the Price-to-Earnings (P/E) ratio.
4. What are the three types of market trends according to Dow Theory?
5. How does the RSI help in trading decisions?
6. What is the difference between a support line and a resistance line?
7. Describe the characteristics of a head and shoulders chart pattern.
8. What information does a candlestick chart provide that a line chart does not?
9. How does the Exponential Moving Average differ from the Simple Moving Average?
10. What are the primary components of Elliott Wave Theory?

3.7 Case study

Economic Analysis and Stock Market Prediction
The 2008 financial crisis was preceded by several economic indicators that signaled distress in the economy. Key indicators included a significant rise in subprime mortgage defaults, a steep decline in housing prices, and a tightening of credit markets. As these indicators worsened, major financial institutions began to fail, leading to widespread panic and a stock market crash. By analyzing these economic indicators, investors could have anticipated the downturn and taken protective measures in their portfolios. **Question** What economic indicators signaled the impending financial crisis?
Technical Analysis in Action In 2020, Apple Inc.'s stock experienced significant volatility due to market conditions influenced by the COVID-19 pandemic. Technical analysts used tools like the Relative Strength Index (RSI) and Bollinger Bands to gauge the stock's performance. When the RSI indicated overbought conditions (typically an RSI above 70), it signaled that the

stock might be overvalued and due for a correction. Simultaneously, when Apple's stock price touched or exceeded the upper Bollinger Band, it suggested overbought conditions. These signals helped traders make decisions on when to sell or take profits, potentially avoiding subsequent price drops. **Question** How did RSI and Bollinger Bands indicate overbought conditions in Apple's stock in 2020?
Dow Theory Application
The dot-com bubble of the late 1990s and early 2000s saw massive overvaluation in technology stocks, leading to an eventual market crash. Dow Theory, with its tenet that indices must confirm each other, was used to analyze the market conditions. During the bubble, tech-heavy indices like the NASDAQ surged, but traditional indices like the Dow Jones Industrial Average did not always confirm these highs, indicating a potential divergence. Furthermore, volume analysis showed decreasing volume during the uptrend, suggesting weakening momentum. These signals, according to Dow Theory, hinted at an unsustainable rally and foreshadowed the bubble's burst. **Question** What were the key signals from Dow Theory that indicated the start of the dot-com bubble burst?

3.8 Answer for Check Your Progress

Section 3.1	**An overview of Fundamental Analysis**
1.	c) Economic Indicators
2.	b) Balance Sheet
3.	c) Return on Equity (ROE)
4.	c) How much investors are willing to pay per dollar of earnings
5.	c) Gross Domestic Product (GDP)
Section 3. 2	**An Overview of Preference Shares**
1.	c) Candlestick Chart
2.	c) Overbought or oversold conditions
3.	b) It is calculated by taking the average of closing prices over a specific period.

4.	a) Three lines a middle band and two outer bands.
5.	c) Three
Section 3.3	**Advanced Technical Tools**
1.	c) Simple Moving Average (SMA)
2.	c) Recent price changes
3.	a) Bollinger Bands
4.	c) Momentum oscillator
5.	c) Stochastic Oscillator

3.9 Reference and suggested Readings

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- Donald E. Fischer, Ronald J. Jordan, Ashwini. K. Pradhan (2018), “Security Analysis Portfolio Management”, 7th Edition, Pearson Publication Pvt. Ltd., India, Noida
- Avadhani V.A.(2016),“Securities Analysis and Portfolio Management”, 12th Edition, Himalaya Publishing House, Mumbai

UNIT IV: EFFICIENT MARKET HYPOTHESIS
Efficient Market Hypothesis – Markowitz Model Arbitrage Pricing Theory–Sharpe's Single index portfolio selection method – Capital Asset Pricing Model (CAPM).

Key Theories and Models in Portfolio Selection and Market Efficiency

UNIT OBJECTIVES

Understand the three forms of EMH.

Evaluate implications for investors and market efficiency.

Discuss criticisms and challenges to EMH.

SECTION 4.1 OVERVIEW OF EFFICIENT MARKET HYPOTHESIS

4.1.1 What is the Efficient Markets Hypothesis?

The Efficient Markets Hypothesis (EMH) is an investment theory primarily derived from concepts attributed to Eugene Fama's research as detailed in his 1970 book, "Efficient Capital Markets A Review of Theory and Empirical Work." Fama put forth the basic idea that it is virtually impossible to consistently "beat the market" – to make investment returns that outperform the overall market average as reflected by major stock indexes such as the S&P 500 Index.

https://www.shiksha.com/online-courses/articles/understanding-efficient-market-hypothesis-and-its-forms-blogId-157727

According to Fama's theory, while an investor might get lucky and buy a stock that brings him huge short-term profits, over the long term he cannot realistically hope to achieve a return on investment that is substantially higher than the market average.

4.1.2 Understanding the Efficient Markets Hypothesis

Fama's investment theory — which carries essentially the same implication for investors as the Random Walk Theory — is based on a number of assumptions about securities markets and how they function. The assumptions include the one idea critical to the validity of the efficient markets hypothesis: the belief that all information relevant to stock prices is freely and widely available, "universally shared" among all investors.

As there are always a large number of both buyers and sellers in the

market, price movements always occur efficiently (i.e., in a timely, up-to-date manner). Thus,stocks are always trading at their current fair market value.

The major conclusion of the theory is that since stocks *always trade at their fair market value*, then it is virtually impossible to either buy undervalued stocks at a bargain or sell overvalued stocks for extra profits. Neither expert stock analysis nor carefully implemented market timing strategies can hope to average doing any better than the performance of the overall market. If that's true, then the only way investors can generate superior returns is by taking on much greater risk.

4.1.3 Variations of the Efficient Markets Hypothesis

There are three variations of the hypothesis – the **weak**, **semi-strong**, and **strong** forms – which represent three different assumed levels of market efficiency.

1. Weak Form

The weak form of the EMH assumes that the prices of securities reflect all available public market information but may not reflect new information that is not yet publicly available. It additionally assumes that past information regarding price, volume, and returns is independent of future prices.

The weak form EMH implies that technical trading strategies cannot provide consistent excess returns because past price performance can't predict future price action that will be based on new information. The weak form, while it discounts technical analysis, leaves open the possibility that superior fundamental analysis may provide a means of outperforming the overall market average return on investment.

2. Semi-strong Form

The semi-strong form of the theory dismisses the usefulness of both technical and fundamental analysis. The semi-strong form of the EMH incorporates the weak form assumptions and expands on this by assuming that prices adjust quickly to any new public information that becomes available, therefore rendering fundamental analysis incapable of having any predictive power about future price movements. For

example, when the monthly Non-farm Payroll Report in the U.S. is released each month, you can see prices rapidly adjusting as the market takes in the new information.

3. Strong Form

The strong form of the EMH holds that prices always reflect the entirety of both public and private information. This includes all publicly available information, both historical and new, or current, as well as insider information. Even information not publicly available to investors, such as private information known only to a company's CEO, is assumed to be always already factored into the company's current stock price.

So, according to the strong form of the EMH, not even insider knowledge can give investors a predictive edge that will enable them to consistently generate returns that outperform the overall market average.

4.1.4 Arguments For and Against the EMH

Supporters and opponents of the efficient markets hypothesis can both make a case to support their views. Supporters of the EMH often argue their case based either on the basic logic of the theory or on a number of studies that have been done that seems to support it.

A long-term study by Morningstar found that, over a 10-year span of time, the only types of actively managed funds that were able to outperform index funds even *half* of the time were U.S. small growth funds and emerging markets funds. Other studies have revealed that less than one in four of even the best-performing active fund managers prove capable of outperforming index funds on a consistent basis.

Note that such data calls into question the whole investment advisory business model that has investment companies paying out huge amounts of money to top fund managers, based on the belief that those money managers will be able to generate returns well above the average overall market return.

Opponents of the efficient markets hypothesis advance the simple fact that

there ARE traders and investors – people such as John Templeton, Peter Lynch, and Paul Tudor Jones – who DO consistently, year in and year out, generate returns on investment that dwarf the performance of the overall market. According to the EMH, that should be impossible other than by blind luck. However, blind luck can't explain the *same* people beating the market by a wide margin, over and over again. a long span of time.

In addition, those who argue that the EMH theory is not a valid one point out that there are indeed times when excessive optimism or pessimism in the markets drives prices to trade at excessively high or low prices, clearly showing that securities, in fact, do *not* always trade at their fair market value.

4.1.5 Impact of the EMH

The significant rise in the popularity of index funds that track major market indexes – both mutual funds and ETFs – is due, at least in part, to widespread popular acceptance of the efficient markets hypothesis. Investors who subscribe to the EMH are more inclined to invest in passive index funds that are designed to mirror the market's overall performance, and less inclined to be willing to pay high fees for expert fund management when they don't expect even the best of fund managers to significantly outperform average market returns.

On the other hand, because research in support of the EMH has shown just how rare money managers can consistently outperform the market, the few individuals who have developed such a skill are ever more sought after and respected.

4.1.6 Limitations of the Efficient Market Hypothesis

Since its first implementation in the 1960s, many limitations of EMH have gradually emerged. They are discussed in detail below –

1. **Market crashes and speculative bubbles**

   Speculative bubbles tend to arise when the price of a financial instrument rises above its fair market value and reaches a point where market corrections take place. During this situation, prices begin to fall rapidly, which

leads to a market crash. But EMA suggests that both financial crashes and market bubbles should not arise. As a matter of fact, this theory completely dismisses their existence.

2. Market anomalies

Market anomalies refer to a situation where there is a difference between the trajectory of a market price as established by the efficient market hypothesis and its behaviour in reality. Market anomalies may arise anytime for no particular reason. This proves that financial markets do not remain efficient at all times.

3. Investors have outperformed the market

There are many investors who have consistently outperformed the market. They do not subscribe to the suggestions of EMH and have been vocal in criticizing the same for its passive approach.

4. Behavioural economics

Behavioural economics dismisses the idea that all market participants are rational individuals. It also suggests that difficult circumstances may put stress on individuals, forcing them to make irrational decisions. Thus, due to social pressure, traders may also commit major errors and undertake unwarranted risks. Also, the herding phenomenon plays a vital role in elucidating behavioural aspects of traders which are not considered by EMH.

Moreover, traders' decisions may also be influenced by their individual personality traits and emotions.

Generally, traders who feel that the stock market is volatile with rapid fluctuations in the market price, subscribe to the efficient market hypothesis. But traders engaging in short-term trade do not tend to support this hypothesis. Most investors prefer to choose a long-term strategy due to rapid price fluctuations in the stock market.

Let's Sum Up

Efficient Market Hypothesis (EMH) posits that financial markets efficiently incorporate all available information into asset prices. It comes in three forms Weak, Semi-Strong, and Strong. Weak EMH suggests past prices cannot predict future prices; Semi-Strong EMH implies no abnormal returns from publicly available information; Strong EMH claims no abnormal returns from any information.

Section 4.1 overview of Efficient Market Hypothesis

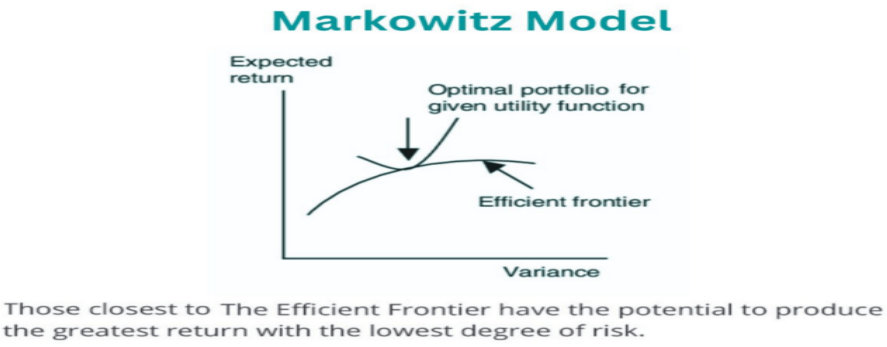
Check Your Progress – Quiz – 1

1. According to the Weak Form of the Efficient Market Hypothesis (EMH), stock prices reflect
   A) All publicly available information.
   B) All publicly available and some private information.
   C) All information including insider trading.
   D) Only historical prices.
2. Semi-Strong Form EMH suggests that stock prices
   A) Reflect all publicly available information, including past prices.
   B) Reflect all private and insider information.
   C) Are influenced solely by market sentiment.
   D) Are predictable using technical analysis.
3. Strong Form EMH implies that stock prices
   A) Reflect all information that is available to the public.
   B) Reflect all information, both public and private.
   C) Are predictable based on past performance.
   D) Are influenced by irrational investor behavior.
4. The Efficient Market Hypothesis (EMH) suggests that investors
   A) Can consistently beat the market by picking undervalued stocks.
   B) Cannot consistently earn abnormal returns.
   C) Should rely on technical analysis for stock selection.
   D) Always outperform the market through diversification.
5. According to EMH, which form of market efficiency allows for the possibility of insider trading?
   A) Weak Form
   B) Semi-Strong Form
   C) Strong Form
   D) All forms equally allow for insider trading.

SECTION 4.2 MARKOWIZ MODEL OF PORTFOLIO THEORY

4.1.1 What is Markowitz Model?

The Markowitz model is a method of maximizing returns within a calculated risk. It is also called the Markowitz portfolio theory or modern portfolio theory. This model facilitates practical application; many new investors use this technique in capital markets.



The Markowitz model of selection mainly focuses on portfolio diversification. It separates stocks into high-risk and low-risk assets. The Harry Markowitz Model was introduced in 1952 through the journal of finance. Harry Markowitz won the Nobel prize for his contribution in 1990.

4.2.2 Markowitz Model of Portfolio Theory

The Markowitz model is an investment technique. It is used to create a portfolio that would yield maximized returns. In 1952, Harry Markowitz published his model in the Journal of Finance. Markowitz is an American economist. He is considered the creator of the **modern portfolio theory**. The theory is also known as the Markowitz Mean Variance Model.

The Markowitz model of portfolio suggests that the risks can be minimized through diversification. Simultaneously, the model assures maximization of overall portfolio returns. Investors are presented with two types of stocks—low-risk, low-return, and high-risk, high-return stocks. Risks are also divided into two—systematic

risk and unsystematic risk. The Harry Markowitz model uses mathematical calculations to reduce risks; it builds an ideal portfolio.

Nonetheless, real-world investments cannot eliminate a certain level of risk. Thus, investors must possess some risk appetite. New investors especially benefit from this theory—the Markowitz model of portfolio popularized diversification. Not to mention the importance of understanding and avoiding systematic portfolio risks.

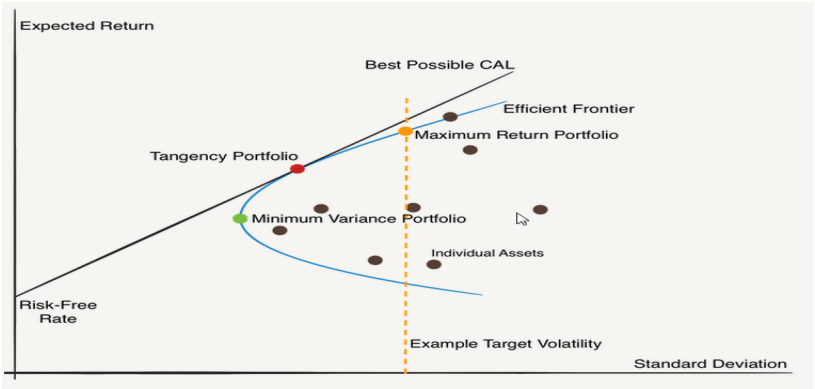
On the downside, the limitations of Markowitz model stem from its overreliance on assumptions. These flaws can make the conclusions irrelevant to prevailing market conditions.

4.2.3 Markowitz's Assumptions

- The model assumes that investors are rational and will always behave in a certain manner.
- The model assumes that there are only two different types of assets—low returns and high returns.
- Harry Markowitz argues that markets will always work in a certain direction and will always be efficient. But this is not always the case.
- Diversification is important. But the theory assumes diversification is the only way to minimize investment risks.
- The Markowitz model of portfolio assumes that every investor has unlimited access to information about market changes. In reality, investors often lack the time and expertise to gather relevant data.
- Markowitz assumes that all investors are risk-averse, but that is not universally true.

The model mentions a bracket of bearable loss—but not all real-world investors can afford that. The Markowitz diagram depicts the **standard deviation** (risk) on the x-axis and expected returns on the y-axis. The diagram elucidates three portfolios

1. Minimum variance portfolio
2. Tangency portfolio
3. Maximum return portfolio



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The efficient frontier is a parabola depicting all three portfolios toward efficiency. The agency portfolio is also the optimal one—with the highest Sharpe ratio.

In contrast, the minimum variance portfolio is the green point in the diagram. It marks the change from convex to concave. Finally, the maximum return portfolio is the orange point—it has the highest volatility.

In the Markowitz diagram, portfolios on the efficient frontier are better than those under it. This is because the point where the linear Capital Market Line (CML) touches the y-axis is a risk-free asset.

Formula of Markowitz Model

$$R_P = I_{RF} + (R_M – I_{RF})\sigma_P/\sigma_M$$

Here,

R_P = Expected Portfolio Return
R_M = Market Portfolio Return
I_{RF} = Risk-free Rate of Interest
σ_M = Market's Standard Deviation
σ_P = **Standard Deviation of Portfolio**

Calculation Example

Let us now look at a Markowitz example to understand the theory better.

Let us assume that Charlie is an investor who possesses a small portfolio—

only two stocks. He has invested $900,000 in stock A and $180,000 in stock B—a portfolio of $1080000. Charlie anticipates a 4% return on stock A and a 9% return on stock B.

To calculate the portfolio's expected returns, we divide the current value of stock A by the total portfolio value and multiply it by its **expected return**

- Portfolio expected return = $900,000/1080000 x 4%.

Now, we repeat the step for the second asset

- Portfolio Expected Return = $180,000/1080000 x 9%.

So, for stock A (most invested), Charlie gets an expected return of 3%; for stock B (least invested), Charlie gets an expected return of 2%. The portfolio can expect a return of 5%.

To increase the expected portfolio return to 6.5%, Charlie needs to shift an appropriate amount of **capital** towards stock B (less invested).

A 50-50 allocation of capital will result in the following returns

Portfolio Expected Return of 6.5%

- 50% x 4% = 2%
- Plus 50% x 9% = 4.5%
- Portfolio Expected Return = 2% + 4.5% = 6.5%

Let's assume Charlie divides the $1080000 portfolio into four equal assets. The first asset has a beta of 1, so its systematic risk exposure is identical to the market. The second asset has a beta of 1.6, as Charlie is willing to take a bit more risk. The third has a beta of 0.75—less exposure than the market; the fourth has an even lower beta of 0.5.

Multiplying the allocation of 25% with their respective beta values and adding the results give Charlie an overall portfolio beta value of 0.96. Since it is below 1, the portfolio is considered a systematic risk.

Let us consider another hypothetical; Charlie shifts 10% of the third and fourth assets with the lowest risk betas and 5% from the first division and invests in the second asset (highest-beta asset). Here the second asset, which started with a 25% allocation, will become 50% of the total portfolio's capital, the first amounts to 20%, and the third and fourth divisions account for 15% each.

First division beta = 20% x 1 = 0.2

Second division beta = 50% x 1.6 = 0.8

Third division beta = 15% x 0.75 = 0.11

Fourth division beta = 15% x 0.5 = 0.08

The new beta will be 1.19, close to the required desired beta value of 1.2

4.2.4 Advantages and disadvantages of Markowitz Model

The advantages are as follows

- The portfolio becomes resistant to systematic risk
- Diversification helps investors understand different sectors.
- Such portfolios suit both long-term wealth creation and short-term **profits**.
- A variety of **financial instruments** fit this investment strategy.

The disadvantages are as follows

- This approach is often called Markowitz Mean Variance Model. It is more inclined towards variance and tends to overlook potential risks.
- It does not guarantee good returns and is only based on historical data.
- The model does not account for associated costs like broker commissions, taxes, and other charges.
- The whole model is based on irrelevant stock market assumptions. In reality, stock markets are as unpredictable as they are volatile.

Let's Sum Up

The Markowitz Model of Portfolio Theory revolutionized the way investors approach portfolio management by introducing the concept of diversification and the

efficient frontier. By understanding and applying these principles, investors can make informed decisions to optimize their portfolios and manage risk effectively in varying market conditions.

Section 4.2 Markowitz Model of Portfolio Theory

Check Your Progress – Quiz 2

1. According to the Markowitz Model, an optimal portfolio is one that
   A) Maximizes risk and return simultaneously.
   B) Minimizes risk for a given level of return.
   C) Always guarantees high returns regardless of market conditions.
   D) Is based solely on historical returns.
2. Diversification in portfolio theory helps to
   A) Increase the overall risk of the portfolio.
   B) Reduce risk by combining assets with low correlations.
   C) Guarantee higher returns in all market conditions.
   D) Eliminate all risks associated with investing.
3. In Modern Portfolio Theory, the risk associated with an individual asset is
   A) Its market value volatility.
   B) The percentage change in its price.
   C) Its deviation from the market return.
   D) Its correlation with other assets in the portfolio.
4. Markowitz's model assumes that investors are
   A) Risk-loving and seek maximum returns.
   B) Risk-averse and seek to minimize risk for a given level of return.
   C) Indifferent to risk and return.
   D) Only concerned with short-term gains.
5. Question Which concept in portfolio theory allows investors to achieve higher returns without taking on additional risk?
   A) Risk-Return Trade-off
   B) Efficient Frontier
   C) Diversification
   D) CAPM

SECTION 4.3 ARBITRAGE PRICING THEORY

4.3.1 Arbitrage Pricing Theory?

The arbitrage pricing theory model help exploit the short-term profit opportunities presented by the misaligned prices of securities. Individual investors and institutions alike can use the APT to determine the fair value of a particular **financial asset**, including

- Stocks
- Bonds
- Derivatives
- Commodities

To understand APT, let us first take a look at the term **arbitrage**. In finance, arbitrage refers to the act of finding discrepancies in the value of an asset through two different markets and taking advantage of the price difference. For example, say an investor found out that Apple's stock is trading for $120 on the NASDAQ stock exchange and is trading on the Frankfurt stock exchange for $120.50. It offers investors an arbitrage opportunity of $0.50 profit for buying on the Frankfurt stock exchange and selling on the NASDAQ.

https://images.app.goo.gl/RGoqm5CAy76WJXvT6

The APT was first developed in 1976 by former Wharton School of Business professor and economist Stephen Ross. He developed the concept as an alternative to the Capital Asset Pricing Model.

Ross built upon his predecessors' ideas and knowledge to build a model that considers multiple components of risk that can be used to explain the co-movements among stocks. According to the theory, risk components generate all the co-movements among the assets. Any slight differences can be attributed to the individual securities and not the system as a whole.

4.3.2. Elements of risk

For investors, the more critical risk factor will be the asset's sensitivity or exposure to risk components. The elements of risk can include

- ❖ Changes in inflation
- ❖ Gross Domestic Product (GDP)
- ❖ Changes in interest rates
- ❖ Yield curve changes
- ❖ Market sentiments
- ❖ Exchange rates

The model was designed to calculate the fair value of an asset, and if the actual value is different, it can be considered either overvalued or undervalued. For example, suppose the arbitrage pricing model estimates the value of Apple's stock to be $200. But the actual price is $210, and therefore, the stock would be considered overvalued. According to the APT theory, it should correct itself, presenting an arbitrage opportunity.

Arbitrage Pricing Theory Formula

The formula for APT is as follows.

$E(x) = Rf + \beta 1 *(factor\ 1) + \beta 2 *(factor\ 2) + \ldots + \beta n *(factor\ n)$

Where,

- $E(x)$ = the expected return of an asset
- R_f = the expected return assuming zero systematic risk, or market risk
- β = the sensitivity the asset has to the risk factor (beta)
- n factor = risk premium

Example

Let us take a look at an arbitrage pricing theory example. For this example, let's consider our asset as a commodity stock called GOLD 123. The stock has two risk factors associated with it – inflation and the price of the U.S Dollar currency.

Rf (risk free rate) = 2%

Inflation – Risk premium = 2%, Beta = 0.2

U.S Dollar – Risk Premium =10%, Beta = 0.5

E(x) = Rf + β1 *(factor 1) + β2 *(factor 2) + …+ βn *(factor n)

E(x) = 0.02 + 0.2 * (0.02) + 0.5 * (0.10)

= 0.02 + 0.004 + 0.05

= 0.074, or 7.4%

In this arbitrage pricing theory example, the expected return of GOLD 123 is equivalent to 7.4%.

4.3.3 Assumptions of APT

The arbitrage pricing theory model is based on the following three assumptions.

- First, participants in a capital market execute trades to maximize profit.
- Second, the capital market is perfectly competitive and frictionless (free access to the markets, freely available information, and abundant traders.)
- Third, there are no arbitrage cases, and if one presents itself, investors will take advantage of it.

4.3.4 Arbitrage Pricing Theory vs. Capital Asset Pricing Model (CAPM)

Both APT and CAPM models produce the theoretical rate of return of an asset. Since market risk premium is the only factor considered in the case of CAPM,

it is easier to calculate and takes up less time to produce results.

The formula for CAPM is E(x) = Rf + βn *(E(r)- Rf)

Where

- E(x)- expected return of an asset
- Rf- the risk-free rate of return
- β – beta coefficient related to the benchmark index
- E(r) – expected return of benchmark index

The two theories are very different in their approaches and assumptions regarding capital markets. Here is how they differ from one another.

- **Factors Considered –** The APT considers multiple macroeconomic risk factors. In contrast, the CAPM uses only one factor, i.e., expected market return (based on federal funds rate or the ten-year bond yield.)
- **Accuracy –** Since the APT is based on multiple factors, it is typically considered a more accurate model. However, the APT doesn't specify which factors are used, and hence one will have to establish which element should be used for a particular asset. This can determine how accurate the model is.
- **Asset Relationship –** Both the APT and CAPM models assume assets have a linear relationship or that assets move in relation to one another.
- **Assumptions –** Both the models assume that assets have unlimited demand and that investors have the same access to information, which may not always be true.
- **Market portfolio-** CAPM requires an efficient market portfolio and assumes that the returns are normally distributed. But APT makes no such assumption and does not require an efficient portfolio.

Which is better – APT v CAPM?

The APT model provides better efficiency and more reliability. It gives an accurate estimation of long-term asset pricing. But in many cases, one can observe similar results with CAPM, which uses a much simpler means of risk assessment.

APT is recommended for single assets while CAPM can be used on an asset portfolio to avoid complicated calculations. In most instances, one can ultimately go with either model determined by the risk factors they choose to involve with an asset.

Let's Sum Up

Arbitrage Pricing Theory (APT), developed by Stephen Ross, provides an alternative framework to CAPM by asserting that asset returns are influenced by multiple systematic factors rather than just market risk. APT assumes that mispricing due to these factors will be corrected through arbitrage activities, ensuring that assets are fairly priced. Unlike CAPM, which relies on a single-factor model, APT accommodates various sources of risk and return, making it a more flexible and comprehensive approach to understanding asset pricing in financial markets.

Section4.3. Arbitrage Pricing Theory (APT)

Check Your Progress – Quiz – 3

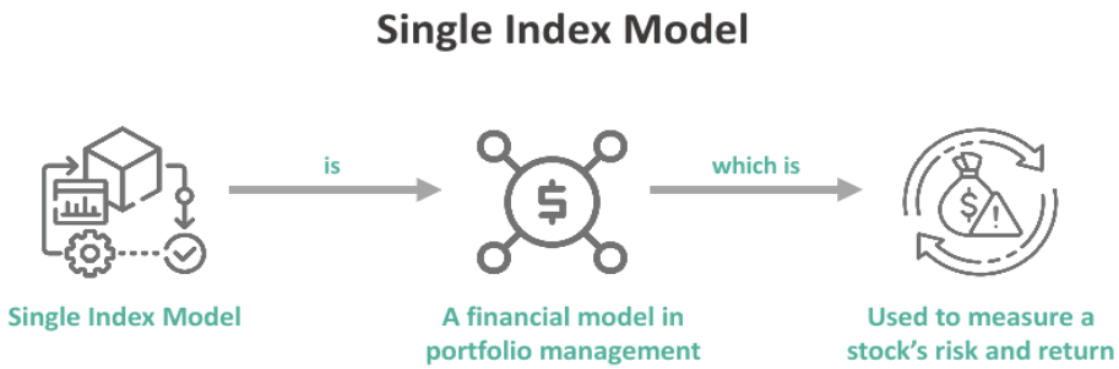
1. Arbitrage Pricing Theory (APT) was developed by
   A) Harry Markowitz
   B) William Sharpe
   C) Stephen Ross
   D) Eugene Fama
2. APT assumes that investors will
   A) Always exploit arbitrage opportunities
   B) Avoid risk completely
   C) Prefer assets with high beta
   D) Ignore market conditions
3. The primary advantage of APT over CAPM is its
   A) Simplicity in calculation
   B) Ability to handle multiple factors influencing asset prices
   C) Reliance on historical data
   D) Focus on individual stock performance
4. APT's reliance on systematic factors implies
   A) Predictable asset returns
   B) Efficient market conditions
   C) Potential for mispriced assets
   D) Lower transaction costs

5. Which theory provides a broader framework for understanding asset pricing beyond market beta?
   A) Efficient Market Hypothesis (EMH)
   B) Arbitrage Pricing Theory (APT)
   C) Capital Asset Pricing Model (CAPM)
   D) Modern Portfolio Theory (MPT)
6. APT challenges CAPM by suggesting that
   A) Market risk is the only factor influencing asset returns.
   B) Diversification is unnecessary in portfolio management.
   C) Mispriced assets can lead to arbitrage opportunities.
   D) Investors should focus solely on historical returns.

SECTION 4.3 AN OVERVIEW OF SINGLE INDEX MODEL

4.4.1 What is A Single Index Model?

The Single Index Model (SIM) is a financial model that investors use to analyze the risk and return characteristics of individual securities in a portfolio. It aims to measure a stock's risk and return. With this model, investors can assess the risk and return trade-offs of individual securities concerning the overall market.



https://www.wallstreetmojo.com/single-index-model/

The SIM is based on the principle that the performance of a broad market index can explain a security's performance. It represents the relationship between a security's return and the return from the market index with a linear equation. The model is beneficial in portfolio management, asset pricing, and risk analysis to make informed investment decisions.

4.4.2 Single Index Model Explained

The Single Index Model is a model in technical analysis that helps traders estimate a security's risk and return. It aids in assessing the risk and return characteristics of individual securities within a portfolio. It relies on the idea that a security's performance has a correlation with the market index's performance. In short, the SIM considers a security's return based on systematic and unsystematic risks.

In SIM, the relationship between a security's return and the return of the market index is established with a linear equation. The equation records the security's systematic risk by multiplying the market return with a beta coefficient specific to that security. The beta coefficient measures the sensitivity of the security's returns to the overall market returns. A security with a beta greater than one has higher volatility than the market, whereas a beta less than one indicates lower volatility.

This model lets investors make informed trading decisions regarding portfolio allocation and risk management. Therefore, it is commonly applicable in asset pricing, portfolio management, and risk analysis. It offers a structure for understanding the relationship between individual securities and the market. Moreover, it enables investors to evaluate their portfolios' risk and return characteristics effectively.

4.4.3 Assumptions

1. **Linear Relationship**

   It assumes a linear relationship between the return from an individual security and the return from a market index. It means that the security's return can be represented as a linear function of the market return.

2. **Systematic And Unsystematic Risk**

   It is based on the assumption that the return from security comprises two components systematic risk and unsystematic risk.

3. **Homogeneous Expectations**

   It surmises that all the investors have the same expectations about the

securities' future returns and risks. Thus, it considers that investors make investment decisions based only on the risk return trade off of the securities.

4. Constant Beta

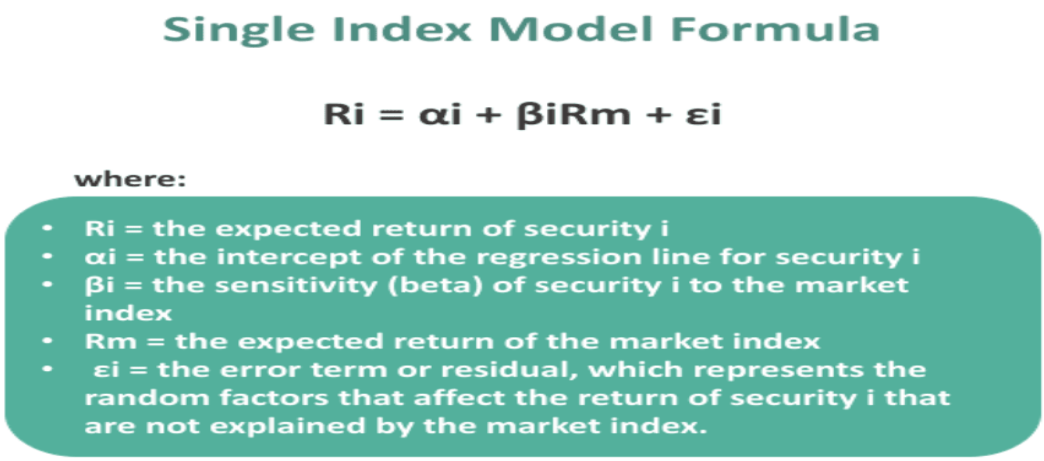
The SIM assumes that the beta coefficient, which measures the sensitivity of a security's returns to the market returns, remains constant over time. Thus, it implies that the relationship between the security and the market index is stable.

5. No Transaction Costs Or Taxes

This model considers that there are no transaction costs, taxes, or other frictions associated with buying or selling securities. It assumes that investors can freely trade securities at no charge.

Formula

The single index model formula is as follows



https://www.wallstreetmojo.com/single-index-model/

4.4.4 Advantages and Disadvantages

The advantages of the single index model are

- The Single Index Model facilitates the evaluation of the risk-return trade-off from individual securities. Investors can assess whether security offers an adequate return given its level of risk by analyzing the relationship between a security's return and its systematic risk. This information is valuable for

making informed investment decisions and constructing well-balanced portfolios.

- This model helps diversify the portfolio by distinguishing between systematic and unsystematic risk. Since the model assumes that unsystematic risk can be diversified away, investors can focus on managing and minimizing the systematic risk in their portfolios. Investors can achieve a diversified portfolio that reduces unsystematic risk by combining securities with low correlations to the market.
- It provides a benchmark for evaluating the performance of individual securities. Investors can assess whether the security is over or underperforming related to its systematic risk exposure by comparing the actual returns from the security with its predicted returns based on the model.

The disadvantages of the single index model are

- The Single Index Model focuses primarily on the relationship between a security and a single market index. It does not consider other factors impacting a security's performance, like interest rates or macroeconomic conditions. Neglecting these factors can result in an inaccurate or incomplete risk and return analysis.
- The model is designed to analyze securities closely related to a market index. It may not be suitable for evaluating or comparing securities that do not correlate strongly with a specific market index.
- It relies on historical data to estimate betas and make predictions. As a result, it may not accurately capture future **market dynamics**, especially during market instability or structural changes. The model's effectiveness is limited to the reliability and relevance of historical data.

4.4.5 Single Index Model vs CAPM

- **Single Index Model** The Single Index Model is more straightforward than the (CAPM Capital Asset Pricing Model). It assumes a linear relationship between a security's return and the return from a market index, which is easier to understand and implement. It focuses on the specific relationship between security and the market index, allowing investors to evaluate the

security's systematic risk and its performance related to the market. The Single Index Model provides a framework for assessing the risk-return trade-off from individual securities within a portfolio, aiding investors in making informed decisions about portfolio construction and diversification. However, the Single Index Model has limitations, including its linear and constant beta assumptions, which may not accurately capture the market relationship complexities and security performance.

- **CAPM** The CAPM is a more comprehensive model than the Single Index Model. It considers the relationship between security and the market index, as well as the risk-free rate and the overall market risk. It provides a systematic way to estimate the expected return from an individual security based on its beta, the risk-free rate, and the market risk premium. This model includes systematic and unsystematic risk in its analysis, offering a more integrated assessment of a security's risk and return characteristics. It is commonly applicable in asset pricing and portfolio management. The model provides a benchmark for evaluating the performance of securities and constructing efficient portfolios. However, the CAPM relies on certain assumptions, like efficient markets and linear relationships, which may not always hold in real-life situations.

Let's Sum Up

The Single Index Model (SIM) is a portfolio theory that simplifies portfolio analysis by relating the returns of a security to the returns of a market index, typically the overall stock market index. It was developed based on the Capital Asset Pricing Model (CAPM) framework and assumes that the performance of individual stocks can be explained by their correlation with the market index.

Section 4. 4. Single Index Model (SIM)

Check Your Progress – Quiz – 4

1. The Single Index Model simplifies portfolio analysis by relating the returns of a security to the returns of
   A) Treasury bills

B) Corporate bonds
C) The market index
D) Real estate investments

2. Each stock's sensitivity to market movements in the Single Index Model is measured by its
   A) Alpha coefficient
   B) Sharpe ratio
   C) Beta coefficient
   D) Standard deviation
3. A stock with a beta of 1.2 is expected to
   A) Perform better than the market in bullish conditions
   B) Outperform the market during bearish markets
   C) Perform in line with the market with slightly higher volatility
   D) Underperform the market in all conditions
4. SIM helps investors assess
   A) Market efficiency
   B) Idiosyncratic risk
   C) Arbitrage opportunities
   D) Systematic risk
5. According to the Single Index Model, a stock with a beta coefficient of 0.5 is expected to
   A) Outperform the market in all conditions
   B) Perform in line with the market with less volatility
   C) Underperform the market in bullish conditions
   D) Provide higher returns than the market index

SECTION 4.5 OVERVIEW OF CAPITAL ASSET PRICING MODEL

4.5.1. Capital Asset Pricing Model

CAPM, or the capital asset pricing model, is a type of financial model used in corporate finance to describe the relationship between the risk of a security (such as a stock) and the market as a whole. Investment bankers often use this model to analyze individual stocks or whole portfolios, and CAPM forms a foundation for other

important calculations in corporate finance.

4.5.2 Definition of CAPM

The capital asset pricing model (CAPM) calculates expected returns from an investment and can be used to determine prices for individual securities, such as stocks. As a core part of corporate finance and investment banking, CAPM looks at the relationship between the investment's riskiness and the inherent risks of the market at large.

CAPM was primarily created to measure systemic risk, or risk that a company or individual can't account for or avoid. Systemic risk includes risk from interest rates, exchange rates, and inflation. Systemic risk is also caused by the fact that prices on the market tend to move together — if the market as a whole is doing well, even share prices for less-than-perfect companies typically do well.

Investors need compensation for this systematic risk through risk premiums. For example, if an investor puts money into a very risky stock, they need high risk premiums (a high return rate) in exchange. The CAPM helps investors determine how much they can expect to get back for investments, especially risky ones.

4.5.3 Who Uses the Capital Asset Pricing Model?

Many areas of the finance industry use CAPM. For example, investment bankers and investors may use this model to determine if an investment is worth the risk or to analyze how well an investment portfolio will perform.

The capital asset pricing model is sometimes used to help calculate other important metrics in finance, too. For example, CAPM ultimately can calculate the cost of equity (or shares of a company), which is essential for figuring out a company's WACC, or weighted average cost of capital — how much the company pays to finance its assets.

CAPM Formula

The capital asset pricing model equation looks like

Ra = Rrf + [Ba x (Rm – Rrf)]

In this formula

- Ra is *the expected rate of return on the investment* (or asset, hence the "a")
- Rrf is *the risk-free rate of return*
- Ba is *the beta (β) of the investment* (or asset, hence the "a")
- Rm is *the expected rate of return of the market* (hence the "m")
- This portion of the formula — (Rm – Rrf) — is referred to as *the risk premium*.

4.5.4 Components of the CAPM Formula

Expected Rate of Return on Investment

An asset or investment's expected rate of return is how much the investor should make over the investment's lifetime. In the CAPM formula, the expected rate of return is based on the other factors within the equation, like the stock's beta and the return rate of the market.

Risk-Free Rate of Return

In theory, certain securities (stocks or bonds) have no risks. In the U.S., the risk-free rate of return is usually based on the return rate for a three-month treasury bill or 10-year government bonds. Using securities issued by the government is the baseline for risk-free rates because the U.S. government is unlikely to default on payment. No default in payments means these investments pose minimal risk to investors.

Beta

Put simply, the beta of a stock, asset, or investment measures how risky it is. The beta is a numerical representation of how volatile the stock's price is compared to the market. Beta can also be thought of as the stock's sensitivity to market changes — a sensitive stock will be very volatile (have a high beta), while a more steadfast stock will not react to market changes as much (have a low beta).

A beta of 1 means the stock is equally as unsteady as the market, while a beta below 1 signifies the stock is more stable than the market and holds less risk. However, stocks with betas above 1 are more volatile than the market. Stocks can have negative betas, too, but a negative beta means the stock has an inverse relationship with the market. For example, if the market is up 15%, but a stock has a

beta of -0.5, the stock will return -5% despite the market being up as a whole.

A high or low beta is not necessarily good or bad. Instead, stocks with high betas are riskier but may also have higher returns. Lower betas are less risky but may offer lower returns. Negative betas are common for certain types of stock options and have their pros and cons.

4.5.5 Expected Rate of Return of the Market

The market's rate of return is the average amount investors can expect to make from investments in the market as a whole, based on historical data.

Risk Premium

In the capital asset pricing model, the risk premium (also called the market risk premium) is the difference between the risk-free rate of return and the returns on a specific stock or investment. Essentially, this is how much the investor is rewarded for taking a risk rather than investing in lower- or zero-risk options, like government bonds. If a stock, asset, or investment is very risky, it will have a high risk premium, meaning the investor should see a higher reward for their risk.

CAPM Example

Using the capital asset pricing model formula, we can calculate the expected rate of return on a stock. First, we need to set some assumptions and gather some

The stock exclusively trades in the U.S. through the New York Stock Exchange (NYSE) — this is important because exchange rates and international investment risk change many aspects of this formula.

- The beta for our imaginary stock is **1.75** — highly volatile but potentially a higher chance of reward.
- Based on current U.S. 10-year treasury bond returns, the risk-free rate is **3.4%**.
- The average market risk premium for stocks traded in the U.S. is **7.5%**.

Using the CAPM equation, we have the following

Ra = 3.4% (risk-free rate) + (1.75 (beta) x 7.5% (risk premium))

Our expected rate of return is **16.5%**

4.5.6 Shortcomings of the CAPM

The capital asset pricing model is widely used despite having some key flaws.

First, CAPM makes some somewhat unreasonable assumptions. For example, the formula only works if we assume that the market is dominated exclusively by rational actors who make decisions that only prioritize returns on investments. This, of course, isn't always true. Additionally, the model assumes that every actor in the market is acting on the same information. In reality, relevant information is not equally distributed to the public, so certain actors may make decisions based on information others don't have.

Another core problem with the capital asset pricing model is its use of beta as a core part of the formula. Beta inherently implies that any positive or negative changes in a stock's price indicate volatility and sensitivity to the market. However, a stock's price may change for reasons other than the market. Stocks may rise or fall in price for intentional reasons rather than simple volatility.

Lastly, CAPM relies only on historical data. This is an issue with many financial models and a problem that is nearly impossible to avoid. Ultimately, in the capital asset pricing model, a stock's historical price changes are not enough to determine the overall risk of investment. In order to truly understand the risk of an investment, other aspects need to be considered, such as economic conditions, the stock's industry and competitors, and internal and external actions of the company itself. For this reason, the CAPM is only one tool investors use when analyzing investment options,

Let's Sum Up

The Capital Asset Pricing Model (CAPM), developed by William Sharpe, John Lintner, and Jan Mossin in the 1960s, is a fundamental tool in finance used to

determine an asset's expected return based on its risk and the overall market's return. CAPM assumes investors are rational and seek to optimize their portfolios to achieve the highest return for a given level of risk.

SECTION 4.5. OVERVIEW OF CAPITAL ASSET PRICING MODEL

Check Your Progress – Quiz – 5

1. CAPM is based on the assumption that investors
   A) Always seek maximum returns
   B) Are risk-averse and rational
   C) Only invest in government securities
   D) Ignore systematic risk
2. The risk-free rate in CAPM represents
   A) The return on government securities
   B) The average return on stocks in the market
   C) The minimum return investors expect
   D) The maximum return on risky assets
3. CAPM helps in determining
   A) Market efficiency
   B) Portfolio diversification
   C) Stock volatility
   D) Cost of equity
4. A stock with a beta of 1.5 is expected to
   A) Perform better than the market
   B) Perform in line with the market with higher volatility
   C) Provide higher returns than the risk-free rate
   D) Have zero systematic risk
5. Question According to CAPM, the expected return of an asset is calculated as
   A) Risk-free rate + Market risk premium
   B) Risk-free rate - Market risk premium
   C) Market risk premium - Risk-free rate
   D) Market risk premium / Risk-free rate

4.6 Unit Summary

In the realm of financial theory, several models guide investment decisions and portfolio management. The **Efficient Market Hypothesis (EMH)** posits that asset prices reflect all available information, implying that it is impossible to consistently outperform the market through stock selection or market timing. This theory influences how investors approach active versus passive investment strategies, focusing on efficient market prices to achieve optimal returns.

Contrasting EMH, the **Markowitz Model** introduces Modern Portfolio Theory (MPT), emphasizing diversification to optimize returns for a given level of risk. MPT suggests constructing portfolios that balance assets with different risk and return profiles to achieve the highest possible return per unit of risk. This approach forms the foundation for understanding risk management and portfolio construction strategies.

Moving to **Arbitrage Pricing Theory (APT)**, developed by Stephen Ross, it proposes that asset prices are influenced by multiple factors beyond market risk. APT allows for a more nuanced analysis of asset pricing by considering various systematic factors, offering insights into how investors can price assets relative to their risk exposures.

Lastly, the **Capital Asset Pricing Model (CAPM)** simplifies the relationship between risk and return, using a single factor—beta—to determine expected returns based on market risk and the risk-free rate. CAPM aids in assessing the cost of equity and understanding the required return on an asset given its risk profile in relation to the broader market.

4.7 Glossary

Risk-Return Tradeoff The principle that higher potential returns typically come with higher risk. Investors must balance their desire for returns with their tolerance for risk.

Diversification Spreading investments across different assets to reduce risk. It aims to minimize the impact of any single asset's poor performance on the overall portfolio.

Portfolio Optimization The process of selecting the optimal mix of assets to achieve a desired level of return for a given level of risk or vice versa.

Standard Deviation A measure of the dispersion of a set of data points from their mean. In finance, it represents the volatility or risk of an asset or portfolio.

Expected Return The anticipated return on an investment, calculated as the weighted average of possible returns based on their probabilities.

Systematic Risk Also known as market risk, it refers to the risk inherent to the entire market or a market segment. It cannot be eliminated through diversification.

Unsystematic Risk Also known as specific risk or diversifiable risk, it pertains to risks that are specific to an individual asset or small group of assets. It can be mitigated through diversification.

Alpha A measure of the excess return of an investment relative to its expected return given its level of risk, often used as an indicator of a manager's skill in generating returns.

Sharpe Ratio A measure of risk-adjusted return, calculated as the ratio of excess return (return above the risk-free rate) to the standard deviation of returns. Higher ratios indicate better risk-adjusted performance.

Market Efficiency The degree to which asset prices reflect all available information. It is categorized into weak, semi-strong, and strong forms based on the type of information that is already incorporated into prices.

Factor Models Models that explain asset returns based on underlying factors (e.g., interest rates, inflation, company-specific factors) rather than relying solely on market indices.

Treynor Ratio A measure of risk-adjusted return that evaluates the excess return per unit of systematic risk (beta). It is similar to the Sharpe Ratio but uses beta as the risk measure.

Liquidity The ease with which an asset can be bought or sold in the market without affecting its price. More liquid assets typically have lower transaction costs.

Volatility A statistical measure of the dispersion of returns for a given security or market index. High volatility implies large fluctuations in prices over short periods.

Efficient Market Anomalies Departures from the predictions of the Efficient Market Hypothesis, suggesting that markets may not always be perfectly efficient due to certain predictable patterns or anomalies.

4.8 Self Assessment

1. What are the implications of Strong Form EMH for insider trading laws?
2. How does EMH impact the practice of technical analysis in stock trading?
3. Explain how a market anomaly could challenge the assumptions of Semi-Strong EMH.
4. Why might behavioral finance theories contradict aspects of EMH?
5. Compare and contrast EMH with the Adaptive Market Hypothesis.
6. What is the primary goal of diversification in the Markowitz Model?
7. How does the efficient frontier help in portfolio decision-making?
8. Explain how risk and return are balanced in the Markowitz Model.
9. How does APT differ from CAPM in explaining asset prices?
10. Name two factors that APT considers in pricing assets and explain their roles.
11. What role do arbitrageurs play in APT, and how does it affect market efficiency?
12. Describe the relationship between beta and expected return in CAPM.
13. What assumptions does CAPM rely on, and how do they impact its applicability in real-world scenarios?
14. How can CAPM be used to determine the cost of equity for a company?

4.9 Case Study

Efficient Market Hypothesis in the Context of Bitcoin Prices

During the cryptocurrency boom of 2017-2018, Bitcoin prices experienced significant volatility. Proponents of EMH argued that the prices reflected all available information at each moment, making it impossible to predict future price movements. However, critics pointed out that the market was influenced by speculative behavior rather than rational valuation, challenging the applicability of EMH in nascent and highly volatile markets like cryptocurrencies.

Question How did the Efficient Market Hypothesis fare in explaining the price movements of Bitcoin during the 2017-2018 period?

Bouri, E., Molnár, P., Azzi, G., Roubaud, D., & Hagfors, L. I. (2017). On the hedge and safe haven properties of Bitcoin: Is it really more than a diversifier? Finance Research Letters, 20, 192-198.

Markowitz Model (Modern Portfolio Theory)

After the 2008 financial crisis, CalPERS re-evaluated its risk tolerance and applied Modern Portfolio Theory (MPT) to adjust its investment strategy. By constructing an efficient frontier, CalPERS was able to optimize its risk-return trade-off, moving into safer assets like bonds while maintaining a diversified portfolio that would maximize returns within the fund's risk tolerance.

Question Explain how the concept of diversification in the Markowitz Model helps in reducing portfolio risk.

CalPERS. (2009). Comprehensive Annual Financial Report. Retrieved from www.calpers.ca.gov.

Arbitrage Pricing Theory (APT)

LTCM's strategy relied on identifying arbitrage opportunities across different asset classes. In 1998, the Russian financial crisis caused significant market turbulence, disrupting LTCM's trades, which depended on certain correlations and factor models. The hedge fund incurred massive losses, and its collapse required a $3.6 billion bailout organized by the U.S. Federal Reserve.

Question How does Arbitrage Pricing Theory account for multiple systematic factors in asset pricing compared to the Capital Asset Pricing Model (CAPM)?

Lowenstein, R. (2001). When Genius Failed: The Rise and Fall of Long-Term Capital Management. Random House

4.10 Answer for Check Your Progress

Section 4.1	**Overview of Efficiency Market Hypothesis**
1.	D) Only historical prices.
2.	A) Reflect all publicly available information, including past prices.
3.	B) Reflect all information, both public and private.
4.	B) Cannot consistently earn abnormal returns.
5.	A) Weak Form
Section 4.2	**An overview of Markowitz Model of Portfolio Theory**
1.	B) Minimizes risk for a given level of return.
2.	C) Stephen Ross
3.	A) Always exploit arbitrage opportunities
4.	B) Ability to handle multiple factors influencing asset prices
5.	C) Potential for mispriced assets
Section 4.3	**Overview of Arbitrage Pricing Theory**
1.	B) Arbitrage Pricing Theory (APT)
2.	C) Mispriced assets can lead to arbitrage opportunities.
3.	B) Reduce risk by combining assets with low correlations.
4.	D) Its correlation with other assets in the portfolio.

5.	B) Risk-averse and seek to minimize risk for a given level of return.
6.	B) Efficient Frontier
Section 4.4	**Overview of Single Index Model**
1.	C) The market index
2.	C) Beta coefficient
3.	A) Perform better than the market in bullish conditions
4.	D) Systematic risk
5.	B) Perform in line with the market with less volatility
Section 4.5	**Single Index Model**
1.	B) Are risk-averse and rational
2.	A) The return on government securities
3.	D) Cost of equity
4.	B) Perform in line with the market with higher volatility
5.	A) Risk-free rate + Market risk premium

4.12 Reference and suggested Readings

- A Random Walk Down Wall Street" by Burton G. Malkiel, W.W. Norton & Company, 2019.
- "Market Efficiency, Long-Term Returns, and Behavioral Finance" by Eugene F. Fama, University of Chicago Press, 2013.
- "Investments" by Zvi Bodie, Alex Kane, and Alan J. Marcus, McGraw-Hill Education, 2020.

UNIT V – Meaning and Evaluation of Portfolio Performance
Portfolio Performance Evaluation–Meaning – Need for Evaluation – Methods of Calculating Portfolio return – Sharpe's Ratio – Treynor's Ratio –Jensen's Differential Returns – Portfolio Revision Need for Portfolio Revision –Formula Plans.

Comprehensive Guide to Portfolio Performance Evaluation and Revision Techniques

UNIT OBJECTIVES

- Understand the importance of portfolio performance evaluation.
- Define key metrics used in evaluating portfolio performance.
- Differentiate between time-weighted return and money-weighted return.
- Understand when each method of calculating portfolio return is appropriate.
- Explain the purpose and calculation of Sharpe Ratio, Treynor's Ratio, and Jensen's Alpha.
- Understand the strengths and limitations of each metric in evaluating portfolio performance.

SECTION 5.1 INTRODUCTION TO PORTFOLIO PERFORMANCE EVALUATION

5.1.1. Meaning of Portfolio management

Portfolio management is the art 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.

Some individuals do their own investment portfolio management. This requires an in-depth understanding of the key elements of portfolio building and maintenance that make for success, including asset allocation, diversification, and rebalancing.

5.1.2 Understanding Portfolio Management

Professional licensed portfolio managers work on behalf of clients, while individuals may choose to build and manage their own portfolios. In either case, the portfolio manager's ultimate goal is to maximize the investments' expected return within an appropriate level of risk exposure.1

Portfolio management requires the ability to weigh the strengths and weaknesses, opportunities and threats of a spectrum of investments. The choices involve trade-offs, from debt versus equity to domestic versus international, and growth versus safety.

Individual investors and institutional investors approach portfolio management with distinct strategies and objectives tailored to their specific circumstances and goals.

Individual Investors Individual investors manage smaller amounts of money relative to institutional investors and focus primarily on personal financial goals such as retirement savings, education funding, or wealth accumulation. Their investment strategies vary widely based on their risk tolerance, financial knowledge, and engagement level. Some individuals prefer active management, involving frequent trading and rebalancing, while others opt for passive management or automated solutions. With advancements in technology, individual investors now have greater access to investment information and tools to customize their strategies according to their personal financial objectives.

Institutional Investors Institutional investors, such as pension funds, endowments, foundations, banks, and insurance companies, manage large pools of capital on behalf of their stakeholders or beneficiaries. Their investment objectives

are often focused on long-term growth, capital preservation, and meeting specific financial obligations and liabilities. Institutional investors operate under stringent regulatory oversight and are guided by ethical and governance considerations in their investment decisions. They typically adopt more conservative investment approaches compared to individual investors, emphasizing risk management and sustainable growth over short-term gains.

Key Differences

1. **Goals and Objectives** Individual investors prioritize personal financial goals, whereas institutional investors manage funds to meet obligations and achieve long-term sustainability.
2. **Risk Tolerance** Individual investors' risk tolerance varies widely, influencing their investment strategies, while institutional investors generally adopt more conservative approaches to safeguard capital.
3. **Management Approach** Individual investors may employ diverse strategies from active trading to passive management, leveraging technological advancements, whereas institutional investors adhere to structured, often regulatory-driven investment strategies.
4. **Regulatory Environment** Institutional investors operate under strict regulatory oversight to ensure fiduciary responsibility and compliance, contrasting with individual investors who face fewer regulatory constraints.

5.1.3. Portfolio Management Two Main Approaches

Passive and active management, each serving distinct purposes and appealing to different types of investors.

Passive Management

Passive portfolio management often referred to as indexing, aims to replicate the performance of a specific market index or benchmark. This strategy involves investing in index funds or ETFs that mirror the composition and weighting of the chosen index. The portfolio manager's role is primarily to maintain this replication

rather than actively selecting individual securities. Passive management is characterized by

- **Cost Effectiveness** Generally lower management fees compared to active management due to reduced trading and research costs.
- **Market Performance** Historically tracks the overall market performance over the long term, aligning closely with the chosen index.
- **Lower Turnover** Reduced buying and selling of securities, leading to lower tax implications and greater tax efficiency.
- **Set-and-Forget Strategy** Requires minimal intervention after initial setup, suitable for investors seeking long-term, stable returns without frequent portfolio adjustments.

Active Management

Active portfolio management involves hands-on management by fund managers or portfolio managers who aim to outperform the market or a specific benchmark index through active buying and selling of individual securities. This approach relies on in-depth research, market forecasting, and the manager's expertise to identify opportunities and manage risks. Key characteristics include

- **Higher Costs** Typically higher management fees due to the active management and research involved in selecting securities.
- **Potential for Outperformance** Seeks to generate returns that exceed the benchmark index, relying on market inefficiencies and superior stock selection.
- **Flexibility** Allows for tactical asset allocation and portfolio adjustments based on changing market conditions, economic outlook, and investment opportunities.
- **Risk Management** Actively managed funds may aim to mitigate risks and capitalize on market trends through timely adjustments and strategic investments.

5.1.4 Key Elements of Portfolio Management

- **Asset Allocation** Determines the mix of assets (e.g., stocks, bonds, cash equivalents) based on investor goals, risk tolerance, and market conditions.
- **Diversification** Spreads investment risk across different asset classes, sectors, and geographical regions to reduce portfolio volatility.
- **Rebalancing** Periodic adjustments to maintain the desired asset allocation and risk-return profile, ensuring alignment with long-term investment objectives.
- **Tax Efficiency** Structuring portfolios to minimize tax liabilities through strategic asset placement and tax-efficient investment vehicles.

5.1.5 Common Portfolio Management Strategies

Every investor's specific situation is unique. Therefore, while some investors may be risk-averse, others may be inclined to pursue the greatest returns (while also incurring the greatest risk). Very broadly speaking, here are several common portfolio management strategies an investor can consider

- **Aggressive** An aggressive portfolio prioritizes maximizing the potential earnings of the portfolio. Often invested in riskier industries or unproven alternative assets, an investor may be willing to risk losses. Instead, investors are looking for a "home run" investment by striking it big with a single investment.
- **Conservative** Meanwhile, a conservative portfolio relates to capital preservation. Extremely risk-averse investors may adopt a portfolio management strategy that minimizes growth but also minimizes the risk of losses.
- **Moderate** A moderate portfolio management strategy blends an aggressive and conservative approach. In an attempt to get the best of both worlds, a moderate portfolio still invests heavily in equities but also diversifies and may be more selective in what those equities are.

- **Income-oriented** Often the option of choice for retired investors, this is for those who wish to live in part off their portfolio returns. These returns could come from bond coupons or dividends.
- **Tax-efficient** As discussed above, investors may be inclined to focus primarily on minimizing taxes, even at the expense of higher returns. This may be especially important for high earners who are in the highest income tax bracket. This may also be a priority for young investors who have a very long way until retirement. By getting started with a Roth IRA, these investors can grow their portfolio over time and face no federal taxes on these funds when they retire.

5.1.6 Challenges of Portfolio management,

Portfolio management, regardless of the chosen strategy, faces inherent challenges that impact investment outcomes and decision-making processes.

1. **Market Volatility** Investment portfolios are susceptible to market fluctuations and volatility, which can lead to significant losses even with a well-planned management strategy. Market conditions, economic shifts, geopolitical events, and investor sentiment can all influence portfolio performance unpredictably.
2. **Diversification Complexity** While diversification is crucial for managing risk, achieving an optimal mix of asset classes and investments can be challenging. It requires a deep understanding of market dynamics, correlations between asset classes, and the investor's risk tolerance. Additionally, diversification efforts may incur costs due to the need to acquire a broad range of securities.
3. **Risk Assessment and Management** Effective portfolio management hinges on accurately assessing and managing risk. This involves understanding individual risk preferences, investment horizons, and return expectations. Changes in market conditions or personal circumstances can alter risk profiles, necessitating ongoing evaluation and adjustments.

4. **Regulatory and Tax Considerations** Portfolio management strategies must comply with regulatory requirements and adapt to changes in tax regulations. These factors can impact investment decisions, asset allocation, and overall portfolio performance. Investors and managers need to stay informed about regulatory updates and their potential implications.
5. **Costs and Fees** Portfolio management services typically incur fees, which can vary based on the strategy, complexity, and level of service provided. These costs include management fees, transaction fees, and administrative expenses. Balancing the value provided by portfolio management services against associated costs is essential for optimizing investment returns.
6. **Dynamic Market Views** Portfolio managers may have differing market outlooks and strategies compared to individual investors. Aligning these views and expectations requires effective communication and transparency between the investor and manager to ensure mutual understanding and agreement on investment decisions.

Let's Sum Up

Portfolio management involves strategically managing investments to achieve specific financial objectives while managing risks effectively. Key aspects include diversification to reduce risk exposure, asset allocation based on risk tolerance and return expectations, and active management to capitalize on market opportunities. Metrics such as the Sharpe Ratio and CAPM aid in evaluating portfolio performance and determining optimal asset mixes. Successful portfolio management requires a balanced approach that considers both short-term market dynamics and long-term investment goals, ensuring alignment with investor preferences and risk profiles.

SECTION 5.1 INTRODUCTION TO PORTFOLIO MANAGEMENT

Check Your Progress – Quiz – 1

1. Which of the following is NOT a primary objective of portfolio management?
    a. Maximizing returns
    b. Minimizing risks

c. Achieving absolute profitability
d. Diversifying investments

2. Portfolio diversification primarily aims to
   a. Increase transaction costs
   b. Reduce unsystematic risk
   c. Concentrate investments in a single asset
   d. Maximize returns

3. The Capital Asset Pricing Model (CAPM) is used to
   a. Calculate the expected return of an individual security
   b. Assess the performance of a portfolio manager
   c. Measure market volatility
   d. Estimate the required return on an asset based on its risk

4. Active portfolio management involves
   a. Mimicking the performance of a benchmark index
   b. Buying and holding securities for the long term
   c. Constantly adjusting the portfolio based on market conditions
   d. Minimizing transaction costs

5. What does the Sharpe Ratio measure in portfolio management?
   a. Excess return per unit of total risk
   b. Excess return per unit of systematic risk
   c. Excess return relative to market return
   d. Excess return relative to risk-free rate

SECTION 5.2 INTRODUCTION TO PORTFOLIO EVALUATING

5.2.1. Portfolio Evaluating

Portfolio evaluating refers to the evaluation of the performance of the investment portfolio. It is essentially the process of comparing the return earned on a portfolio with the return earned on one or more other portfolio or on a benchmark portfolio. Portfolio performance evaluation essentially comprises of two functions,

performance measurement and performance evaluation. Performance measurement is an accounting function which measures the return earned on a portfolio during the holding period or investment period. Performance evaluation, on the other hand, address such issues as whether the performance was superior or inferior, whether the performance was due to skill or luck etc.

The ability of the investor depends upon the absorption of latest developments which occurred in the market. The ability of expectations if any, we must able to cope up with the wind immediately. Investment analysts continuously monitor and evaluate the result of the portfolio performance. The expert portfolio constructor shall show superior performance over the market and other factors. The performance also depends upon the timing of investments and superior investment analysts' capabilities for selection.

The evolution of portfolio always followed by revision and reconstruction. The investor will have to assess the extent to which the objectives are achieved. For evaluation of portfolio, the investor shall keep in mind the secured average returns, average or below average as compared to the market situation. Selection of proper securities is the first requirement.

5.2.2 Definition of Portfolio Performance Evaluation

Portfolio performance evaluation is an essential aspect of the investment process that allows investors and portfolio managers to assess the effectiveness of their investment strategies. The main goal of performance evaluation is to determine whether the chosen investment strategy is achieving the desired risk and return objectives.

5.2.3 Components of Portfolio Performance Evaluation

Risk Assessment

A crucial part of evaluating portfolio performance is assessing the level of risk taken by the investor. This can be done by examining the volatility of the portfolio, measured by the standard deviation or other risk metrics, as well as the correlation of the portfolio's returns with the broader market.

Return Assessment

Return assessment involves analyzing the returns generated by the portfolio over a specific period. This can include measures such as absolute returns, relative returns compared to a benchmark, or even risk-adjusted returns that take into account the level of risk taken to achieve the given returns.

Risk-Adjusted Performance

Risk-adjusted performance metrics allow investors to evaluate the effectiveness of a portfolio by considering both the returns generated and the level of risk taken to achieve those returns. This is important as it helps determine whether a portfolio is generating sufficient returns for the level of risk taken.

Attribution Analysis

Attribution analysis seeks to identify the sources of a portfolio's performance, such as sector allocation, security selection, and interaction effects. This information can help investors and portfolio managers make more informed decisions about their investment strategies.

Benchmark Comparison

Comparing a portfolio's performance to a relevant benchmark is a common practice in performance evaluation. This allows investors to determine whether the portfolio is outperforming or underperforming the market or its peers, providing valuable insight into the effectiveness of the investment strategy.

Key Performance Metrics

Absolute Return Measures

Total Return

Total return is a measure of the total gain or loss of a portfolio over a specific period, expressed as a percentage of the initial investment. It includes both capital gains and any income generated, such as dividends or interest.Compound Annual Growth Rate (CAGR)

CAGR is a measure of the average annual growth rate of a portfolio over a specific period. It is a useful metric for comparing the performance of different investments, as it smooth out the effects of short-term fluctuations and provides a standardized measure of growth. Risk-Adjusted Return Measures

5.2.4 Portfolio Performance Evaluation Methods

The objective of modern portfolio theory is maximization of return or minimization of risk. In this context the research studies have tried to evolve a composite index to measure risk based return. The credit for evaluating the systematic, unsystematic and residual risk goes to Sharpe, Treynor and Jensen.

The portfolio performance evaluation can be made based on the following methods

1. Sharpe's Measure
2. Treynor's Measure
3. Jensen's Measure

1. Sharpe's Measure

Sharpe's Index measure total risk by calculating standard deviation. The method adopted by Sharpe is to rank all portfolios on the basis of evaluation measure. Reward is in the numerator as risk premium. Total risk is in the denominator as standard deviation of its return. We will get a measure of portfolio's total risk and variability of return in relation to the risk premium. The measure of a portfolio can be done by the following formula

SI =(Rt — Rf)/Ïƒf

Where,

- SI = Sharpe's Index
- Rt = Average return on portfolio
- Rf = Risk free return
- Ïƒf = Standard deviation of the portfolio return.

2. Treynor's Measure

The Treynor's measure related a portfolio's excess return to non-diversifiable or systematic risk. The Treynor's measure employs beta. The Treynor based his formula on the concept of characteristic line. It is the risk measure of standard deviation, namely the total risk of the portfolio is replaced by beta. The equation can be presented as follow

$T_n = (R_n - Rf)/\hat{I}^2_m$

Where,

- T_n = Treynor's measure of performance
- R_n = Return on the portfolio
- Rf = Risk free rate of return
- $\hat{I}^2_m$ = Beta of the portfolio (A measure of systematic risk)

3. Jensen's Measure

Jensen attempts to construct a measure of absolute performance on a risk adjusted basis. This measure is based on Capital Asset Pricing Model (CAPM) model. It measures the portfolio manager's predictive ability to achieve higher return than expected for the accepted riskiness. The ability to earn returns through successful prediction of security prices on a standard measurement. The Jensen measure of the performance of portfolio can be calculated by applying the following formula

$R_p = R_f + (R_{MI} — R_f) \times \hat{I}^2$

Where,

- R_p = Return on portfolio
- R_{MI} = Return on market index
- R_f = Risk free rate of return

5.2.5 Performance Attribution

Sector Allocation

Sector allocation refers to the impact of a portfolio's allocation to different sectors on its performance. By analyzing this factor, investors can determine whether their investment decisions in certain sectors contributed positively or negatively to the overall performance.

Security Selection

Security selection refers to the impact of individual security selection within a sector on a portfolio's performance. Analyzing this factor allows investors to determine if their choices of specific securities contributed positively or negatively to the overall performance.

Interaction Effect

The interaction effect is the combined impact of sector allocation and security selection on portfolio performance. Understanding this effect can help investors identify whether their investment decisions resulted in a synergy that enhanced overall performance.

5.2.6 Benchmark Selection and Comparison

Choosing an appropriate benchmark is crucial for meaningful performance evaluation. An accurate benchmark should have similar risk characteristics and investment objectives as the portfolio being evaluated to provide a fair comparison.

Types of Benchmarks

Market Indices

Market indices, such as the S&P 500 or the NASDAQ, are common benchmarks used for evaluating portfolio performance. These indices represent broad market performance and can be useful for comparing the performance of a portfolio to the overall market.

Peer Group Comparisons

Peer group comparisons involve comparing a portfolio's performance to that of similar portfolios or investment funds. This method can help investors gauge the effectiveness of their portfolio manager relative to other managers with similar investment strategies.

Custom Benchmarks

Custom benchmarks are created to match the specific risk and return characteristics of a portfolio. They can be particularly useful for evaluating the performance of portfolios with unique investment objectives or strategies that may not be well-represented by market indices or peer groups.

Limitations of Benchmark Comparisons

Benchmark comparisons are not without their limitations. Issues such as data quality, benchmark selection bias, and the risk of overemphasis on short-term performance can impact the validity of benchmark comparisons.

Practical Considerations in Portfolio Performance Evaluation

Data Accuracy and Quality

Accurate and reliable data is essential for effective performance evaluation. Ensuring that all data, such as prices, returns, and risk metrics, is up-to-date and accurate can help avoid erroneous conclusions.

Frequency of Evaluation

Determining the appropriate frequency for performance evaluations depends on factors such as investment objectives, time horizon, and market conditions. Regular evaluations can help investors stay informed and make necessary adjustments to their investment strategies.

Evaluation Period

The evaluation period should be long enough to capture a representative sample of the portfolio's performance. This can help minimize the impact of short-term fluctuations and provide a more accurate assessment of the investment strategy's effectiveness.

Impact of Fees and Taxes

Investment fees and **taxes** can significantly impact portfolio performance. It is essential to consider these factors when evaluating performance to obtain a clear understanding of the net returns generated by the portfolio.

5.2.7 Tools and Techniques for Portfolio Performance Evaluation

Software and Platforms

Numerous software and platforms are available to assist investors and portfolio managers in evaluating portfolio performance. These tools can help automate the process, provide advanced analytics, and generate detailed reports.

Portfolio Analytics

Portfolio analytics involves using various quantitative techniques to analyze the risk and return characteristics of a portfolio. These techniques can include optimization, stress testing, and scenario analysis, among others.

Reporting and Visualization

Effective reporting and visualization can help investors and portfolio managers better understand and communicate their portfolio's performance. Tools such as charts, graphs, and tables can help illustrate complex data in a more digestible format.

Roles of Performance Evaluation in Investment Decisions

Identifying Strengths and Weaknesses

Performance evaluation can help investors identify the strengths and weaknesses of their investment strategies. This information can be used to make adjustments to improve performance or reduce risk.

Improving Investment Strategy

Regular performance evaluations can help investors and portfolio managers refine their investment strategies by identifying areas that require improvement or adjustment based on market conditions and individual objectives.

Monitoring Manager Performance

For investors who use professional portfolio managers, performance evaluations can be an essential tool for monitoring the manager's effectiveness and ensuring that they are adhering to the agreed-upon investment strategy.

Portfolio performance evaluation is a critical aspect of the investment process that helps investors and portfolio managers make informed decisions and optimize their strategies.

By assessing risk, return, and risk-adjusted performance, investors can identify the strengths and weaknesses of their investment approaches and make necessary adjustments.

Regular evaluations also help investors monitor their portfolio managers' performance and maintain confidence in their investment decisions.

Incorporating a wide range of performance metrics, appropriate benchmarks, and advanced tools can provide a more accurate and comprehensive evaluation.

However, it is essential to consider practical factors such as data accuracy, evaluation frequency, and the impact of fees and taxes to ensure a true representation of a portfolio's performance.

As markets and investment objectives evolve, performance evaluation methodologies must adapt to provide meaningful insights. Ultimately, regular and thorough portfolio performance evaluations can lead to better investment decisions and improved investor confidence and trust.

Let's Sum up

Portfolio performance evaluation involves assessing investment strategies using metrics like Sharpe Ratio, Treynor's Ratio, and Jensen's Alpha. These metrics help investors and managers gauge risk-adjusted returns and make informed decisions about portfolio adjustments. Understanding both time-weighted and money-weighted returns is essential for evaluating actual versus theoretical performance. Each metric has specific strengths and limitations, aiding in comprehensive portfolio analysis and management.

SECTION 5.2 INTRODUCTION TO PORTFOLIO PERFORMANCE EVALUATION

Check Your Progress – Quiz – 2

1. What is the primary purpose of portfolio performance evaluation?
    a. To predict future market movements.
    b. To assess the effectiveness of investment strategies.
    c. To maximize short-term gains.
    d. To minimize diversification.
2. Which of the following is NOT a commonly used metric in portfolio performance evaluation?
    a. Sharpe Ratio
    b. R-squared
    c. Treynor's Ratio
    d. Jensen's Alpha
3. Portfolio performance evaluation primarily focuses on
    a. Quantifying individual stock returns.
    b. Evaluating returns without considering risk.
    c. Analyzing returns relative to risks.
    d. Maximizing portfolio turnover.
4. Why is it important for investors to evaluate portfolio performance?
    a. To ensure they always beat the market.
    b. To assess if returns meet their investment goals.

c. To avoid taxes on gains.
d. To minimize transaction costs.

5. The Sharpe Ratio measures
   a. Excess return per unit of systematic risk.
   b. Excess return per unit of total risk.
   c. Excess return per unit of unsystematic risk.
   d. Total return per unit of total risk.

SECTION 5.3. AN OVERVIEW OF PORTFOLIO REVISION

5.3.1. What is a Portfolio?

A combination of various investment products like bonds, shares, securities, mutual funds and so on is called a portfolio. In the current scenario, individuals hire well trained and experienced portfolio managers who as per the client's risk taking capability combine various investment products and create a customized portfolio for guaranteed returns in the long run. It is essential for every individual to save some part of his/her income and put into something which would benefit him in the future. A combination of various financial products where an individual invests his money is called a portfolio.

5.3.2. What is Portfolio Revision ?

The art of changing the mix of securities in a portfolio is called as portfolio revision. The process of addition of more assets in an existing portfolio or changing the ratio of funds invested is called as portfolio revision. The sale and purchase of assets in an existing portfolio over a certain period of time to maximize returns and minimize risk is called as Portfolio revision.

5.3.3. Need for Portfolio Revision

- An individual at certain point of time might feel the need to invest more. The need for portfolio revision arises when an individual has some additional money to invest.

- Change in investment goal also gives rise to revision in portfolio. Depending on the cash flow, an individual can modify his financial goal, eventually giving rise to changes in the portfolio i.e. portfolio revision.
- Financial market is subject to risks and uncertainty. An individual might sell off some of his assets owing to fluctuations in the financial market.

5.3.4 Portfolio Revision Strategies

There are two types of Portfolio Revision Strategies.

1. **Active Revision Strategy** Active Revision Strategy involves frequent changes in an existing portfolio over a certain period of time for maximum returns and minimum risks.

   Active Revision Strategy helps a portfolio manager to sell and purchase securities on a regular basis for portfolio revision.

2. **Passive Revision Strategy** Passive Revision Strategy involves rare changes in portfolio only under certain predetermined rules. These predefined rules are known as formula plans.

   According to passive revision strategy a portfolio manager can bring changes in the portfolio as per the formula plans only.

5.3.5 What are Formula Plans in Portfolio Revision?

Formula Plans are certain predefined rules and regulations deciding when and how much assets an individual can purchase or sell for portfolio revision. Securities can be purchased and sold only when there are changes or fluctuations in the financial market.

Why Formula Plans?

- Formula plans help an investor to make the best possible use of fluctuations in the financial market. One can purchase shares when the prices are less and sell off when market prices are higher.
- With the help of Formula plans an investor can divide his funds into aggressive and defensive portfolio and easily transfer funds from one portfolio to other.

Aggressive Portfolio

Aggressive Portfolio consists of funds that appreciate quickly and guarantee maximum returns to the investor.

Defensive Portfolio

Defensive portfolio consists of securities that do not fluctuate much and remain constant over a period of time.

Formula plans facilitate an investor to transfer funds from aggressive to defensive portfolio and vice a versa.

5.3.6 Assumptions of Formula Plan

The formula plan operates on the following assumptions

1. An upward trend in the market may result in a decline of stocks in the portfolio or the proportion of stocks may remain constant. In a declining market, the portfolio will be more aggressive and in an upward market, the portfolio will be defensive.
2. Investors generally allocate their funds among common stocks and fixed-income securities in such proportion as per the prevailing market condition, say 30 per cent in common stock and 70 per cent in bonds or vice versa. They may also change this proportion as the market condition changes. In a balanced fund, the investors may maintain a proportion of 50 per cent in common stock and 50 per cent in fixed-income securities.

3. The investors continue to strictly follow the formula plan once adopted and never change it.
4. The stocks are bought and sold whenever there is a significant change in the prices in the market. Such changes in the prices of stocks can be measured with the help of stock indices, such as the Bombay Stock Exchange (BSE), SENSEX (Sensitive Index), or Standard & Poor's CRISIL, NSE Index (S&P CNX Nifty) strictly follow the formula. ls plan once adopted and never change it.
5. Investors choose stocks which move along with the market reflecting the market's risk and return. The prices of the selected stocks are closely correlated with the overall market movement. The beta of these stocks will be around 1.0. These stocks belong to fundamentally strong companies.

5.3.7 Advantages and Disadvantages of the Formula Plan

Advantages of the Formula Plan

A formula plan has the following advantages

- This plan has rigid rules and regulations to overcome human emotions
- It provides the basic rules and regulations for buying and selling of securities
- The plan suggests a course of action designed to achieve the objectives established by the investor.
- It is highly helpful in determining the optimal timing for investments.
- It controls the trading (buying and selling) of securities by the investor.
- The plan enables an investor to earn higher returns.

Disadvantages of the Formula Plan

The disadvantages of the formula plan are as follows

- No adjustment is possible due to the inflexible and rigid nature of the rules.
- Formula plan does not help the investors in market forecasting, which has to be done separately and based on technical or fundamental analyses.

- The transaction cost will be high for short-term transactions; hence, the plan can be adopted only for long-term investments.
- The plan does not provide help for the selection of securities which has to be done based on technical or fundamental analyses.

5.3.8 Types of Formula Plan

Portfolio revision involves analyzing and adjusting the structure and composition of shares in the portfolio. It might involve a simple revision of the weights of the shares or the inclusion or dropping of a share to/from the portfolio revision can be studied under the following formula plans

Types of Formula Plan are listed below

1. Constant Rupee Value Plan
2. Constant Ratio Plan
3. Rupee Cost Averaging Plan
4. Variable Ratio Plan

Constant Rupee Value Plan

The objective of the constant rupee plan is to achieve a balanced allocation between the conservative and aggressive components of a portfolio with a focus on reaching the target value. The target value could be fixed initially by the investor at a preferred ratio.

For example, a constant rupee plan could consider the initial value of ₹10,000 each between conservative and aggressive portfolios. There can also be an initial value of ₹15,000 and 5,000 in the aggressive and conservative portfolio components respectively. Subsequently, changes in the portfolio components may lead to a reallocation or shift of funds from one component to the other.

The target portfolio value in the aggressive component may be set at the initial value with the excess being transferred to the conservative portfolio. Similarly, any shortfall in the aggressive component can be rectified by using the funds from the conservative portfolio. The purpose of the constant rupee plan is to ensure that

the total value of the aggressive portfolio remains stable over time. To achieve this, the investor can monitor the changes in the portfolio components and fix the percentage change in price that would require a portfolio revision.

Advantages of Constant Rupee Value Plan

The advantage of a constant ratio plan is the automation with which it forces the manager to counter-adjust his portfolio cyclically. However, this approach does not eliminate the necessity of carefully selecting individual security measures.

Disadvantages of Constant Rupee Value Plan

The limitation of the plan is that the funds are reallocated from the stock portion to the bond portion. Bonds are also a type of capital market instrument and are influenced by market forces. Both bond and share prices may fluctuate at the same time, with the possibility of both rising and falling in tandem. During the downtrend, both prices may experience a decline followed by a subsequent increase.

Constant Ratio Plan

This investment strategy involves maintaining the portfolio's composition by asset class at a certain level through periodic adjustments. When the balance is upset, it is periodically restored by moving money from over-performing assets to under-performing ones. This system ensures that no single asset class dominates the portfolio. This is one way to maintain a desirable asset allocation.

The constant-ratio plan specifies that the value of the aggressive portfolio to the value of the conservative portfolio will be held constant at the predetermined ratio. This plan automatically forces the investor to sell stocks as their prices rise, to keep the ratio of the value of their aggressive portfolio to the value of the conservative portfolio constant. Likewise, the investor is forced to transfer funds from conservative portfolios to aggressive portfolios as the price of stocks falls.

Advantages of Constant Value Ratio Plan

The advantage of a constant ratio plan is automatism which enables the manager to regularly adjust their portfolio. However, this cyclical adjustment does not reduce the importance of carefully selecting individual securities.

Disadvantages of Constant Value Ratio Plan

One major limitation of the plan is that the money is reallocated from the stock portion to the bond portion. Bonds are a type of capital market instrument that responds to market pressures. The prices of both the bonds and shares may rise and fall at the same time. In the downtrend, prices may decline and then gain.

Rupee Cost Averaging Plan

Rupee cost averaging is a strategy that relies on the mathematical principle of "averaging out" investment costs over time. Here investors are buyers in the market. Irrespective of fluctuations in prices, the investors intend to purchase the shares as part of their portfolio-building strategy. The method of buying the shares depends on the rise or fall in prices, when there is a fall in the price of a share, it is purchased in larger quantities. On the other hand, when the share price rises, the investors purchase the share in smaller quantities. The primary goal is to increase the wealth of the investors rather than securing returns for them. To expand their portfolio, investors may identify a certain percentage for increasing or decreasing their investments.

Advantages of Rupee Cost Averaging Plan

- It reduces the pressure associated with market timing by eliminating the need for investors to time their stock purchases.
- Reduces the average cost per share and improves the possibility of gain over a long period.
- Applicable to both falling and rising markets, although it works best if the stocks are acquired in a declining market.

- Makes the investors plan the investment program thoroughly on the commitment of funds that has to be done periodically.

Disadvantages of Rupee Cost Averaging Plan

- The plan does not indicate when to sell. It is only a strategy for buying
- The averaging advantage does not yield profit if the stock price is in a downward trend
- It does not eliminate the necessity for selecting the individual stocks that are to be purchased.
- Extra transaction costs are involved with small and frequent purchases of shares.
- The plan appears to be more effective when stock prices have cyclical patterns.
- There is no indication of the appropriate interval between purchases.

Variable Ratio Plan

The variable-ratio plan gives more flexibility to the investors in adjusting their portfolio components. When the share price decreases, the investor may choose to reallocate a major part of their conservative portfolio to the aggressive component. The desired ratio of investment holding between conservative and aggressive components of a portfolio may vary depending on the level of flexibility the investor wishes to incorporate in the portfolio revision decisions. When the share price increases, then the investors may choose to reallocate funds to maintain a stabilized portfolio.

Advantages of Variable Ratio Plan

The investors automatically adjust their portfolio according to the price changes. The investors are not emotionally affected by the market price fluctuations. By using accurate forecasts the variable ratio plan takes more advantage of price fluctuations than a fixed ratio plan.

Disadvantages of Variable Ratio Plan

- The selection of security has to be done by the investor by analyzing the merits of the stock.
- The investor has to construct the appropriate zones and trends for alterations of the proportions.
- If the zones are too small frequent changes have to be done and it would limit portfolio performance
- The plan does not help in the selection of scrip's.

Let's Sum Up

Portfolio revision refers to the process of periodically reviewing and adjusting the composition of an investment portfolio. It is necessary due to changes in investor goals, market conditions, economic outlook, and performance evaluation results. The primary objectives of portfolio revision include optimizing returns, managing risks, and aligning the portfolio with current financial objectives and risk tolerance levels.

Section 5.3. An Overview of Portfolio Revision

Check Your Progress – Quiz – 3

1. What is the primary objective of portfolio revision?
    - A) Maximizing short-term gains
    - B) Adapting the portfolio to changes in investor goals and market conditions
    - C) Minimizing transaction costs
    - D) Avoiding taxes on gains
2. When might an investor consider portfolio revision?
    - A) Only when the portfolio underperforms for multiple years
    - B) After significant changes in economic outlook
    - C) At the end of each calendar year
    - D) When the risk-free rate changes
3. What role do formula plans play in portfolio management?
    - A) Maximizing short-term profits

- B) Reducing the need for diversification
- C) Providing a systematic approach to decision-making
- D) Eliminating all risks

4. Why is it important to periodically review portfolio performance?
   - A) To maximize transaction costs
   - B) To identify underperforming assets
   - C) To avoid paying dividends
   - D) To increase market volatility
5. How does portfolio revision contribute to risk management?
   - A) By increasing exposure to high-risk assets
   - B) By reducing diversification
   - C) By rebalancing the portfolio to maintain a balanced risk exposure
   - D) By minimizing returns

5.4 Unit Summary

Portfolio performance evaluation aims to assess the effectiveness of investment strategies by analyzing returns relative to risks. Methods such as Sharpe Ratio, Treynor's Ratio, and Jensen's Alpha quantify risk-adjusted returns, guiding portfolio revisions to align with investor objectives and market conditions. Formula plans enhance decision-making consistency. Evaluation facilitates informed adjustments to optimize portfolio performance and meet investor goals effectively.

5.5 Glossary

Term	Definition	Examples
Active Management	A strategy where portfolio managers actively buy and sell securities in an attempt to outperform a benchmark.	A fund manager might overweight technology stocks believing the sector will outperform the market.
Alpha	The excess return of an investment relative to its benchmark.	An alpha of 1% means the investment outperformed its benchmark by 1%.
Asset Allocation	The distribution of assets (e.g., stocks, bonds, real estate) within	Conservative investors often have a higher

	a portfolio to achieve a preferred risk-return profile.	allocation of bonds, while aggressive investors want more exposure to growth stocks.
Asset Class	A group of investments with similar characteristics (e.g., stocks, bonds, real estate).	A diversified portfolio might include multiple asset classes.
Benchmark	A standard against which the performance of an investment or portfolio is measured.	A common benchmark for U.S. stocks is the S&P 500 index.
Beta	A measure of an investment's volatility in relation to the overall market.	A beta of 1 means the investment moves in line with the market, while a beta greater than 1 indicates higher volatility.
Diversification	Spreading investments across assets to lower risk.	Owning stocks from different industries or countries.
Index Fund	A type of mutual fund or ETF that tracks the performance of a specific market index	The S&P 500 index, which tracks the largest 500 American publicly traded companies in terms of market capitalization.
Net Asset Value (NAV)	The value per share of a mutual fund or ETF on a specific date or time.	The NAV of a mutual fund fluctuates daily based on the market value of its underlying holdings.
Passive Management	A strategy that aims to replicate the performance of a benchmark index, often through investing in index funds or ETFs.	An investor might choose a passive S&P 500 index fund to mirror the performance of the U.S. large-cap market.
Portfolio Optimization	The process of selecting the best portfolio (asset allocation) given	Modern portfolio theory is a common approach to

	the investor's constraints and objectives.	portfolio optimization.
Rebalancing	Adjusting a portfolio's asset allocation back to its target percentages to maintain the desired risk-return profile.	Selling some stocks and buying more bonds to return to a target allocation of 60% stocks and 40% bonds.
Risk Tolerance	An investor's ability and willingness to withstand changes in the value of their holdings.	An investor with a high-risk tolerance might be comfortable with a portfolio of mostly stocks.
Risk-Return Tradeoff	The principle that potential returns rise with an increase in risk. Thus, lower-risk investments offer lower potential returns, while higher-risk investments offer higher potential returns.	Stocks are generally considered riskier than bonds, but they also have the potential for higher returns.
Sharpe Ratio	A measure of risk-adjusted return, calculated as the excess return of an investment over the risk-free rate divided by its standard deviation.	A higher Sharpe ratio indicates better risk-adjusted performance.
Tracking Error	The difference between the performance of a portfolio and the performance of its benchmark index.	A tracking error of 1% means the portfolio's return deviated from the benchmark's return by 1%.
Turnover	The percentage of a portfolio's holdings that are sold and replaced over a specific period.	A high turnover rate can result in higher transaction costs and have tax implications.
Volatility	The degree of variation in prices over time for a given asset.	Stocks with high volatility experience larger price swings than those with low volatility.

5.6 Self Assessment

1. What is the purpose of portfolio performance evaluation, and why is it important for investors?
2. What key performance metrics are commonly used in portfolio performance evaluation?
3. How can investors select an appropriate benchmark for portfolio performance evaluation?
4. What are some practical considerations to keep in mind during portfolio performance evaluation?
5. How can portfolio performance evaluation tools and techniques assist in the investment decision-making process?
6. Why is it important to consider risk-adjusted returns when evaluating portfolio performance?
7. What factors might prompt a portfolio revision according to performance evaluation results?
8. How does a time-weighted return differ from a money-weighted return?
9. What role does the risk-free rate play in calculating Sharpe and Treynor Ratios?
10. How can formula plans contribute to systematic portfolio management?
11. Why do investors use benchmark indices when evaluating portfolio performance?
12. What are the limitations of relying solely on past performance data for portfolio evaluation?

5.7 Case Study

Tesla, Inc., led by CEO Elon Musk, has garnered significant attention not only for its innovative electric vehicles but also for its unique approach to strategic portfolio management. Tesla's portfolio includes investments in technology, renewable energy, and automotive sectors. Over recent years, Tesla's stock has experienced substantial volatility due to market sentiment, technological advancements, and regulatory changes.

1. **Investment in Innovation** Tesla consistently allocates resources to research and development (R&D) for advancing battery technology and autonomous driving systems, aiming to maintain its competitive edge in the electric vehicle market.
2. **Diversification Strategy** Recognizing the cyclical nature of the automotive industry, Tesla diversifies its revenue streams by expanding into solar energy products and energy storage solutions through its acquisition of SolarCity.
3. **Strategic Partnerships** Tesla has formed strategic partnerships with key players in the tech and energy sectors, such as Panasonic for battery production and utilities for energy storage solutions, to leverage synergies and reduce operational risks.

Question 1 How does Tesla's strategic portfolio management approach help mitigate risks associated with its core automotive business?

Berkshire Hathaway's Investment Portfolio

Scenario Berkshire Hathaway, headed by Warren Buffett, is renowned for its disciplined approach to portfolio management and long-term investment strategies. The conglomerate's portfolio includes diverse holdings in insurance, utilities, manufacturing, and consumer goods sectors. Buffett's investment philosophy emphasizes value investing and acquiring companies with strong fundamentals and competitive advantages.

1. **Acquisition Strategy** Berkshire Hathaway acquires companies with sustainable competitive advantages, such as See's Candies and Dairy Queen, to generate stable cash flows and long-term returns.
2. **Focus on Financial Strength** Buffett prioritizes companies with robust financials, low debt levels, and consistent profitability, reflecting Berkshire Hathaway's preference for companies with enduring economic moats.
3. **Public Equity Investments** Berkshire Hathaway holds significant stakes in publicly traded companies like Apple and Coca-Cola, leveraging its large capital base to make substantial investments in blue-chip stocks.

Question 1 How does Berkshire Hathaway's diversified portfolio contribute to its overall investment strategy and risk management approach?

5.8 Answers For Check Your Progress

Section 5.1	**Introduction to Portfolio Management**
1.	C) Achieving absolute profitability
2.	B) Reduce unsystematic risk
3.	D) Estimate the required return on an asset based on its risk
4.	C) Constantly adjusting the portfolio based on market conditions
5.	A) Excess return per unit of total risk
Section 5.2	**Introduction to Portfolio Performance Evaluation**
1.	B) To assess the effectiveness of investment strategies.
2.	B) R-squared
3.	C) Analyzing returns relative to risks.
4.	B) To assess if returns meet their investment goals.
5.	B) Excess return per unit of total risk.
Section 5.3	**An overview of Portfolio Revision**
1.	B) Adapting the portfolio to changes in investor goals and market conditions
2.	B) After significant changes in economic outlook
3.	C) Providing a systematic approach to decision-making
4.	B) To identify underperforming assets
5.	C) By rebalancing the portfolio to maintain a balanced risk exposure

5.9 Reference and Suggested Readings

- Investments Analysis and Management, Charles P. Jones, John Wiley & Sons,2020
- Investment Analysis and Portfolio Management, Frank K. Reilly and Keith C. Brown, Cengage Learning, 2019
- Portfolio Management A Strategic Approach, Richard A. DeFusco, Dennis W. McLeavey, Jerald E. Pinto, and David E. Runkle, CFA Institute, 2018
- The Intelligent Investor The Definitive Book on Value Investing, Benjamin Graham, Harper Business, 2006 (Revised Edition)