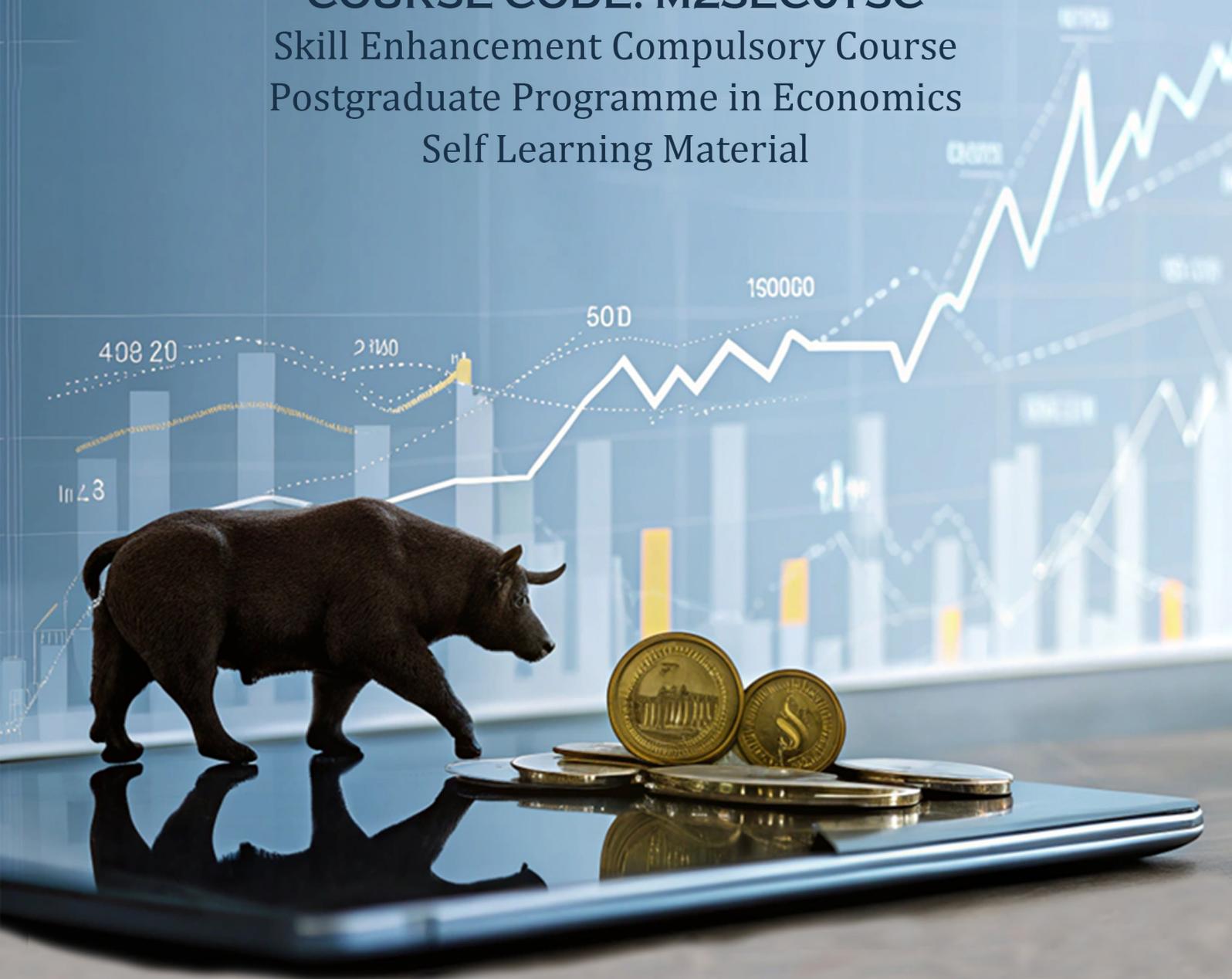# SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

## COURSE CODE: M23EC01SC

Skill Enhancement Compulsory Course

Postgraduate Programme in Economics

Self Learning Material

# SREENARAYANAGURU OPEN UNIVERSITY

## Vision

*To increase access of potential learners of all categories to higher education, research and training, and ensure equity through delivery of high quality processes and outcomes fostering inclusive educational empowerment for social advancement.*

## Mission

To be benchmarked as a model for conservation and dissemination of knowledge and skill on blended and virtual mode in education, training and research for normal, continuing, and adult learners.

## Pathway

Access and Quality define Equity.

# Security Analysis and Portfolio Management

Course Code: M23EC01SC

Semester - III

# Skill Enhancement Compulsory Course
# Postgraduate Programme in Economics
# Self Learning Material

## SREENARAYANAGURU OPEN UNIVERSITY

The State University for Education, Training and Research in Blended Format, Kerala

# SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

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I extend my heartfelt greetings and profound enthusiasm as I warmly welcome you to Sreenarayanaguru Open University. Established in September 2020 as a state-led endeavour to promote higher education through open and distance learning modes, our institution was shaped by the guiding principle that access and quality are the cornerstones of equity. We have firmly resolved to uphold the highest standards of education, setting the benchmark and charting the course.

The courses offered by the Sreenarayanaguru Open University aim to strike a quality balance, ensuring students are equipped for both personal growth and professional excellence. The University embraces the widely acclaimed "blended format," a practical framework that harmoniously integrates Self-Learning Materials, Classroom Counseling, and Virtual modes, fostering a dynamic and enriching experience for both learners and instructors.

The University aims to offer you an engaging and thought-provoking educational journey. The postgraduate programme in Economics builds on the undergraduate programme by covering more advanced theories and practical applications. The course material aims to spark learners' interest by using real-life examples and combining academic content with empirical evidence, making it relevant and unique. The Self-Learning Material has been meticulously crafted, incorporating relevant examples to facilitate better comprehension.

Rest assured, the university's student support services will be at your disposal throughout your academic journey, readily available to address any concerns or grievances you may encounter. We encourage you to reach out to us freely regarding any matter about your academic programme. It is our sincere wish that you achieve the utmost success.

Regards,
Dr. Jagathy Raj V.P.                                            01-01-2025

# Contents

# BLOCK 1

# Investment and Valuation

# UNIT 1 | UNDERSTANDING INVESTMENT

## Learning Outcomes

After completing this unit, learners will be able to:

- understand the characteristics of investment

- discuss the step-by-step investment process

- know various financial institutions and markets that facilitate investment activities

## Background

Asha had always been careful with her money. She worked as a school teacher and saved a small portion of her salary every month. One day, while having tea with her friend Meera, she mentioned how she wanted to do something meaningful with her savings instead of letting them sit idle in her bank account. Meera, who worked in a financial firm, smiled and asked, "Have you ever thought about investing?" Asha hesitated. "Investing sounds risky. What if I lose my money?" she asked. Meera explained, "That is a common fear, but not all investments are the same. Some are safe and grow slowly, while others can give higher returns but carry risks. The key is understanding your options." Curious, Asha decided to learn more. She discovered that investments could be in many forms—stocks, bonds, real estate, and even fixed deposits in banks. Each has its own advantages and risks. She also learned that investment decisions were not just about individuals like her; businesses, financial institutions, and even governments invested money in different ways to grow wealth and support economic activities. As Asha explored further, she realised that investing was not just about putting money somewhere and hoping for the best. There was a process involved—analysing risks, understanding markets, and choosing the right option based on goals.

## Keywords

Investment, Investment Process, Investment Institutions, Financial Markets, Liquidity

### 1.1.1 Investment

Investment refers to the commitment of funds for a certain period with the expectation of future financial returns. An investor can be an individual, a corporation, a government, or a pension fund. Investments can take various forms, including corporate investments in infrastructure, machinery, and equipment or individual investments in stocks, bonds, commodities, and real estate. This discussion primarily focuses on investments made by individuals. At its core, investment involves exchanging a known amount of money today for an expected future stream of returns that should exceed the initial amount. This process contributes to capital formation, which plays a major role in economic growth. Investment leads to an increase in the economy's capital stock, including buildings, equipment, and inventory, all of which facilitate the production of goods and services. While investment and savings are often used interchangeably, they are distinct concepts. Savings refer to setting aside money, whereas investment involves utilising funds to purchase assets that are expected to generate returns. Not all savers are investors. Investment funds are committed with the objective of earning additional income or appreciating value over time. Investment, therefore, involves using resources that have been saved with the hope of generating future benefits.

**Investment can be classified based on time horizon and risk:**

- Long-term investments generally yield higher returns but come with greater risk.

- Short-term investments may offer lower returns but provide quick liquidity.

- Risk-free investments (such as government bonds) provide stable but relatively lower returns.

- Risky investments (such as stocks or commodities) have the potential for higher returns but carry uncertainty.

According to Donald E. Fischer and Ronald J. Jordan: "Investment is a commitment of funds made in the expectation of some positive rate of return. If the investment

> - Using funds with the goal of earning future returns

is properly undertaken, the return will be commensurate with the risk assumed by the investor." According to F. Amling: "Investment refers to the purchase of a financial or real asset by an individual or institutional investor, with an expected return proportionate to the risk assumed over a future investment period." Investment, therefore, is not merely about putting money aside but rather strategically allocating it with the aim of wealth creation and financial security.

## 1.1.1.1 Nature of Investment

Investments are primarily made with the objective of maximising returns while minimising risks. Alongside these key goals, investors also consider factors such as safety, liquidity, profitability, taxation, inflation, government regulations, legality, transferability, and tangibility. The nature of investments is as follows.

1. **Safety of Investment**: An ideal investment should operate within the legal and regulatory framework. Investments that lack legal backing pose risks, as investors may face challenges in seeking redressal for any grievances. Regulatory approvals provide an added layer of security, ensuring investors' protection.

2. **Liquidity:** Liquidity refers to the ease with which an investment can be converted into cash without significant loss of value. Marketability plays a major role in determining liquidity, as assets with a well-established trading market can be easily sold. Stocks, for instance, are considered liquid if they offer attractive returns through dividends and capital appreciation, thereby maintaining consistent demand in the market.

3. **Profitability:** The primary motive behind investing is to generate profits. Profit can be realised in two major forms:

• Capital Appreciation: This occurs when an asset is sold at a price higher than its purchase price, resulting in a positive difference between the selling price and the initial cost.

• Yield: Investment yield refers to earnings derived from interest or dividends over time.

4. **Tax Implications:** Investors should consider the tax impact of their investment choices, as different assets are subject to varying tax treatments. A well-

planned investment strategy should consider tax-saving provisions and efficient tax planning opportunities to optimise returns.

5. **Inflation Hedge:** Inflation reduces the purchasing power of money, diminishing the real value of investments over time. To counteract this, investors must choose assets that provide returns exceeding the inflation rate, ensuring the preservation and growth of capital.

6. **Government Regulations:** Various legislative measures, such as the Gold Control Act and the Urban Land Ceiling Act, influence investment decisions. Compliance with government policies is essential for making legally sound investments and avoiding regulatory complications.

7. **Legal Considerations:** Investment decisions should align with legal provisions concerning minors, estates, trusts, shares, and insurance. Ensuring legal validity enhances investor confidence and mitigates potential legal disputes.

8. **Transferability:** Even if an investor intends to hold securities for the long term, investments should be easily transferable. The ability to buy and sell assets without facing legal or procedural hurdles enhances the flexibility and attractiveness of an investment.

9. **Tangibility:** While tangible assets such as land and buildings do not generate regular income, some investors prefer them over intangible assets, which may lose value due to market fluctuations, legal restrictions, or economic instability.

## 1.1.1.2 Characteristics of Investment

Investing involves various factors that influence financial decisions. Understanding these key characteristics helps investors make informed choices that align with their goals and risk tolerance. Below are the essential characteristics of investment:

1. **Risk and Return:** Risk and return are fundamental to every investment decision. Risk represents the possibility of losses or lower-than-expected returns, while return refers to the financial gains from an investment. Typically, higher risks are associated with higher potential returns, making risk tolerance a critical factor in investment planning. Diversification can help manage risk while optimising potential returns.

- Ensures financial growth and security

- Various factrors financial decision

2. **Liquidity:** Liquidity refers to how quickly an investment can be converted into cash without significantly affecting its value. Highly liquid assets, such as stocks and government bonds, can be sold quickly, whereas real estate and long-term securities often have lower liquidity. Balancing liquid and illiquid investments ensures financial flexibility when needed.

3. **Time Horizon:** The time horizon of an investment refers to the period an investor plans to hold an asset before requiring access to the funds. Investments can be categorised as:

- Short-term (e.g., treasury bills, money market funds)

- Medium-term (e.g., bonds, balanced funds)

- Long-term (e.g., equities, retirement funds) Aligning investments with the appropriate time horizon ensures that financial goals are met efficiently.

4. **Diversification:** Diversification involves spreading investments across different asset classes, industries, and geographical locations to minimise risk. By investing in a mix of stocks, bonds, real estate, and other assets, investors can reduce the impact of poor performance in any single category, promoting stability and consistent returns.

5. **Inflation Protection:** Inflation reduces the purchasing power of money over time, making it essential to invest in assets that can keep pace with or exceed inflation. Investments such as equities, real estate, commodities, and inflation-indexed bonds serve as effective hedges against rising costs.

6. **Tax Efficiency:** Tax efficiency refers to structuring investments in a way that minimises tax liabilities, thereby maximising after-tax returns. Strategies include utilising tax-advantaged accounts like pensions and Individual Savings Accounts (ISAs), tax-loss harvesting, and selecting investments with favourable tax treatment.

7. **Market Volatility**: Financial markets are naturally volatile, with prices fluctuating due to economic conditions, geopolitical events, and investor sentiment. Understanding and managing volatility through strategies like dollar-cost averaging and long-term investing can help investors remain focused on their financial objectives.

- A strategic approach ensures grwoth and financial security

**8. Investment Goals:** Clearly defined investment goals provide a roadmap for decision-making. Common objectives include retirement planning, home ownership, education funding, and wealth accumulation. Tailoring investment strategies to specific goals ensures better alignment with financial aspirations and risk tolerance.

**9. Psychological Factors:** Investor behaviour is influenced by cognitive biases such as fear of missing out (FOMO), loss aversion, and herd mentality. Overcoming emotional decision-making through education, disciplined investing, and professional guidance helps maintain a rational and objective approach.

**10. Cost Efficiency:** Investment costs, including management fees, transaction fees, and advisory charges, impact overall returns. Choosing low-cost investment options like index funds and exchange-traded funds (ETFs) can improve cost efficiency. Long-term investors can further reduce costs by adopting a buy-and-hold strategy rather than frequent trading.

By considering these key characteristics, investors can make well-informed decisions that align with their financial goals, risk tolerance, and market conditions. A strategic and disciplined approach to investing ensures sustained growth and financial security over time.

## 1.1.2 Investment Decision Process

Investing is a major financial activity that requires careful planning and strategic decision-making. Two fundamental aspects of investing include converting savings into investments and adopting a balanced approach when selecting securities. Many investors incur losses due to impulsive decisions driven by market trends rather than well-informed strategies. For instance, past market booms—such as the secondary market surge in 1992 and the primary market boom of 1994-95—led to significant financial setbacks for investors who failed to plan adequately. Similarly, many investors in the late 1990s faced heavy losses in software stocks due to poor investment strategies influenced by market hype and greed. The investment decision process is a systematic approach to allocating financial resources to various assets to achieve specific financial objectives. This process involves analysing financial goals, assessing risk tolerance, selecting appropriate investment avenues, and continuously monitoring and rebalancing the portfolio to maximise returns and minimise risks.

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• Investing requires understanding factors like risk, liquidity, diversification, and cost efficiency

• Converting savings into investments and selecting securities wisely to avoid losses

**Steps Involved in the Investment Decision Process**

1. **Setting Financial Goals:** Setting clear financial goals is key for any successful investment journey. These goals can be short-term (such as purchasing a car) or long-term (such as retirement planning). Defining and prioritising these objectives provides direction and shapes investment strategies. By establishing clear goals, individuals create a roadmap that aligns their investments with their aspirations. Goal-setting ensures purposeful and motivated investment decisions, turning aspirations into financial achievements.

2. **Assessing Risk Tolerance:** Understanding risk tolerance is key in making investment decisions. It refers to an investor's ability to face fluctuations in the value of their investments. This assessment involves evaluating psychological and financial resilience against market uncertainties. Investors can be broadly categorised into three types:

- Conservative investors – Prefer stability and lower risks.

- Moderate investors – Balance between risk and return.

- Aggressive investors – Seek high returns despite higher risks.

By gauging risk appetite, investors can tailor their investment portfolio accordingly. This step ensures investments align with personal temperament, making the financial journey both profitable and emotionally secure.

3. **Creating a Budget and Emergency Fund:** A strong financial foundation begins with disciplined budgeting and an emergency fund. Budgeting helps track income and expenses, ensuring surplus funds for investments. Simultaneously, an emergency fund safeguards investments against unexpected financial crises like medical emergencies or job loss. The emergency fund provides:

- Financial security

- Reinforcement in maintaining investments during market fluctuations

- Assurance that investments stay on track to meet long-term goals

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**Margin notes:**

- A systematic investment process to optimise returns and minimise risks

- Assessment involves evaluating psychological and financial resilience against market uncertainties

- Budgeting ensuring surplus funds for investments

**4. Diversifying the Investment Portfolio:** Diversification is a fundamental principle in investment management. It involves spreading investments across various asset classes such as stocks, bonds, mutual funds, real estate, and commodities to reduce risks. A diversified portfolio helps reduce the impact of poor performance in any single investment. For instance, when stocks underperform, bonds might provide stability. By distributing investments strategically, investors safeguard their portfolios and improve the potential for steady, long-term growth.

**5. Conducting Research and Analysis:** Making informed investment decisions requires thorough research and analysis. Investors must evaluate different investment opportunities based on the following:

- Fundamental analysis – Examining a company's financial health and performance indicators.

- Technical analysis – Studying market trends and price patterns.

- Macroeconomic indicators – Analysing economic trends, inflation, and interest rates.

Continuous research enables investors to identify promising opportunities, mitigate risks, and ensure alignment with financial goals.

**6. Making Informed Investment Decisions:** Investment decisions should be backed by expert guidance and continuous market monitoring. Investors can consult financial advisors or utilise online tools to gain insights. Key aspects of making informed decisions include:

- Evaluating investment risks and returns

- Adapting strategies to market fluctuations

- Ensuring investments align with evolving life goals

By staying informed and flexible, investors can respond effectively to market dynamics, ensuring sustainable financial growth.

**7. Regularly Reviewing and Rebalancing the Portfolio:** Periodic portfolio reviews and rebalancing are essential to maintain the desired asset allocation. This involves:

**Sidebar notes:**

- Diversification involves spreading investments across various asset classes

- Investors must evaluate different investment opportunities based

- Investors financial advisors or utilise online tools to gain insights

- Structured approach ensures financial stability, optimises returns and supports long-term objectives

- Steps help investors achieve financial growth and security in a dynamic market

- Investment institutions and markets enable capital flow between investors and entities

- Assessing investment performance against financial objectives

- Adjusting asset allocation based on market conditions

- Reallocating funds based on life events such as marriage, career changes, or retirement

By actively managing and optimising investments, investors can maximise returns while minimising risks. Regular monitoring ensures that investment strategies remain relevant and aligned with an investor's evolving financial goals.

The investment decision process is a dynamic and continuous cycle that requires strategic planning, informed decision-making, and active portfolio management. By following these structured steps, investors can increase their financial security, optimise returns, and achieve their long-term financial objectives. Investing wisely ensures stability, growth, and financial independence in an ever-changing economic landscape.

### 1.1.3 Investment Institutions and Markets

Investment institutions and markets play a major role in the financial system, facilitating capital flow between investors and businesses or governments that require funding. These institutions and markets provide a structured environment for investment activities, ensuring liquidity, transparency, and efficiency in financial transactions.

### 1.1.3.1 Investment Institutions

Investment institutions are organisations that pool funds from investors and allocate them across various asset classes to generate returns. These institutions cater to different investor needs, offering diversification, risk management, and professional expertise in portfolio management. Some of the major types of investment institutions include:

1. **Mutual Funds:** Mutual funds collect money from multiple investors and invest in a diversified portfolio of securities, such as stocks, bonds, and money market instruments. They are managed by professional fund managers who aim to maximise returns while minimising risks. Mutual funds provide retail investors access to professionally managed investment portfolios,

reducing the burden of individual stock selection and risk management.

2. **Pension Funds**: Pension funds are long-term investment pools created to provide retirement benefits to employees. These funds invest in a mix of equities, fixed-income securities, and alternative investments to ensure sustainable growth over time. Managed by government agencies or private organisations, pension funds play a significant role in the stability of financial markets.

3. **Insurance Companies:** Insurance companies act as institutional investors by pooling premiums collected from policyholders and investing them in various financial instruments. Life insurance companies, for instance, invest in bonds, equities, and real estate to ensure they can meet future claims and provide financial security to policyholders.

4. **Hedge Funds:** Hedge funds are private investment vehicles that employ diverse strategies with the objective of generating high returns. These funds typically target high-net-worth individuals and institutional investors, using techniques such as short selling, leverage, and derivatives trading to capitalise on market inefficiencies.

5. **Investment Banks:** Investment banks facilitate large-scale financial transactions such as mergers, acquisitions, and initial public offerings (IPOs). They also engage in proprietary trading, asset management, and advisory services for corporations and governments. Investment banks play a crucial role in capital formation by underwriting securities and advising on financial transactions, indirectly influencing financial market development.

6. **Sovereign Wealth Funds (SWFs):** Sovereign wealth funds are state-owned investment funds that manage surplus revenues, often derived from commodities like oil or foreign exchange reserves. These funds invest in global markets to generate returns that contribute to a nation's long-term economic stability.

## 1.1.3.2 Investment Markets

Investment markets, also called financial markets, facilitate the buying and selling of securities and other financial assets. These markets are essential for price analysis, liquidity provision, and efficient allocation of capital. They can be

• Investment institutions pool investor funds and allocate them across various assets with the aim of generating returns

• Investment markets are platforms for leading functional assets

broadly classified into the following categories:

1. **Stock Markets**: Stock markets facilitate the trading of equity securities, allowing companies to raise capital by issuing shares to investors. Investors buy and sell these shares through exchanges such as the New York Stock Exchange (NYSE), NASDAQ, and the Bombay Stock Exchange (BSE). Stock markets play a key role in wealth creation and corporate financing.

2. **Bond Markets:** The bond market, also known as the fixed-income market, enables governments, corporations, and municipalities to raise funds by issuing debt securities. Investors purchase bonds to earn periodic interest payments and receive the principal amount upon maturity. The bond market is crucial for funding infrastructure projects and corporate expansion.

3. **Money Markets:** Money markets deal with short-term financial instruments such as Treasury Bills, Commercial Paper, and Certificates of Deposit. These markets provide liquidity to businesses and financial institutions while allowing investors to earn returns on surplus funds with minimal risk.

4. **Derivatives Markets:** Derivatives markets facilitate the trading of financial instruments whose value is derived from underlying assets such as stocks, bonds, commodities, or interest rates. Common derivative products include futures, options, and swaps. These instruments help investors hedge risks, speculate on price movements, and improve portfolio diversification.

5. **Foreign Exchange (Forex) Markets:** The forex market is the largest and most liquid financial market in the world, where currencies are traded against each other. It enables businesses, investors, and governments to manage currency risks, conduct international trade, and invest in global markets. The forex market operates 24/7, driven by factors such as interest rates, geopolitical events, and economic data.

6. **Commodity Markets**: Commodity markets facilitate the buying and selling of physical goods such as gold, oil, agricultural products, and metals. These markets play a significant role in global trade and economic stability, allowing producers and investors to hedge against price fluctuations.

> • Finanacial markets enables the buying and selling of various assets, supporting economic growth

- Investment markets serve as platforms for price discovery and liquidity

Investment institutions and markets form the backbone of the financial system, ensuring the efficient allocation of capital and risk management. While investment institutions provide avenues for individuals and organisations to participate in financial markets, investment markets serve as platforms for price discovery and liquidity. A well-functioning investment ecosystem contributes to economic growth, financial stability, and wealth generation by efficiently allocating capital and managing investment risks.

## Summarised Overview

Investment refers to the commitment of funds with the expectation of future financial returns. It can be undertaken by individuals, corporations, governments, or institutions and may take various forms, such as stocks, bonds, real estate, or business infrastructure. Unlike savings, which merely involve setting aside money, investment actively allocates funds into assets with the goal of generating income or appreciation over time. Investment can be classified based on time horizon and risk. Long-term investments generally yield higher returns but involve greater risks, while short-term investments provide quick liquidity with lower returns. Investments can be categorized by risk level, with government bonds being relatively low-risk and stocks or commodities being high-risk. The primary objectives of investment include safety, liquidity, profitability, tax efficiency, and inflation hedging. Key factors in investment include safety, liquidity, profitability, tax implications, inflation protection, and legal considerations. An ideal investment must ensure regulatory compliance, offer ease of transferability, and maintain value over time. The characteristics of investment include risk and return trade-offs, diversification, time horizon, inflation protection, market volatility management, tax efficiency, and cost efficiency. Psychological factors like investor behaviour and biases also play a major role in investment decisions. The investment decision process involves several steps, including setting financial goals, assessing risk tolerance, creating a budget and emergency fund, diversifying the investment portfolio, conducting research, making informed decisions, and regularly reviewing the portfolio. Failure to follow a structured approach may lead to financial losses due to impulsive decisions influenced by market trends and speculation. Investment institutions and markets play a major role in capital flow within the financial system. Institutions such as mutual funds, pension funds, insurance companies, hedge funds, investment banks, and sovereign wealth funds facilitate investment opportunities and risk management. Financial markets, including stock markets, bond markets, money markets, derivatives markets, foreign exchange markets, and commodity markets, provide structured environments for buying and selling financial assets. These markets ensure liquidity, transparency, and efficient allocation of capital. A well-functioning investment ecosystem contributes to economic growth, financial stability, and wealth generation by channelling funds from investors to productive enterprises. Investors must strategically allocate their resources, balance risk and return, and remain adaptable to market conditions to achieve financial security and long-term wealth creation.

## Assignments

1. Discuss the importance of investment in economic growth and financial stability.
2. Analyse the various types of investments and the factors influencing investment decisions.
3. Examine the role of financial markets and investment.
4. Provide examples of how structured investment decision-making can lead to long-term financial success and stability.

## Suggested Reading

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# Space for Learner Engagement for Objective Questions

Learners are encouraged to develop objective questions based on the content in the paragraph as a sign of their comprehension of the content. The Learners may reflect on the recap bullets and relate their understanding with the narrative in order to frame objective questions from the given text. The University expects that 1 - 2 questions are developed for each paragraph. The space given below can be used for listing the questions.

# UNIT 2

# SECURITIES AND MONEY MARKET INSTRUMENTS

## Learning Outcomes

After completing this unit, learners will be able to:

- understand the concept of securities

- identify different types of money market instruments

- discuss the significance of money market instruments

## Background

Rahul had always been curious about how businesses and governments manage their finances. One day, while reading a news article, he came across a report discussing how companies raise money without taking long-term loans. The article mentioned "money market instruments" like treasury bills and commercial paper, but the terms seemed unfamiliar to him. He wondered what these financial tools are and why they are so important. Later that evening, while watching the news, he heard about a sudden liquidity crisis in the financial market. Experts were discussing how banks and corporations rely on short-term funds to maintain smooth operations. This made Rahul think: Where do these short-term funds come from? How do businesses and financial institutions ensure they always have enough cash flow? His curiosity led him to an online search, where he found that money markets play a crucial role in providing short-term liquidity. These markets operate through various instruments that allow governments, corporations, and banks to borrow and lend money for short periods. He realised that understanding these instruments is key to grasping how financial markets function efficiently. As Rahul continued his search, he discovered that treasury bills, commercial papers, and certificates of deposit were some of the most commonly used money market instruments. He was eager to learn more about how they work and their role in the economy.

## Keywords

## Discussion

### 1.2.1 Securities

Security is a financial instrument that represents ownership, a creditor relationship, or rights to ownership, and it is tradable in financial markets. In India, securities include a broad range of financial instruments regulated under the Securities Contracts (Regulation) Act of 1956 and overseen by the Securities and Exchange Board of India (SEBI). The Indian securities market is categorised into primary and secondary markets, with major exchanges such as the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE) facilitating trading.

- A security is a tradable financial instrument

#### 1.2.1.1 Types of Securities in India

1. **Equity Securities:** Equity securities primarily include shares of publicly listed companies that signify ownership in a firm. Investors in equity securities earn returns through capital appreciation and dividends. In India, equity trading occurs on stock exchanges like BSE and NSE. Companies raise capital by issuing:

- **Common Equity Shares:** Provide voting rights and dividends.

- Ssecurities include a broad range of financial instruments

- **Preference Shares:** Offer fixed dividends but limited voting rights.

2. **Debt Securities:** Debt securities involve borrowing arrangements where issuers agree to repay investors with interest. These securities are popular among risk-averse investors seeking fixed income. Major types include:

- **Government Securities:** Issued by the Reserve Bank of India (RBI) on behalf of the government, including Treasury Bills and Bonds.

- **Corporate Bonds:** Issued by companies to raise funds, offering periodic interest payments.

- **Municipal Bonds:** Issued by local government bodies for infrastructure projects.

3. **Derivative Securities:** Derivatives are financial contracts whose value is derived from underlying assets such as stocks, indices, commodities, or currencies. Common derivatives in India include:

- **Futures and Options (F&O):** Traded on NSE and BSE, allowing hedging and speculation.

- **Commodity Derivatives:** Traded on exchanges like the Multi Commodity Exchange (MCX) and National Commodity and Derivatives Exchange (NCDEX).

- **Currency Derivatives:** Based on exchange rates, helping manage forex risks.

4. **Hybrid Securities**: Hybrid securities combine features of both debt and equity instruments. Some commonly used hybrid securities in India include:

- **Convertible Debentures:** Can be converted into equity shares after a specified period.

- **Preference Shares:** Exhibit both debt-like fixed dividends and equity-like ownership rights.

5. **Asset-Backed Securities:** These securities are backed by financial assets such as loans, leases, or receivables. In India, asset-backed securities include:

- Mortgage-Backed Securities: Backed by home loans.

- Loan Securitisation: Used by financial institutions to transfer loan portfolios.

The regulation of securities in India is primarily overseen by the Securities and Exchange Board of India (SEBI), which ensures investor protection and market transparency. Additionally, other key regulatory bodies play significant roles in specific segments of the securities market. The Reserve Bank of India (RBI) regulates money markets and government securities, ensuring stability in the financial system. The Insurance Regulatory and Development Authority of India (IRDAI) governs securities related to the insurance sector, maintaining compliance and protecting policyholders. Similarly, the Pension Fund Regulatory and Development Authority (PFRDA) supervises pension fund securities, ensuring the proper management of retirement funds.

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- The Indian securities market offers diverse instruments

- Regulators like RBI, IRDAI, and PFRDA ensure transparency and investor protection

## 1.2.2 Financial Market in India

The financial market in India serves as a platform for mobilising savings and channelling investments into productive sectors of the economy. It is broadly classified into two segments: the money market and the capital market.

The money market deals with short-term financial instruments that have a maturity of up to one year. It facilitates liquidity management and short-term borrowing and lending among financial institutions, businesses, and the government. Key instruments in the money market include Treasury Bills, Commercial Papers, Certificates of Deposit, and Repurchase Agreements. The Reserve Bank of India (RBI) regulates the money market to ensure financial stability and control inflation.

The capital market, on the other hand, serves long-term investment needs and consists of the primary market, where new securities are issued, and the secondary market, where existing securities are traded. Investors participate in trading equity shares, bonds, debentures, mutual funds, and derivatives. The Securities and Exchange Board of India (SEBI) regulates the capital market, ensuring transparency, investor protection, and fair-trading practices.

Apart from these, the financial market in India also comprises the foreign exchange market, which facilitates currency trading and is regulated by the RBI, and the commodity market, where agricultural and non-agricultural commodities like gold, silver, and crude oil are traded. Regulatory bodies such as the Forward Markets Commission (FMC) and SEBI oversee the functioning of the commodity market. The integration of digital trading platforms, regulatory reforms, and increasing participation of retail and institutional investors continue to strengthen the financial ecosystem in India.

### 1.2.2.1 Money Market

The money market serves as a platform for short-term borrowing and lending, typically for 364 days or less. It facilitates financial transactions where funds are borrowed and repaid within this short time frame. Businesses require financing for two key needs: (1) day-to-day operational expenses, such as procuring raw materials, paying wages, and covering utilities, and (2) capital expenditures, including purchasing machinery or installing pollution control equipment. The first

- The Indian financial market, comprising the money, capital, foreign exchange, and commodity markets

- India's financial system is strengthened by regulatory reforms, digital trading platforms, and increased investor participation

- Short-term fund mobilisation

type of financing, which is short-term in nature, is crucial for maintaining seamless production processes. The financial marketplace where such funds are transacted is known as the money market. A key function of the money market is to bridge liquidity gaps. It enables businesses and financial institutions to manage temporary mismatches in their cash flows by either borrowing funds when in deficit or investing surplus funds for short durations. The money market is a mechanism for short-term fund mobilisation. It plays a dual role: facilitating the movement of substantial amounts of money between banks and enabling cash-rich corporations and institutions to lend their surplus funds to those in need at a cost. Any entity with a temporary excess of funds can act as a supplier in the money market. Common money market instruments include government bonds, corporate bonds, and bank-issued bonds, all of which have readily available markets, similar to the trading of equity shares in a stock exchange. The market primarily deals with short-term securities (with an original maturity of one year or less), such as Treasury Bills, Certificates of Deposit, and Commercial Paper. These instruments are highly liquid, making them attractive to investors seeking quick access to funds. Unlike the stock market, the money market is not a physical location but rather an activity conducted through electronic networks, particularly over telephone-based transactions. A key characteristic of the money market is its emphasis on trust and creditworthiness, ensuring the honouring of financial commitments. The money market plays a vital role in the financial system by balancing the availability of surplus funds from lenders with the short-term borrowing needs of various entities. Additionally, it provides a non-inflationary means for financing government deficits, supports the implementation of monetary policies through open market operations, and acts as a benchmark for setting interest rates in the economy. The primary characteristic of money market instruments is their high liquidity, allowing them to be easily converted into cash to meet short-term financial needs. These instruments are typically traded over the counter (OTC) through certified brokers or money market mutual funds rather than by individual investors.

**Objectives of the Money Market**

The money market serves several key purposes:

- **Short-term Financing**: It provides short-term funds at reasonable costs to borrowers, including private investors,

- Common money market instruments include government bonds, corporate bonds, and bank-issued bonds

- Money market emphasis on trust and creditworthiness

businesses, and governments. Due to the short maturity of money market instruments, lenders also benefit from increased liquidity.

- **Working Capital Support:** Many businesses lack adequate working capital. The money market helps such firms secure the funds they need to meet their short-term financial requirements.

- **Government Funding:** The money market is a key source of funding for governments, facilitating both domestic and international trade. It also allows banks to park their surplus funds efficiently.

- **Productive Investment:** It enables lenders to convert idle capital into productive investments, benefiting both borrowers and lenders.

- **Economic Regulation**: As the Reserve Bank of India (RBI) regulates the money market, it plays a key role in managing liquidity levels in the economy.

**Types of Money Market Instruments**

Money market instruments aim to improve financial liquidity and economic growth while providing secure, low-risk investment opportunities. The key instruments include:

1. **Certificate of Deposit:** A Certificate of Deposit is a time deposit issued by banks that allows investors to lend a substantial sum to financial institutions. It operates similarly to a fixed deposit but offers greater negotiability and slightly lower liquidity.

2. **Commercial Paper:** Commercial Paper is an unsecured promissory note issued by large corporations to raise short-term funds. It is typically used by companies with strong credit ratings and has a maturity period ranging from 7 days to one year. Due to its unsecured nature, it carries a slightly higher risk than government-backed securities.

3. **Treasury Bills (T-Bills):** Issued by the central government, Treasury Bills are short-term securities used to meet immediate funding needs. They do not generate interest but are issued at a discount, allowing investors to earn capital gains upon maturity. Since they are government-backed, the default risk is negligible, making them an ideal investment for risk-averse investors.

- Money markets provides shortterm financing, supporting working capital, fund govt needs and helps economic regulation

- Money market offer low risk investment

- Money marketinstrument helps to improve functional liquidity

4. **Repurchase Agreements:** These are short-term borrowing arrangements where one party sells securities with an agreement to repurchase them at a predetermined price in the future. Typically, government securities are used in repurchase agreements, making them relatively secure and subject to market interest rates.

5. **Banker's Acceptance:** A Banker's Acceptance is a time draft or bill of exchange guaranteed by a bank. It functions similarly to a post-dated cheque and is widely used in international trade. The issuing bank guarantees payment at a specified future date, typically within 30 to 180 days.

- These instruments provide secure, short-term funding options for businesses and governments

The money market is essential for maintaining economic stability by facilitating short-term funding and liquidity management. Its instruments provide secure investment opportunities while ensuring smooth financial operations for businesses and governments. By balancing liquidity and risk, the money market plays a key role in the overall economic ecosystem.

## Summarised Overview

The securities market in India comprises various financial instruments that represent ownership, creditor relationships, or rights to ownership and are tradable in financial markets. Regulated under the Securities Contracts (Regulation) Act, 1956 and overseen by SEBI, the Indian securities market is divided into primary and secondary markets, with major exchanges such as BSE and NSE facilitating trading. Securities in India include equity securities, such as common equity shares with voting rights and preference shares with fixed dividends, as well as debt securities like government securities, corporate bonds, and municipal bonds. Additionally, derivative securities, including futures and options, commodity derivatives, and currency derivatives, allow hedging and speculation, while hybrid securities, such as convertible debentures and preference shares, combine debt and equity features. Asset-backed securities, such as mortgage-backed securities and loan securitisation, offer investment opportunities backed by financial assets. SEBI regulates the securities market, ensuring investor protection and transparency, while other regulatory bodies like the RBI, IRDAI, and PFRDA oversee specific segments.

The financial market in India, playing a major role in mobilising savings and channelling investments, consists of the money market for short-term financial instruments and the capital market for long-term investments. The money market, regulated by the RBI, deals with instruments such as Treasury Bills, Commercial Papers, Certificates of Deposit, and Repurchase Agreements, facilitating liquidity management for businesses and governments. Unlike the stock market, the money market operates electronically through

OTC transactions rather than on a centralised exchange. Key objectives of the money market include short-term financing, working capital support, government funding, productive investment, and economic regulation. Its highly liquid instruments provide secure, low-risk investment opportunities, ensuring financial stability. The integration of digital trading platforms, regulatory reforms, and increasing retail and institutional investor participation continue to strengthen India's financial ecosystem.

## Assignments

1. Discuss the structure and functioning of the securities and financial markets in India.
2. Highlight the various types of securities, their role in economic development, and the regulatory framework governing these markets.
3. How do money markets contribute to financial stability and economic growth?

## Suggested Reading

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1. Bhole, L. M., & Mahakud, J. (2017). *Financial Institutions and Markets: Structure, Growth, And Innovations* (6th Ed.). McGraw Hill.
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4. Reserve Bank of India. (N.D.). *Reports on Financial Markets.* Retrieved From https://www.rbi.org.in
5. Securities And Exchange Board of India. (N.D.). *Regulatory Framework of Indian Capital Market.* Retrieved From https://www.sebi.gov.in

## Space for Learner Engagement for Objective Questions

Learners are encouraged to develop objective questions based on the content in the paragraph as a sign of their comprehension of the content. The Learners may reflect on the recap bullets and relate their understanding with the narrative in order to frame objective questions from the given text. The University expects that 1 - 2 questions are developed for each paragraph. The space given below can be used for listing the questions.

## Learning Outcomes

After completing this unit, learners will be able to:

- differentiate between investment and speculation

- understand the concept of risk and return

- identify different types of risk

- know about risk-measuring tools

## Background

Imagine you are about to cross a river. You have two choices: a strong bridge or a set of slippery stones. The bridge feels safe but takes longer, while the stones offer a quicker route but come with the risk of falling. Which one would you choose? Your decision depends on how much risk you are willing to take and the return you expect from crossing quickly. Investing is quite similar. Some people choose a slow but steady path, carefully analysing their choices and planning for the long term. Others take quick, uncertain steps, hoping to gain high rewards but risking significant losses. This difference in approach is what separates investment from speculation. Just like crossing the river, every financial decision involves some level of risk. But not all risks are the same, some are predictable, while others are beyond control.

## Keywords

Investment, Speculation, Risk, Return, Systematic Risk, Unsystematic Risk, Beta, Variance, Standard Deviation, Risk Premium, Expected Return, Risk-Return Trade-Off

### 1.3.1 Investing vs. Speculating

Investment occurs when an individual allocates money with the expectation of earning a return based on thorough research and a reasonable assessment of potential success. This decision is supported by fundamental analysis and long-term considerations. In contrast, speculation involves placing money into high-risk ventures where the likelihood of failure is significant. Here, success or failure largely depends on external forces, unpredictable events, or market fluctuations. While investing relies on careful analysis and aims for steady returns, speculation often resembles gambling, where the potential for substantial gains comes with an equally high chance of losses.

### 1.3.1.1 Investing

- Investing involves long-term decisions for steady returns while speculating is a high risk for significant gains or losses

Investment takes many forms, including money, time, or effort. In financial markets, investing typically involves purchasing assets such as stocks, bonds, mutual funds, exchange-traded funds (ETFs), and other financial instruments. Investors seek to generate income or profit through capital appreciation, dividend payments, or interest earnings while maintaining a controlled level of risk. Investments are generally held for the long term, often for at least a year. For instance, consider an investor purchasing shares in a well-established multinational company. This company may offer consistent dividends and operate with relatively low business risk. To further reduce risk, the investor may diversify their portfolio by including stocks from different industries. A key component of investing is analysis and research. Investors evaluate assets, industries, and market trends using fundamental or technical analysis. Fundamental analysis assesses financial statements, macroeconomic factors, and company performance to determine an asset's inherent value. Technical analysis examines price patterns and market trends to identify investment opportunities. Investors have multiple options for investing, including brokerage accounts and robo-advisors. Brokerage firms facilitate trading by providing access to financial markets, while robo-advisors use algorithms to create investment strategies based on an investor's goals and risk tolerance.

- Investments held for the long term, often for at least a year

Investment involves allocating money, time, or effort into assets

## 1.3.1.2 Speculating

Speculation involves investing in high-risk financial activities to achieve exceptional returns. Unlike investing, speculation does not rely on extensive research and is often based on market sentiment, news, or price fluctuations. Speculators typically hold assets for short periods, frequently buying and selling to capitalise on market movements. Speculators typically hold assets for short periods and frequently buy and sell to capitalize on market movements. For example, a speculator might invest in a small, volatile gold mining company that has an equal chance of making a significant discovery or going bankrupt. While long-term investors may avoid such uncertainty, speculators may take the risk based on a hunch or market rumours. Speculative trading can sometimes lead to market bubbles. For instance, during the late 1990s, investors poured money into internet companies, driving valuations to unsustainable levels. When the dot-com bubble burst in 2001, many firms lost substantial value, and numerous startups collapsed.

**Table 1.3.1 Investment vs. Speculation**

| Criteria | Investment | Speculation |
|---|---|---|
| Time Horizon | Long-term (years to decades) | Short-term (days to months) |
| Risk Level | Moderate to low | High |
| Research & Analysis | Extensive fundamental and technical analysis | Minimal research based on market movements and trends |
| Primary Objective | Steady returns and capital appreciation | High potential profits with significant risk |
| Examples | Government bonds, blue-chip stocks, mutual funds | Day trading, cryptocurrency speculation, short selling |

- Speculation involves high-risk, short-term financial activities aiming for exceptional returns

Investing and speculating both aim to generate profits, but they differ significantly in risk levels, strategies, and objectives. While investing focuses on long-term stability and informed decision-making, speculation involves high-risk ventures with potentially substantial gains or losses. Understanding the difference is key for market participants looking to build wealth while managing risk effectively.

## 1.3.2 Risk

Risk, in financial terms, refers to the probability that actual investment outcomes will differ from expected returns. The fundamental principle of risk and return states that higher-risk investments should offer greater potential returns to compensate investors for the added uncertainty. In financial terms, risk refers to the likelihood that the actual returns on an investment will deviate from the expected outcome. It includes the potential for losing part or all of the initial investment. To quantify risk, analysts often examine historical trends and past performance. Understanding the fundamentals of risk and its measurement is essential for effectively managing investment risks. By recognising the various risks associated with different investment scenarios and adopting strategies to reduce them, investors and business managers can minimise unnecessary losses. Since every investment carries some level of risk, financial decision-making involves assessing the degree of uncertainty and potential financial loss. Typically, the higher the risk, the greater the expected return, as investors demand higher compensation for taking on additional uncertainty. Different saving and investment products come with varying levels of risk and return. These differences influence factors such as liquidity (how easily funds can be accessed), growth potential, and overall security of the investment.

## 1.3.2.1 Types of Risk - Systematic Risk vs Unsystematic Risk

Risk can be broadly classified into two categories:

1. **Systematic Risk:** Also known as market risk, it refers to the uncertainty that affects all investments within a market or industry. It arises from external factors such as economic downturns, political instability, or changes in interest rates, which investors cannot control. The key types of systematic risks are as follows :

- Market Risk: The possibility that an investment's value will fluctuate due to broader economic conditions or market-wide events.

- Interest Rate Risk: The risk that fluctuations in interest rates will affect investment returns, particularly in bonds and fixed-income securities.

- Inflation Risk: The potential decline in purchasing power due to rising prices, which impacts the real value of investment returns.

- Currency Risk: The impact of exchange rate fluctuations on investments denominated in foreign currencies.

- Political/Regulatory Risk: The effect of government policies, regulations, or political instability on investments.

- Country Risk: Economic and political uncertainties specific to a particular country that may affect investments.

2. **Unsystematic Risk:** This is specific to a company or industry and arises from factors such as poor management decisions, operational failures, or financial distress. Unlike systematic risk, unsystematic risk can be reduced through diversification. The key types of unsystematic risks are as follows :

- Business Risk: The exposure of a company to factors that may lower its profitability, such as competition and changing consumer preferences.

- Operational Risk: Risks arising from failures in internal processes, human errors, or supply chain disruptions.

- Financial Risk: Related to a company's capital structure, particularly its leverage and debt obligations.

- Management Risk: The effect of corporate leadership decisions on business success.

- Legal Risk: The potential for litigation or changes in legal frameworks that could impact business operations.

- Reputational Risk: The impact of public perception on a company's financial standing.

While risk is an inherent aspect of investing, strategic measures can help reduce its effects. The key risk management strategies include:

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- Systematic Risk refers to the uncertainty that affects all investments within a market or industry

- Unsystematic risk can be reduced through diversification.

- Diversification: Spreading investments across different asset classes and sectors to reduce exposure to specific risks.

- Hedging: Using financial instruments like options or futures to offset potential losses.

- Asset Allocation: Balancing investment portfolios to match an investor's risk tolerance and financial goals.

- Regular Monitoring: Continuously assessing economic conditions, regulatory changes, and market trends to adapt investment strategies.

Understanding and effectively managing different types of risk allows investors to make informed decisions, align their portfolios with financial goals, and improve long-term investment success.

### 1.3.2.2 Total Risk

In investment analysis, total risk refers to the overall uncertainty or fluctuations in returns that an investor might encounter. Total risk includes all possible factors that could influence an investment's performance. Understanding total risk is important, as it helps investors measure the potential volatility of their investments and assess the likelihood of achieving their expected returns. Total risk is essentially the sum of systematic risk and unsystematic risk. It reflects the full range of potential fluctuations in an investment's returns. While systematic risk is inbuilt to the market and cannot be eliminated, unsystematic risk can be minimised through diversification. Investors who understand the concept of total risk can make more informed decisions about portfolio construction and risk management.

### 1.3.3 Return

A return, or financial return, refers to the profit or loss from an investment over a certain period. It can be expressed as a monetary gain or loss (nominal return) or as a percentage of the initial investment. Returns can be gross, considering only price changes or net, which accounts for taxes, fees, and inflation. A positive return indicates a profit, while a negative return signifies a loss. Investors often compare returns using annualised figures, though a holding period return measures gains or losses over the entire duration an investment is held. Nominal returns focus on price changes alone, whereas real returns adjust for inflation. In stock investments, the total return

**Sidebar notes:**

- Strategies like diversification, hedging, asset allocation, and regular monitoring help reduce investment risks

- Total risk represents the complete uncertainty affecting an investment's returns

- Measuring investment returns

includes price changes as well as income from dividends or interest. To compare returns across different periods, investors use annualisation, which converts shorter or longer returns into a yearly equivalent for consistency. Returns can be classified into different types:

**Types of Returns**

- **Absolute Return:** The total gain or loss from an investment over a specific period, without considering external factors like inflation or market conditions.

- **Relative Return:** Compares the return of an investment to a benchmark index, such as the Nifty 50 or S&P 500.

- **Expected Return:** The weighted average of possible returns, considering probabilities of different outcomes. Calculated using the formula: $E(R) = \sum (P_i \times R_i)$, where Pi is the probability of a return Ri.

- **Required Rate of Return:** The minimum returns an investor expects, considering risk and opportunity cost.

- **Risk-Free Rate:** The return on an investment with zero risk, such as government bonds or treasury bills.

- **Real Return:** Adjusted for inflation to reflect the actual increase in purchasing power. Calculated using the formula: Real Return=Nominal Return -Inflation

- **Market Return:** The return generated by the overall market, often represented by indices like the SENSEX or Dow Jones.

### 1.3.4 Measurement of Risk

Risk is a fundamental concept in investing, representing the uncertainty of future outcomes. It arises from the possibility that the actual return on an investment may differ from the expected return. Measuring risk is essential for investors to evaluate the potential for losses and make informed decisions. By quantifying risk, investors can better understand the trade-off between risk and return, which is at the heart of investment strategy. The key methods and tools used to measure risk are as follows:

1. **Volatility:** Volatility is one of the simplest and most widely used measures of risk. It refers to the degree of variation or fluctuation in an asset's price or returns over

- Investment return categories

- Measuring risk is essential for investors to evaluate the potential for losses and make informed decisions.

time. When an asset experiences significant price swings, it is considered highly volatile. For example, a stock whose price frequently rises and falls by large margins is more volatile than one with stable prices. Volatility is often synonymous with risk because it reflects the uncertainty of future outcomes. The greater the volatility, the higher the risk, as investors face increased uncertainty about the asset's future performance. By analysing historical volatility, investors can gain insights into the potential risk of an investment.

2. **Standard Deviation:** Standard deviation is a statistical measure that quantifies the dispersion of returns around the mean (average) return. It is one of the most common tools for measuring total risk, as it captures both upside and downside variability. A higher standard deviation indicates greater risk, as the returns are more spread out from the mean. For example, if two stocks have the same expected return but different standard deviations, the stock with the higher standard deviation is considered riskier. Standard deviation effectively assesses risk in individual securities and portfolios.

3. **Probability Distributions:** Probability distributions play a major role in understanding risk. They outline all possible outcomes of an investment and their associated probabilities. For instance, an investor might expect a stock to return 10% over the next year, but there could be a range of possible outcomes, each with its own probability. Probability distributions can be either discrete, where each outcome has a specific probability, or continuous, where outcomes are infinite. The normal distribution, represented by a bell curve, is a common example of a continuous distribution. The expected value of a probability distribution, calculated as the weighted average of all possible returns, provides the most likely outcome. By analysing probability distributions, investors can better understand the range of potential outcomes and their likelihoods, which is essential for assessing risk.

4. **Beta:** Beta is a measure of systematic risk, which is the risk inherent to the entire market and cannot be eliminated through diversification. It compares the volatility of an individual security to the overall market. A beta of 1.0 indicates that the security moves in line with the market, while a beta greater than 1.0 indicates higher volatility. For example, a stock with a beta of 1.5

is 50% more volatile than the market. Such stocks are considered aggressive, as they tend to rise or fall more sharply than the market. Conversely, stocks with betas below 1.0 are seen as more conservative. Beta is a useful tool for comparing the relative risk of different stocks and is widely used in portfolio construction to balance risk and return.

5. **Alpha:** Alpha measures the excess return of an investment relative to a benchmark. It is often used to evaluate the performance of actively managed funds. A positive alpha indicates that the investment has outperformed the benchmark, while a negative alpha suggests underperformance. For example, if a fund generates a return of 12% while its benchmark returns 10%, the fund's alpha is 2%. Alpha is particularly useful for assessing the value added by a portfolio manager, as it reflects their ability to generate returns above the market average.

- Measures the excess return of an investment relative to a benchmark.

6. **R-squared (R²):** R-squared quantifies the proportion of a security's performance that can be explained by its benchmark. It ranges from 0 to 1, with higher values indicating a stronger relationship. For example, an R-squared of 0.70 means that 70% of the security's performance is attributable to the benchmark. R-squared is useful for understanding how closely security follows market movements. A low R-squared suggests that the security's performance is influenced by factors other than the market, which may indicate higher unsystematic risk.

- A low R-squared indicate higher unsystematic risk

7. **Sharpe Ratio:** The Sharpe Ratio evaluates risk-adjusted returns by comparing excess return to volatility. It is calculated as the difference between the investment's return and the risk-free rate, divided by the standard deviation. A higher Sharpe Ratio indicates better risk-adjusted performance. For example, a Sharpe Ratio of 1.5 suggests that the investment generated 1.5 units of return per unit of risk. The Sharpe Ratio is widely used to compare the performance of different investments or portfolios, as it accounts for both return and risk.

- Evaluates risk-adjusted returns by comparing excess return to volatility

8. **Value at Risk (VaR):** Value at Risk (VaR) estimates the maximum potential loss of an investment over a specific period under normal market conditions. VaR is commonly used in risk management to assess downside risk and set risk limits. However, it has limitations, as it does not account for extreme events or tail risks.

- VaR assess downside risk and set risk limits

**9. Coefficient of Variation (CV):** The Coefficient of Variation (CV) measures relative variability by comparing the standard deviation to the mean. It is calculated as (Standard Deviation / Mean) × 100. The CV is useful for comparing the risk of investments with different expected returns. For example, if two investments have the same standard deviation but different means, the one with the lower mean will have a higher CV, indicating greater relative risk.

Risk measurement is essential for portfolio management, performance evaluation, and risk management. By quantifying risk, investors can construct diversified portfolios that balance risk and return. Ultimately, risk measurement enables investors to make informed decisions and achieve their financial goals. Risk measurement is a cornerstone of investment analysis, providing investors with the tools to assess uncertainty and make informed decisions. By combining these tools, investors can gain a complete understanding of risk and develop strategies to manage it effectively.

## 1.3.5 Use of Beta and Variance in Risk Assessment

Risk assessment is a critical component of investment decision-making, helping investors evaluate the potential risks associated with different securities and portfolios. Among the various statistical measures used in risk assessment, Beta ($\beta$) and Variance ($\sigma^2$) play key roles in understanding market risk and total risk, respectively.

**Beta:** Beta ($\beta$) measures a security's volatility relative to the overall market. It serves as a measure for risk and plays a major role in the Capital Asset Pricing Model (CAPM). Stocks with higher beta values are considered riskier but also have the potential for higher returns. The beta coefficient provides insights into how a stock behaves relative to the market:

- $\beta = 1$: The stock's volatility matches the market.

- $\beta > 1$: The stock is more volatile than the market.

- $0 < \beta < 1$: The stock is less volatile than the market.

- $\beta = 0$: The stock's performance is uncorrelated to the market.

- $\beta < 0$: The stock moves inversely to the market.

For instance, a technology company with a beta of 1.75 is significantly more volatile than the market. If the market returns 10%, this company might return 17.5%. Conversely, an electric utility company with a beta of 0.45 would be less volatile, potentially returning only 4.5% under the same market conditions. A gold company with a negative beta, say -0.2, might decline by 2% when the market rises by 10%, showcasing its inverse relationship with market trends. Portfolio managers use beta to construct portfolios aligned with investor risk tolerance. For example:

- Beta measures stock volatility

- High-beta portfolios ($\beta > 1$) are suited for aggressive investors.

- Low-beta portfolios ($\beta < 1$) are ideal for conservative investors.

**Variability:** In investment analysis, variability and variance are often used interchangeably to assess risk. Variance measures how far individual data points deviate from their mean. A higher variance indicates a wider spread of returns, signalling greater risk, while a lower variance suggests more stable returns. Investments with high variability experience significant fluctuations in returns, making them riskier. On the other hand, low variability indicates steadier returns, appealing to risk-averse investors. Variability is a major factor for investors when comparing different investment options, as it helps them measure the level of uncertainty associated with potential returns. Portfolio variance evaluates the combined risk of all securities within a portfolio, considering their individual variances and correlations. A lower correlation between securities typically results in reduced portfolio variance, which is a foundation of modern portfolio theory. By diversifying across asset classes with low or negative correlations, such as stocks and bonds, investors can minimise portfolio risk.

- Variance measures return fluctuations

The formula for calculating portfolio variance in a two-asset portfolio is:

$$\text{Portfolio Variance} = w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1 w_2 Cov_{1,2}$$

Where:

- $w_1$ and $w_2$ are the weights of the two assets in the portfolio,

- $\sigma_1$ and $\sigma_2$ represent the standard deviations of the two assets,

- $Cov_{1,2}$ is the covariance between the two assets, which can also be expressed as $\rho_{12}\,\sigma_1\,\sigma_2$, with $\rho_{12}$ being the correlation coefficient.

- Portfolio variance quantifies combined risk

Portfolio variance is essentially the square of the portfolio's standard deviation. As the number of assets in a portfolio increases, the complexity of calculating variance grows exponentially. For example, a three-asset portfolio involves six terms in the variance calculation, while a five-asset portfolio requires 15. Tools like Excel can simplify these computations, making it easier for investors to optimise their portfolios.

- Beta, and variance guide risk-return decisions

Both beta and variance are fundamental in risk assessment. Beta helps investors understand systematic risk and market sensitivity, guiding them in selecting stocks that align with their risk tolerance. Variance, on the other hand, provides insights into the total risk of an asset, helping investors manage the volatility of their portfolios. By balancing these two measures, investors can make informed decisions to optimise returns while minimising risk. By understanding beta and portfolio variance, investors can make informed decisions to balance risk and return, aligning their investments with their financial goals and risk tolerance.

### 1.3.6 Risk and Reward in Investment Analysis

- Balance risk, reward for returns

Investing involves balancing risk and reward. Investors aim to maximise returns while minimising risk. However, achieving this balance requires a deep understanding of key financial concepts such as probability distributions, expected returns, and risk measurement tools like standard deviation.

- Probability distribution assigns probabilities to different possible returns

**1. Probability Distribution:** When investing in stocks, the returns are uncertain and can vary widely. For instance, a stock might yield a return of 5%, 15%, or even 35%. To assess the likelihood of these outcomes, investors use probability distributions. A probability distribution assigns probabilities to different possible returns, helping investors understand the range of potential outcomes and their likelihood. Suppose there is an 80% chance that the price of Stock A will rise in the next two weeks. This means there is an 80% probability of a positive return and a 20% chance that the price will remain unchanged.

**2. Expected Rate of Return:** The expected rate of return is a fundamental concept in investment analysis. It represents the weighted average of all possible returns, where each return is multiplied by its probability of occurrence. This metric helps investors estimate the average return they can expect from an investment.

Formula:

$$E(R) = \sum_{i=1}^{n} R_i P_i$$

Where:

E(R) = Expected return

$R_i$ = Return under outcome i

$P_i$ = Probability of outcome i

n = Number of possible outcomes

- Expected rate of return represents weighted average of all possible returns

Example:

- **Bharat Foods Stock:**

$E(R_B)$= (0.30×16%)+(0.50×11%)+(0.20×6%)=11.5%

This means the expected return for Bharat Foods is 11.5%.

- **Oriental Shipping Stock:**

$E(R_O)$= (0.30×40%)+(0.50×10%)+(0.20×-20%)=13%

The expected return for Oriental Shipping is 13%

**3. Standard Deviation of Return:** While expected return provides an average outcome, risk measures the variability or uncertainty of those returns. The most common measure of risk is the standard deviation, which quantifies the dispersion of returns around the expected return. A higher standard deviation indicates greater risk.

- Standard deviation quantifies the dispersion of returns around the expected return

Formula:

$$\sigma^2 = \sum P_i \times [R_i - E(R)]^2$$

$$\sigma = \sqrt{\sigma^2}$$

Where:

- $\sigma^2$ = Variance

- $\sigma$ = Standard deviation

- $R_i$ = Return for the ith outcome

- $P_i$ = Probability of the ith outcome

- E(R) = Expected return

**Example Calculations:**

- Bharat Foods Stock:

- Variance $(\sigma^2)$ = 12.25

- Standard Deviation ($\sigma$) = 3.5%

- This indicates relatively low risk, as the returns are closely clustered around the expected return of 11.5%.

- **Oriental Shipping Stock:**

- Variance $(\sigma^2)$ = 441.0

- Standard Deviation ($\sigma$) = 21.0%

- This suggests higher risk, as the returns are more widely dispersed around the expected return of 13%.

Understanding risk and reward is essential for making informed investment decisions. By analysing probability distributions, expected returns, and standard deviation, investors can assess the potential outcomes of their investments and balance the tradeoff between risk and reward. Tools like these enable investors to build portfolios that align with their financial goals and risk tolerance, ultimately leading to more strategic and successful investing.

### 1.3.6.1 Expected Returns

Expected return refers to the anticipated profit or loss from an investment based on historical data, probabilities, or forecasts. It is a key concept in investment decision-making, helping investors evaluate the potential performance of different assets. The expected return is typically calculated as a weighted average of possible returns, where each return is multiplied by its probability of occurrence. This measure does not guarantee actual returns but provides an estimate to

- Balance risk, returns strategically

- Expected return guides investment decisions

guide portfolio selection and risk assessment. Investors use expected returns to compare investment options and align their choices with risk tolerance and financial goals. While a higher expected return may indicate greater profit potential, it is often associated with higher risk. Factors such as market conditions, economic trends, and company performance can influence expected returns, making it essential to complement this measure with risk assessment tools like standard deviation and beta.

The expected return of an investment is calculated using the probability-weighted sum of possible returns:

$$E(R) = \sum_{i=1}^{n} R_i P_i$$

Where:

- E(R) = Expected return

- $R_i$ = Return under outcome i

- $P_i$ = Probability of outcome i

- n = Number of possible outcomes

### 1.3.6.2 Risk Premium

Risk premium refers to the additional return an investor expects to earn for taking on extra risk compared to a risk-free investment. Since all investments carry some degree of uncertainty, investors demand compensation for bearing this risk. The risk-free rate, typically represented by government bonds, serves as a benchmark, and any return above this rate is considered the risk premium. The size of the risk premium depends on factors such as market conditions, economic stability, and the specific risk associated with an asset. For instance, stocks generally offer a higher risk premium than bonds due to their price volatility. Similarly, investments in emerging markets tend to have a higher risk premium than those in developed economies, reflecting the additional uncertainty. A well-diversified portfolio aims to optimise returns by selecting assets that offer a favourable risk-to-reward ratio. By carefully assessing risk premiums, investors can make informed decisions that align with their financial goals and risk tolerance. Mathematically, it is expressed as:

Risk Premium = Expected Return on Risky Asset-Risk Free Rate

Where:

- Expected Return on Risky Asset is the anticipated return from an investment based on historical performance, market conditions, and risk factors.

- Risk-Free Rate is the return on an investment considered free of risk, typically represented by government securities like Treasury Bills.

### 1.3.7 Risk-Return Tradeoff

The risk-return tradeoff suggests that the potential for higher returns increases with greater risk. This principle explains the investment decision-making process, where lower risk levels are associated with lower potential returns, while higher uncertainty or risk can lead to greater profit opportunities. Investors accepting a higher degree of risk stand a better chance of earning higher returns, but they must also be prepared for the possibility of significant losses. The risk-return tradeoff links higher risk with greater potential returns in investment management. The appropriate level of risk for an investor depends on multiple factors, including their risk appetite, investment timeline, and financial capacity to absorb potential losses.

Time plays a major role in assessing risk and return. Investors with long-term investments may benefit from riskier asset classes, such as equities, as they have time to recover from market downturns and take advantage of growth phases. Conversely, short-term investors face a greater risk with the same equities due to market fluctuations. This tradeoff is not only considered in individual investments but also at the portfolio level. A well-diversified portfolio balances risk and return by assessing the holdings. Overexposure to high-risk assets can lead to volatility, while excessive conservatism may limit potential gains. The risk-return tradeoff refers to an investor's approach to balancing risk exposure in their investment strategy. The principle states that riskier assets, such as stocks and mutual funds, offer greater return potential but come with higher volatility. For instance, equities provide the possibility of substantial returns but are also prone to significant market fluctuations.

Sidebar notes:
- Risk premium compensates for uncertainty
- Higher risk, higher return potential
- Balancing risk exposure in their investment strategy

**Risk-return tradeoff balances investment goals**

**Risk and return are proportional**

**Taking risk is essential for generating investment returns**

Determining an optimal risk-return tradeoff depends on several factors, including investment goals, risk tolerance, investment tenure, and the ability to recover potential losses. Investors seeking higher returns within a shorter timeframe often invest in more volatile assets, accepting a greater risk exposure. However, the level of risk varies based on factors such as investment duration, asset volatility, and individual risk tolerance. The tradeoff concept suggests that while low-risk investments may provide stability, they may not generate substantial returns. For example, Rohan must choose between a savings account and stocks. A savings account offers a low yet stable return with deposit insurance, while stocks carry higher volatility and the potential for greater profits.

Risk and return are directly proportional. Higher risk increases the potential for higher returns, while lower risk typically leads to lower returns. An investor's goal is to balance these factors to align with their financial objectives and comfort with risk. A well-structured risk-return tradeoff considers portfolio diversification. It evaluates whether the asset mix is too risky or overly conservative, affecting return potential. However, it is important to note that high risk does not always guarantee high returns; it simply increases the probability of experiencing both gains and losses. While often used interchangeably, risk appetite and risk tolerance are distinct concepts.

Risk appetite refers to the level of risk an investor is willing to take to achieve financial goals. In contrast, risk tolerance reflects the ability to endure fluctuations in investment returns without distress. Consider an investor choosing between a fixed deposit (FD) and a NIFTY 50 Index fund. A five-year FD might offer a stable 6.5% annual return, whereas the NIFTY 50 Index fund, based on historical data, may yield around 12% annually. However, stock market investments involve market fluctuations and are not insured, whereas bank FDs carry lower risks with government-backed insurance up to ₹5 lakhs under the DICGC scheme. Thus, investors must evaluate whether they prefer safer investments with modest returns or are willing to embrace higher risks for the potential of greater gains. Taking on some level of risk is essential for generating investment returns. While complete risk elimination is impossible, strategic investing enables individuals to optimise returns while maintaining peace of mind. Investors should carefully assess their financial goals, risk capacity, and market conditions to make informed investment decisions.

## Summarised Overview

Investing and speculating differ in objectives, risk, and approach. Investing relies on research for long-term wealth accumulation through capital appreciation, dividends, or interest, whereas speculation focuses on short-term price movements with higher risk. Common investment instruments include stocks, bonds, mutual funds, and exchange-traded funds (ETFs). Investors rely on fundamental and technical analysis to make informed decisions and often aim for steady returns with moderate to low risk. Tools such as brokerage accounts and robo-advisors assist investors in portfolio management. In contrast, speculation involves high-risk financial activities driven by market sentiment, news, and price fluctuations. Speculators engage in short-term trading, often without extensive research, hoping to achieve substantial returns.

Risk is an inherent aspect of financial markets and is classified into systematic and unsystematic risks. Systematic risk, also known as market risk, affects all investments and arises from economic downturns, political instability, interest rate fluctuations, inflation, currency exchange rate changes, and regulatory shifts. Unsystematic risk, on the other hand, is specific to a company or industry and includes business, operational, financial, management, legal, and reputational risks. While systematic risk cannot be eliminated, unsystematic risk can be reduced through diversification. Effective risk management strategies include diversification, hedging, asset allocation, and continuous monitoring of economic and market trends. Total risk comprises both systematic and unsystematic risks, and its understanding is crucial for constructing balanced investment portfolios. Return on investment is the measure of profit or loss over a period, expressed in monetary terms or as a percentage. It can be categorised into absolute return, relative return, expected return, required rate of return, risk-free return, real return, and market return. The evaluation of returns enables investors to compare investment performance and make informed financial decisions.

Risk measurement is a major aspect of investment analysis. Various tools and techniques are used to quantify risk, including volatility, standard deviation, probability distributions, beta, alpha, R-squared, Sharpe ratio, value at risk (VaR), and the coefficient of variation (CV). These metrics help investors understand the trade-off between risk and return and optimise portfolio performance. By employing comprehensive risk management and analysis techniques, investors can enhance long-term financial stability and achieve their investment goals. Risk assessment is a fundamental aspect of investment decision-making, with Beta ($\beta$) and Variance ($\sigma^2$) serving as key statistical measures for evaluating market and total risk. Beta measures the volatility of a security relative to the market and is integral to the Capital Asset Pricing Model (CAPM). A beta of 1 indicates market-level volatility, whereas values above or below suggest higher or lower volatility, respectively. High-beta stocks are suited for aggressive investors, while low-beta stocks align with conservative strategies. Variance, on the other hand, assesses how widely returns fluctuate from their mean. A high variance signifies greater risk and return potential, whereas a low variance indicates stability. Portfolio variance considers both individual variances and

the correlation among assets, allowing diversification to minimise risk. The calculation of portfolio variance becomes increasingly complex with more assets, but tools like Excel simplify the process. Risk and reward are inherently linked in investment analysis. Probability distributions help investors measure potential returns, while the expected rate of return provides a weighted average estimate. The standard deviation measures the dispersion of returns, with a higher standard deviation indicating greater uncertainty and risk. Comparing variance and standard deviation between investments enables risk assessment and decision-making. The risk-return tradeoff states that higher potential returns come with increased risk. Investors must balance risk exposure based on their goals, timeline, and risk tolerance. Long-term investments generally benefit from riskier assets, while short-term investors may prefer stability. Portfolio diversification reduces excessive risk while optimising returns. An investor's risk appetite reflects their willingness to take on risk, while risk tolerance determines their capacity to endure fluctuations. Investment decisions should strategically balance risk and return, ensuring alignment with financial objectives and market conditions.

## Assignments

1. Critically analyse the differences between investing and speculating.

2. Discuss the role of risk in financial decision-making and how systematic and unsystematic risks influence investment outcomes.

3. Evaluate various risk measurement techniques and risk management strategies that investors can employ to maximise returns while minimising potential financial losses.

4. Critically analyse the role of Beta and Variance in risk assessment, highlighting their applications in portfolio management.

5. Discuss the significance of expected returns, risk premiums, and the risk-return tradeoff in investment decision-making.

## Suggested Reading

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## Space for Learner Engagement for Objective Questions

Learners are encouraged to develop objective questions based on the content in the paragraph as a sign of their comprehension of the content. The Learners may reflect on the recap bullets and relate their understanding with the narrative in order to frame objective questions from the given text. The University expects that 1 - 2 questions are developed for each paragraph. The space given below can be used for listing the questions.

# VALUATION AND ANALYSIS OF SECURITIES

## Learning Outcomes

After completing this unit, learners will be able to:

- understand the concept of security valuation

- know about an economy, industry, and company analysis

- discuss valuation techniques to determine the value of securities

## Background

Imagine you are planning to buy a car. The process is not as simple as walking into a showroom and picking one randomly. You first think about your budget. Then, you start exploring different brands and models. You consider fuel efficiency, maintenance costs, safety features, and even the resale value. Some people rely on online reviews and expert opinions, while others take test drives to get a real feel of the car before deciding. Now, imagine you are torn between two options: one is a stylish, high-performance car with a hefty price tag, while the other is a reliable, fuel-efficient car that fits your budget. What would you choose? Some buyers focus purely on the looks and brand name, while others prefer a vehicle that offers long-term value. However, the most informed buyers analyse both the car's specifications and its practical benefits before making a final choice. Investing in the stock market works in a similar way. Some investors buy stocks just because they are trending, while others carefully analyse financial reports and market trends before investing. Those who make informed decisions do not just rely on emotions; they follow structured methods to evaluate whether a stock is worth investing in.

## Keywords

Securities, Intrinsic Value, Market Price, Security Analysis, Risk Assessment, Forecasting, Fundamental Analysis, Industry Analysis, Technical Analysis

## 1.4.1 Valuation of Securities

The valuation of securities is the process of determining the intrinsic value of financial instruments such as stocks, bonds, and derivatives. This inherent value is based on various factors, including the company's financial health, market trends, and economic conditions. Valuation helps investors decide whether a security is overvalued, undervalued, or fairly valued, enabling them to make informed investment decisions. Security valuation is key for various stakeholders, including investors, financial managers, and policymakers. It helps in identifying profitable investment opportunities, ensuring fair pricing of securities in financial markets, and making strategic financing decisions. Proper valuation also aids in portfolio management by balancing risky and risk-free securities to achieve optimal returns. Several factors influence the valuation of securities. Risk and return play a significant role, as higher risk generally leads to lower valuation, while higher expected returns increase valuation. Market conditions, including economic growth, interest rates, and inflation, also impact security prices. Additionally, a company's financial performance, such as profitability, revenue growth, and stability, affects the valuation of its securities. There are various methods for valuing securities.

One of the most widely used approaches is the Discounted Cash Flow (DCF) Analysis, which calculates the present value of expected future cash flows by discounting them at an appropriate rate. Another common approach is the Price-to-Earnings (P/E) Ratio, which compares a company's stock price to its earnings per share (EPS) to determine its relative valuation. Similarly, the Price-to-Book (P/B) Ratio evaluates a stock's market price in relation to its book value per share, indicating whether it is overvalued or undervalued. Apart from fundamental valuation models, alternative methods are also used. Book Value represents the net worth of a company as per its financial statements. At the same time, Liquidation Value refers to the amount that could be realised if all assets were sold and liabilities settled. Intrinsic Value is the perceived worth of a security based on fundamental analysis, whereas Replacement Value estimates the cost to replace an asset at current market prices. Different types of securities require distinct valuation techniques. Equity shares (stocks) are

- Valuation determines security intrinsic value

- Valuation methods guide investment decisions

generally valued using future earnings projections, dividend discount models, and market multiples. Preference shares are assessed based on fixed dividend payments and their discounted future cash flows. Bonds and debentures are valued using the present value of their future interest payments and principal repayments, applying a discount rate that reflects the time value of money. Derivatives, such as options and futures, require complex models like the Black-Scholes model for pricing options, while futures prices depend on spot prices and prevailing interest rates. Investment decisions are made by comparing a security's expected return with the required rate of return. If the expected return exceeds the required return, the investment is considered attractive. Proper valuation helps investors construct well-diversified portfolios, aligning investments with financial goals and risk tolerance. It ensures fair pricing, facilitates informed decision-making, and helps in risk management. A combination of valuation models and a deep understanding of market conditions enables accurate assessment and maximisation of investment returns.

### 1.4.2 Security Analysis

Security analysis is the process of evaluating financial instruments such as stocks, bonds, and derivatives to determine their value, potential risks, and expected returns. It is a major aspect of investment decision-making, helping investors assess the viability of securities for portfolio inclusion. Security analysis provides insights into the financial health of companies, market conditions, and macroeconomic factors influencing investments. Security analysis can be broadly classified into three main approaches such as:

**1. Fundamental Analysis:** Fundamental analysis focuses on evaluating a security's intrinsic value based on financial statements, economic indicators, and industry trends. It involves analysing key financial metrics such as revenue, earnings, debt levels, and growth prospects. Fundamental analysts use tools like the price-to-earnings (P/E) ratio, earnings per share (EPS), and discounted cash flow (DCF) models to determine whether a security is overvalued or undervalued. Macroeconomic factors, including interest rates, inflation, and government policies, are also considered in fundamental analysis. Fundamental analysis consists of three key levels:

- **Economy Analysis:** The overall economic environment significantly impacts the performance of financial mar-

- Investment decisions are made by comparing a security's expected return with the required rate of return

- Security analysis evaluates investment viability

- Fundamental analysts use tools and models to determine whether a security is overvalued or undervalued

kets. Factors such as GDP growth, inflation, interest rates, exchange rates, fiscal and monetary policies, and global economic trends influence investor sentiment and market movements. A stable and growing economy supports higher corporate earnings, making securities more attractive for investment.

- **Industry Analysis:** Each industry operates within a specific economic and regulatory framework. Industry analysis involves examining demand and supply conditions, competitive landscape, technological advancements, and government regulations affecting the industry. Investors assess industry trends, market cycles, and the positioning of firms within the industry to identify profitable investment opportunities.

- **Company Analysis:** This level focuses on evaluating a specific company's financial strength, management efficiency, profitability, and competitive advantage. Investors analyse financial statements, profit margins, earnings growth, debt levels, and corporate governance. A strong company with a solid business model, competitive positioning, and good financial health is more likely to generate positive returns for investors.

- Evaluates intrinsic value, financial health

**2. Technical Analysis:** Technical analysis involves studying past price movements and trading volumes to forecast future price trends.

This method assumes that historical price patterns tend to repeat over time. Technical analysts use charts, trend lines, moving averages, and momentum indicators to identify patterns such as support and resistance levels, price trends, and market cycles. Unlike fundamental analysis, which focuses on a company's financial health, technical analysis relies on market psychology and trading patterns to make investment decisions.

- Predicts trends using price patterns

**3. Quantitative Analysis:** Quantitative analysis uses mathematical and statistical models to assess securities. It involves the use of algorithms, financial modelling, and large datasets to identify investment opportunities. Quantitative analysts apply techniques such as risk-return modelling, factor analysis, and machine learning to optimise investment strategies. This approach is widely used by institutional investors, hedge funds, and algorithmic traders.

- Uses mathematical, statistics for decisions

Investors must evaluate the expected return of a security against the risk involved. Systematic risk, such as market risk, interest rate risk, and inflation risk, affects all securities and cannot be diversified away. Unsystematic risk, such as business risk and financial risk, is specific to a company or industry and can be reduced through diversification. The primary goal of security analysis is to make informed investment decisions by assessing whether a security is worth buying, holding, or selling. Investors use a combination of analysis to develop diversified investment portfolios aligned with their financial goals and risk tolerance. Proper security analysis helps minimise risks, maximise returns, and achieve long-term financial success.

- Security analysis balances risk and returns

### 1.4.3 Fundamental Analysis

Fundamental analysis is a method used to evaluate the intrinsic value of a security by examining various economic, financial, and qualitative factors. This approach aims to determine the true worth of an asset, guiding investors on whether it is overvalued or undervalued compared to its current market price. At its core, fundamental analysis involves assessing a company's financial health, its position within the industry, and the overall economic environment. The primary goal is to make informed investment decisions by understanding the major factors that drive a company's performance. There are two main approaches to fundamental analysis:

- Fundamental analysis evaluates intrinsic value

1. **Top-Down Analysis:** This approach starts with a broad examination of the global economy, followed by an analysis of specific industries, and finally narrows down to individual companies. Investors assess macroeconomic indicators such as GDP growth rates, inflation, interest rates, and energy prices to identify sectors for growth.

2. **Bottom-Up Analysis:** Conversely, this method begins with a detailed evaluation of individual companies, regardless of the broader economy or industry trends. Investors focus on a company's financial statements, management quality, product offerings, and competitive advantages to determine its potential.

- Top-Down vs Bottom-Up analysis

A structured approach known as the EIC framework—including Economy Analysis, Industry Analysis, and Company Analysis—provides a systematic method to assess these factors. This framework enables investors to make informed decisions by examining the broader economic environment, specific industry dynamics, and individual company performance. Key components of fundamental analysis are:

- EIC framework in Analysis

### 1.4.3.1 Economy Analysis

Economy analysis involves assessing the overall economic environment to understand its impact on investment opportunities. This macro-level evaluation considers various economic indicators and policies that influence market conditions.

- **Economic Indicators**: Key metrics such as Gross Domestic Product (GDP) growth, inflation rates, employment levels, and consumer spending patterns provide insights into the health of an economy. For instance, rising GDP and low unemployment typically signal economic expansion, which can positively affect corporate earnings.

- **Fiscal and Monetary Policies**: Government fiscal policies, including taxation and public spending, alongside central bank monetary policies like interest rate adjustments and money supply control, play key roles in shaping economic activity. Expansionary policies can stimulate growth, while contractionary measures aim to control inflation.

- **Global Economic Conditions:** International trade dynamics, exchange rates, and geopolitical events can significantly influence domestic economies. Global recessions or booms, trade agreements, and political stability are factors that investors must consider when analysing economic environments.

By understanding these elements, investors can anticipate economic trends and adjust their strategies accordingly.

### 1.4.3.2 Industry Analysis

Industry analysis involves evaluating the competitive landscape, market trends, and regulatory environment. This meso-level analysis helps identify industries with favourable prospects and understand the challenges they may face. The study includes analysing:

- **Market Structure and Competition:** Assessing the number of competitors, market share distribution, and the level of competition (e.g., monopoly, oligopoly, or perfect competition) helps determine an industry's attractiveness. High competition might squeeze profit margins, while monopolistic conditions could indicate higher profitability.

- Economy analysis guides investment strategies

- Industry analysis involves evaluating the competitive landscape, market trends, and regulatory environment

- **Growth Prospects**: Understanding the life cycle stage of an industry helps in assessing future growth potential. Emerging industries may offer rapid growth opportunities, while mature industries might provide stability.

- **Regulatory Environment:** Industries are often subject to specific regulations that can impact operations and profitability. For example, environmental laws can affect manufacturing industries, while data protection regulations can influence tech companies.

- **Technological Advancements:** The pace of technological innovation within an industry can determine its future growth path. Industries adopting new technologies may experience increased efficiency and growth, where as those lagging may get outdated.

Conducting a thorough industry analysis enables investors to pinpoint sectors that align with their investment objectives and risk tolerance.

### 1.4.3.3 Company Analysis

Company analysis focuses on evaluating individual firms to determine their financial health, operational efficiency, and growth prospects. This micro-level analysis is key for identifying companies that are well-positioned within their industries. The study includes analysing:

- **Financial Performance:** Examining financial statements—such as income statements, balance sheets, and cash flow statements—provides insights into a company's profitability, liquidity, and solvency. Key financial ratios like return on equity (ROE), debt-to-equity ratio, and net profit margin are instrumental in this assessment.

- **Management Quality:** The competence and experience of a company's management team can significantly influence its success. Investors often evaluate leadership styles, strategic vision, and corporate governance practices.

- **Competitive Positioning:** Assessing a company's market share, brand strength, and unique selling propositions helps in understanding its competitive advantages or vulnerabilities within the industry.

- **Innovation and R&D:** A company's commitment to research and development can indicate its potential for future growth and adaptability to market changes. Firms that

> - Industry analysis identifies growth opportunities

> - Company analysis assesses financial health, growth

innovate are often better equipped to maintain a competitive edge.

By meticulously analysing these aspects, investors can identify companies that not only perform well currently but also have sustainable prospects for the future.

The EIC framework offers a complete approach to investment evaluation. By systematically examining the macroeconomic environment, industry-specific factors, and individual company performance, investors can make well-informed decisions that align with their financial goals and risk appetite. This analysis is fundamental to identifying valuable investment opportunities and achieving long-term investment success. Fundamental analysis is the foundation of value investing, providing a framework to assess the true worth of a security by examining economic indicators, industry trends, and company-specific data. It equips investors with the insights needed to make informed decisions and potentially achieve favourable returns over the long term.

- EIC framework guides informed investment decisions

### 1.4.4 Technical Analysis

Technical analysis is a method used in security analysis to evaluate and forecast the future price movements of financial instruments by examining historical market data, primarily price and volume. Unlike fundamental analysis, which assesses a security's intrinsic value based on economic and financial factors, technical analysis focuses on identifying patterns and trends in trading activity to inform investment decisions. Technical analysis assumes that all available information, be it fundamental, political, or psychological, is already reflected in the current price of a security. Therefore, analysing price movements alone can provide insights into future price behaviour. Technical analysts assume that prices move in identifiable trends, continuing over time. Recognising these trends early can offer profitable investment opportunities. There is a belief that historical price movements recur over time due to market psychology. By studying past patterns, analysts aim to predict future price actions. Technical analysts employ various tools to interpret market data:

- Technical analysis predicts price trends

- **Charts:** Visual representations of price movements over specific periods, such as line charts, bar charts, and candlestick charts, help in identifying patterns and trends.

- **Indicators and Oscillators:** Mathematical calculations based on price, volume, or open interest provide insights into market momentum and potential reversal points. Common examples include Moving Averages, Relative Strength Index (RSI), and Moving Average Convergence Divergence (MACD).

- **Support and Resistance Levels:** These are specific price points where a security tends to reverse its direction. Identifying these levels helps in making buy or sell decisions.

- Charts and indicators guide technical analysis

Technical analysis is widely used across various financial markets, including stocks, commodities, and forex. Traders and investors utilise it to identify entry and exit points. Technical analysis helps determine optimal buy or sell times by analysing price patterns and indicators. Volume analysis and price action provide insights into the prevailing mood of the market, helping to understand the strength of a trend. Implementing stop-loss orders and setting profit targets based on technical levels assist in effective risk management. However, it is essential to acknowledge its limitations and use it alongside other analytical methods for a complete investment strategy.

- Technical analysis helps trading decisions

### 1.4.5 Quantitative Analysis

Quantitative analysis is a key methodology in security analysis, focusing on the use of numerical data and statistical techniques to evaluate investment opportunities. By systematically analysing measurable variables, investors aim to assess the value and risk associated with securities, facilitating more informed decision-making processes. At its core, quantitative analysis involves the application of mathematical models to interpret financial data. This approach emphasises measurable factors, such as revenue, profit margins, and market share, to derive objective insights into a company's performance and potential. By relying on quantifiable data, this method seeks to minimise subjective biases in qualitative assessments. The key components of Quantitative Analysis are:

- Quantitative analysis uses numerical data and statistical methods

1. **Financial Statement Analysis:** A thorough examination of a company's financial statements, including the balance sheet, income statement, and cash flow statement, is essential. Metrics such as earnings per share (EPS), return on equity (ROE), and debt-to-equity ratio are calculated to measure profitability, efficiency, and financial stability.

2. **Valuation Models**: Quantitative analysis employs various valuation techniques to estimate a security's intrinsic value. Models like Discounted Cash Flow (DCF) analysis project future cash flows and discount them to present value. At the same time, multiples-based approaches compare valuation ratios, such as the Price-to-Earnings (P/E) ratio, against industry peers.

3. **Risk Assessment:** Evaluating the potential risks associated with an investment is crucial. Quantitative risk analysis utilises statistical measures, such as standard deviation and beta coefficients, to assess volatility and systemic risk. Advanced methodologies, like Value at Risk (VaR), estimate the potential loss in value of an asset or portfolio under normal market conditions over a set time period.

- • Quantitative analysis involves financial statement evaluation

- • Computational tools for data-driven investment analysis

Quantitative methods are applied to identify investment opportunities, optimise portfolios, and manage risks. They use software and computational tools to process large datasets, enabling more precise modelling and forecasting. The primary advantage of quantitative analysis lies in its objectivity and ability to process vast amounts of data efficiently. However, this approach also has limitations. Overreliance on historical data may not account for unforeseen market conditions or qualitative factors, such as management expertise or brand reputation, which can significantly impact a company's performance.

## Summarised Overview

The valuation of securities is a fundamental process in financial markets that determines the intrinsic value of stocks, bonds, and derivatives. This process helps investors make informed decisions by assessing whether a security is overvalued or undervalued based on factors such as financial health, market conditions, and economic indicators. Securities are commonly evaluated using valuation methods such as Discounted Cash Flow (DCF) Analysis, Price-to-Earnings (P/E) Ratio, and Price-to-Book (P/B) Ratio. In addition, alternative approaches such as Book Value, Liquidation Value, and Intrinsic Value help in determining the worth of financial instruments. Different securities, such as equity shares, bonds, and derivatives, require specific valuation techniques. Accurate valuation plays a major role in portfolio management, risk assessment, and investment decision-making.

Security analysis involves evaluating financial instruments to assess their value, risks, and expected returns. This analysis is key for investors, financial managers, and policymakers in understanding market trends and making strategic investment choices. Security analysis

is categorised into three main approaches: fundamental analysis, technical analysis, and quantitative analysis. Fundamental analysis examines a company's intrinsic value by analysing financial statements, economic conditions, and industry trends. Technical analysis, in contrast, relies on historical price movements and trading volumes to predict future price trends. This method assumes that all market information is already reflected in security prices and that price trends tend to repeat over time. Technical analysis is widely used in short-term trading and is particularly effective in highly liquid markets. Quantitative analysis is a more data-driven approach that applies mathematical and statistical models to assess securities. This method uses financial statement analysis, valuation models such as DCF and P/E ratio, and risk assessment techniques like standard deviation and beta coefficients. By integrating fundamental, technical, and quantitative approaches, investors can develop well-diversified portfolios that align with their financial goals and market conditions. These analytical methods ensure fair pricing, effective risk management, and long-term investment success.

## Assignments

1. Evaluate the significance of security valuation and analysis in investment decision-making.

2. Discuss the various valuation methods and analytical approaches.

3. How do valuation methods contribute to portfolio management, risk assessment, and long-term financial planning?

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## Space for Learner Engagement for Objective Questions

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SGOU - SLM - MA Economics -Security Analysis and  Portfolio Management

# BLOCK 2

# Portfolio Theories

# UNIT 1 | RISK AND RETURN IN PORTFOLIOS

## Learning Outcomes

After completing this unit, learners will be able to:

- understand the concept of risk and return in portfolio management

- know about expected risk and return using different measurement techniques

- discuss alternative measures of risk

## Background

Imagine you are about to participate in a high-stakes game where you must pick between two mystery boxes. One box contains a guaranteed reward, while the other offers a much higher prize, but with the risk of getting nothing at all. How would you decide? Would you take the safe option or risk it for the chance of a bigger reward? What if you could calculate the probability of winning or losing? Would that change your choice? Everyday, we make decisions that involve some level of uncertainty. A student choosing between two career paths, a business owner deciding whether to expand operations or even a traveller picking between two different routes, each situation involves weighing risks against potential rewards. While some prefer a safer, predictable option, others are willing to take greater risks for higher rewards. The same logic applies in the world of investing. Investors constantly face choices between different financial assets, each carrying its own level of risk and expected return. Some investments offer stable but lower returns, while others may promise higher profits with greater uncertainty. But how do we measure these risks? Can we predict how an investment might perform in the future? Understanding risk and return is essential for making sound investment decisions, just as a player in a game analyses probabilities and strategies before making a move.

## Keywords

## Discussion

### 2.1.1 Measuring Expected Risk

Measuring expected risk is a fundamental aspect of security analysis and portfolio management, as it enables investors to assess potential uncertainties and make informed decisions. Several statistical tools and metrics are employed to quantify this risk, each offering unique insights into the variability and potential deviations of investment returns.

- **Standard Deviation and Variance:** At the core of risk measurement are standard deviation and variance, which quantify the dispersion of returns around the mean. Standard deviation represents the average amount by which individual returns differ from the mean return, providing a clear indication of the investment's volatility. Variance, being the square of the standard deviation, also measures this dispersion but in squared units, making standard deviation more interpretable in the context of return percentages. These are key in modern portfolio theory, where a higher standard deviation or variance signifies greater risk associated with the investment.

- **Beta Coefficient:** The beta coefficient evaluates an investment's sensitivity to market movements, indicating how much an asset's return is expected to change in response to market fluctuations. A beta greater than one suggests that the asset is more volatile than the market, while a beta less than one indicates lower volatility. This metric is key for understanding systematic risk. By incorporating beta into their analyses, investors can measure how individual securities contribute to the overall risk of a diversified portfolio.

- **Value at Risk (VaR):** Value at Risk (VaR) estimates the potential loss in value of an investment or portfolio over a defined period for a given confidence interval, assuming

> • Using statistical tools to assess uncertainties and investment return variability

> • Higher standard deviation or variance signifies greater risk

> • Beta coefficient evaluates an investment's sensitivity to market movements

> • VaR is used to assess the maximum potential loss

> • CVaR offers insight into the severity of extreme losses

> • Higher Sharpe Ratio indicates that the investment offers better returns for the level of risk

> • A lower CV is associated with more consistent returns relative to the mean

normal market conditions and no significant disruptions. For instance, a one-day VaR at a 95% confidence level of ₹1 million implies that there is only a 5% chance that the portfolio will lose more than ₹1 million in a single day. VaR is widely used by financial institutions to assess the maximum potential loss and to ensure that they maintain sufficient capital reserves to cover unexpected downturns.

- **Conditional Value at Risk (CVaR):** Also known as Expected Shortfall, Conditional Value at Risk (CVaR) provides an average of the losses that occur beyond the VaR threshold. While VaR indicates the minimum potential loss at a certain confidence level, CVaR offers insight into the severity of extreme losses. This measure is particularly useful for understanding tail risk, the risk of rare but severe losses, and is often favoured for its ability to measure the potential impact of extreme market events.

- **Sharpe Ratio:** The Sharpe Ratio assesses the risk-adjusted return of an investment by comparing the excess return, i.e. return above the risk-free rate, to the standard deviation of those returns. A higher Sharpe Ratio indicates that the investment offers better returns for the level of risk undertaken. This helps investors determine whether the returns of a portfolio are due to smart investment decisions or a result of excessive risk, thereby facilitating more informed comparisons between different investment opportunities.

- **Coefficient of Variation (CV):** The Coefficient of Variation (CV) is a standardised measure of dispersion that indicates the extent of variability in relation to the mean of the population. In the context of investment risk, a lower CV is associated with more consistent returns relative to the mean, suggesting a more favourable risk-return profile. Recent studies have proposed the use of CV as a direct measure of risk, offering an alternative to traditional mean-variance analysis.

- **Rachev Ratio:** The Rachev Ratio, or R-Ratio, is a performance metric that compares the likelihood of extreme positive returns to the risk of extreme negative returns. By focusing on the tails of the return distribution, this ratio shows the asymmetry of returns and helps investors assess the likelihood of significant gains relative to substantial losses. This metric is particularly valuable in non-Gaussian settings, where return distributions show skewness and kurtosis.

In portfolio management, these risk measures are instrumental in constructing and maintaining portfolios that align with investors' risk tolerance and return objectives. Regular monitoring and adjustment of these metrics ensure that the portfolio maintains alignment with the desired risk-return profile while adapting to changing market conditions and investment goals.

## 2.1.2 Return of a Portfolio

The return of a portfolio represents the gain or loss generated by the combined assets within that portfolio over a specific period. This metric is key for investors as it shows the effectiveness of their investment strategies and helps in assessing whether their financial objectives are being met. One commonly used method to determine the return of a portfolio is the weighted average return. This approach considers the proportion of the total investment allocated to each asset and their respective returns. The formula is:

Expected Return of the Portfolio ($E(R_p)$)

$$=\sum(\text{Weight of each asset}\times\text{Expected Return of each asset})$$

For example, if a portfolio consists of three assets with the following allocations and expected returns:

- Asset A: 50% allocation with an expected return of 8%

- Asset B: 30% allocation with an expected return of 12%

- Asset C: 20% allocation with an expected return of 6%

The portfolio's expected return would be calculated as:

$(0.50\times0.08)+(0.30\times0.12)+(0.20\times0.06)=0.04+0.036+0.012=0.088$ or 8.8%

The key factors that can impact the returns of a portfolio are:

1. **Asset Allocation:** The distribution of investments across various asset classes (such as equities, bonds, and alternatives) significantly affects returns. Strategic asset allocation aims to balance risk and reward by considering an investor's risk tolerance and investment horizon.

2. **Manager Selection:** The choice of fund managers or investment strategies can influence performance, especially in actively managed portfolios. Effective

manager selection can lead to returns that outperform standard benchmarks.

3. **Market Conditions:** Economic indicators, geopolitical events, and market sentiment can cause fluctuations in asset prices, thereby affecting portfolio returns.

4. **Factor Exposures:** Specific characteristics, such as value, size, volatility, momentum, and quality, can drive returns.

5. **External Cash Flows:** The timing and magnitude of contributions and withdrawals can impact portfolio performance, especially when considering money-weighted returns.

By employing appropriate measurement methods, investors can gain a complete understanding of their portfolio's effectiveness and make informed decisions to achieve their financial goals.

## 2.1.2.1 Methods of Measuring Portfolio Performance

Evaluating the performance of an investment portfolio is key for investors aiming to understand the returns achieved relative to the risks undertaken. The methods that facilitate this evaluation are as follows.

**1. Absolute Return:** Absolute return measures the total gain or loss of a portfolio over a specific period without considering the risk involved. It is calculated as:

$$\text{Absolute Return} = \frac{Ending\ Value - Beginning\ Value}{Beginning\ Value} \times 100\%$$

Example: If an investor in India starts with a portfolio valued at ₹10,00,000 and it grows to ₹12,00,000 over a year, the absolute return is:

$$\text{Absolute Return} = \frac{₹12,00,000 - ₹10,00,000}{₹10,00,000} \times 100\% = 20\%$$

**2. Relative Return:** Relative return compares the portfolio's performance to a benchmark index, providing context to the achieved returns. The formula is:

Relative Return = Portfolio Return - Benchmark Return

Example: If the portfolio returned 20% while the Nifty 50 index returned 15% during the same period, the relative return is:

- Proper measurement helps investors assess performance

- Absolute return measures total gain or loss over a period without considering risk

- Relative return measures a portfolio's performance against a benchmark

$$\text{Relative Return } = 20\% - 15\% = 5\%$$

**3. Risk-Adjusted Return:** Risk-adjusted return assesses the return earned per unit of risk taken. Common metrics include the Sharpe Ratio and Treynor Ratio.

**a. Sharpe Ratio**: Developed by William F. Sharpe, this ratio evaluates the excess return per unit of total risk (standard deviation). It is expressed as:

$$\text{Sharpe Ratio} = \frac{Portfolio\ Return - Risk - Free\ Rate}{Standard\ Deviation\ of\ Portfolio\ Returns}$$

Example: Assuming a portfolio return of 20%, a risk-free rate (e.g., the yield on Indian government bonds) of 6%, and a standard deviation of 10%, the Sharpe Ratio is:

$$\text{Sharpe Ratio} = \frac{20\% - 6\%}{10\%} = 1.4$$

A higher Sharpe Ratio indicates better risk-adjusted performance.

**b. Treynor Ratio:** Named after Jack Treynor, this ratio measures returns earned in excess of the risk-free rate per unit of systematic risk (beta). The formula is:

$$\text{Treynor Ratio} = \frac{Portfolio\ Return - Risk - Free\ Rate}{\beta}$$

Example: With a portfolio return of 20%, a risk-free rate of 6%, and a beta of 1.2 relative to the market, the Treynor Ratio is:

$$\text{Treynor Ratio} = \frac{20\% - 6\%}{1.2} = 11.67\%$$

**4. Jensen's Alpha:** Jensen's Alpha determines the abnormal return of a portfolio over the expected return predicted by the Capital Asset Pricing Model (CAPM). It is calculated as:

$$\alpha = \text{Portfolio Return} - [\text{Risk - Free Rate} + \beta \times (\text{Market Return - Risk - Free Rate})]$$

Example: If the portfolio return is 20%, the risk-free rate is 6%, the market return is 15%, and the portfolio beta is 1.2, Jensen's Alpha is:

$$\alpha = 20\% - [6\% + 1.2 \times (15\% - 6\%)] = 20\% - 16.8\% = 3.2\%$$

**5. Sortino Ratio:** The Sortino Ratio refines the Sharpe Ratio by considering only downside volatility, focusing on negative deviations from the mean. It is given by:

$$\text{Sortino Ratio} = \frac{Portfolio\ Return - Risk - Free\ Rate}{Downside\ Deviation}$$

Example: With a portfolio return of 20%, a risk-free rate of 6%, and a downside deviation of 8%, the Sortino Ratio is:

$$\text{Sortino Ratio} = \frac{20\% - 6\%}{8\%} = 1.75$$

> • A higher Sortino Ratio means better risk-adjusted performance, considering only downside risk

**6. M² (Modigliani-Modigliani) Measure:** The M² measure, developed by Franco and Leah Modigliani, provides an absolute return metric adjusted for risk, making it comparable to the market return. It is calculated as:

$$M^2 = (Sharpe\ Ratio \times Standard\ Deviation\ of\ Market) + Risk - Free\ Rate$$

Example: Assuming a Sharpe Ratio of 1.4, a market standard deviation of 12%, and a risk-free rate of 6%, the M² measure is:

$$M^2 = (1.4 \times 12\%) + 6\% = 16.8\% + 6\% = 22.8\%$$

> • A higher M² measure indicates that the portfolio has performed better than the market on a risk-adjusted basis

Each method of measuring portfolio performance serves a distinct purpose, helping investors assess returns relative to benchmarks, risk, and market conditions. For Indian investors, these measures are highly relevant for evaluating mutual funds, equity portfolios, and alternative investments like gold ETFs. Using benchmarks such as the Nifty 50, Sensex, or government bond yields as the risk-free rate, investors can make informed decisions about portfolio diversification.

### 2.1.3 Alternative Measures of Risk

In financial analysis, traditional risk measures like standard deviation and beta are commonly used to assess investment risk. However, these metrics have limitations in fully capturing potential losses under extreme market conditions. To address these shortcomings, alternative risk measures have been developed, offering a clearer understanding of risk. They are as follows:

> • Alternative risk measures provide deeper insights

**1. Value at Risk (VaR):** Value at Risk estimates the potential maximum loss of an investment over a specified time frame at a given confidence level.

Formula:

$$VaR_\alpha = \mu + Z_\alpha \times \sigma$$

Where:

- $\mu$ = Mean (expected) return
- $Z_\alpha$ = Z-score corresponding to the desired confidence level (e.g., 1.65 for 95% confidence)
- $\sigma$ = Standard deviation of returns

Example:

- Estimates potential loss over a defined period at a specific confidence level

Consider an investment in the Nifty 50 index with an expected annual return of 12% and a standard deviation of 18%. To calculate the one-year VaR at a 95% confidence level:

$$VaR_{0.95} = 0.12 + (-1.65 \times 0.18) = 0.12 - 0.297 = -0.177 \; or \; -17.7\%$$

This implies there is a 5% chance that the investment could lose more than 17.7% in a given year.

**2. Conditional Value at Risk (CVaR) or Expected Shortfall:**
While VaR indicates a threshold loss level, it does not quantify losses beyond this point. Conditional Value at Risk addresses this by measuring the expected loss, given that the loss has exceeded the VaR level.

Formula:

$$CVaR_\alpha = E[L \mid L > VaR\alpha]$$

Where:

- L = Loss
- E = Expected value

Example:

- Assesses the average loss beyond the VaR threshold, highlighting extreme risks

Continuing with the Nifty 50 investment, if the losses are beyond the 17.7% VaR average to 25%, then the CVaR at a 95% confidence level is -25%. This indicates that if losses exceed 17.7%, the expected average loss would be 25%.

**3. Drawdown:** Drawdown measures the decline from a portfolio's peak value to its trough over a specific period, reflecting the risk of a significant downturn.

Formula:

$$\text{Drawdown} = \frac{Peak\ Value - Trough\ Value}{Peak\ Value} \times 100\%$$

Example:

If an Indian mutual fund's net asset value (NAV) peaks at ₹200 and subsequently falls to ₹150, the drawdown is:

$$\text{Drawdown} = \frac{₹200 - ₹150}{₹200} \times 100\%$$

This indicates a 25% decline from the peak value.

- Measures the peak-to-trough decline during a specific period, reflecting potential losses

**4. Downside Risk:** Downside risk focuses on the potential for returns to fall below a minimum acceptable level, often zero or a specific target return.

Formula:

$$\text{Downside Risk} = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(0, R_i - Target\ Return)^2}$$

Where:

- $R_i$ = Actual return in period iii

- n = Number of periods

Example:

- Measures the potential for returns to fall below a target level

Assume an investor targets a 10% return on an Indian equity portfolio. If the actual returns over three years are 8%, 12%, and 5%, the downside deviations are 2% (since 8% is 2% below 10%) and 5% (since 5% is 5% below 10%). The downside risk is:

$$Downside\ Risk = \sqrt{\frac{1}{3} \times ((-2\%)^2 + 0 + (-5\%)^2)} = \sqrt{\frac{1}{3} \times (4 + 0 + 25)} = \sqrt{9.67}$$

$$\approx 3.11\%$$

This indicates an average downside deviation of approximately 3.11% from the target return.

**5. Stress Testing:** Stress testing evaluates how a portfolio might perform under extreme market conditions or hypothetical scenarios, such as economic crises or significant political events. This method does not rely on a specific formula but involves simulating various adverse conditions to assess potential impacts on the portfolio.

Example: An Indian investor holding a diversified equity portfolio might stress test its performance by simulating a scenario where the Reserve Bank of India significantly raises interest rates. The investor would analyse how such a rate hike could affect equity valuations and, consequently, the portfolio's value.

- Assesses a portfolio's performance under extreme scenarios

Alternative risk measures provide investors with a clearer understanding of potential losses and portfolio vulnerabilities beyond traditional metrics. By incorporating these measures, investors can better anticipate and mitigate risks, leading to more informed decision-making and robust portfolio management.

## Summarised Overview

Measuring expected risk is a major aspect of security analysis and portfolio management, helping investors assess potential uncertainties and make informed decisions. Various statistical tools and metrics are used to quantify this risk, offering insights into the variability and potential deviations of investment returns. Standard deviation and variance measure the dispersion of returns, indicating volatility. The beta coefficient evaluates an investment's sensitivity to market movements, while Value at Risk (VaR) estimates potential losses within a given confidence interval. Conditional Value at Risk (CVaR) goes further by measuring the severity of extreme losses. The Sharpe Ratio and Coefficient of Variation (CV) assess risk-adjusted returns, while the Rachev Ratio examines the asymmetry of extreme returns. These risk measures are essential in portfolio management to ensure that portfolios align with investors' risk tolerance and financial objectives.

The return of a portfolio represents the gains or losses generated by the combined assets within a specific period. It is typically measured using the weighted average return of its constituent assets. Several factors impact portfolio returns, including asset allocation, manager selection, market conditions, factor exposures, and external cash flows. Portfolio performance can be assessed through various methods, such as absolute return, relative return, and risk-adjusted return. The Sharpe Ratio measures excess return per unit of risk, while the Treynor Ratio evaluates returns relative to systematic risk. Jensen's Alpha determines abnormal returns compared to expected returns under the Capital Asset Pricing Model (CAPM). The Sortino Ratio refines the Sharpe Ratio by considering only downside

volatility, whereas the M² measure, developed by Franco and Leah Modigliani, adjusts returns for risk, making them comparable to market returns.

Beyond traditional risk measures like standard deviation and beta, alternative methods provide a more comprehensive assessment of investment risk. Value at Risk (VaR) estimates the potential maximum loss of an investment over a specified period at a given confidence level. Conditional Value at Risk (CVaR) improves upon VaR by measuring the expected loss beyond the VaR threshold. Drawdown assesses the peak-to-trough decline of a portfolio, while downside risk focuses on returns falling below a minimum acceptable level. Stress testing helps investors understand portfolio performance under extreme market conditions, such as economic crises or political instability. These alternative risk measures allow investors to anticipate and reduce risks more effectively, leading to better decision-making and more resilient portfolio management.

## Assignments

1. Discuss the various methods used to measure expected risk.

2. Compare and contrast traditional risk measures with alternative risk measures.

3. Evaluate how these metrics help investors make informed decisions in portfolio management and asset allocation.

## Suggested Reading

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<table>
<tr><td>UNIT 2</td><td># PORTFOLIO DEVELOPMENT</td></tr>
</table>

## Learning Outcomes

After completing this unit, learners will be able to:

- understand the fundamental steps involved in portfolio building

- discuss the key concepts of portfolio theory

- understand the portfolio management process

## Background

Imagine you are packing a backpack for a long trip. You do not know exactly what the weather will be like or what challenges you might face, so you carefully choose what to carry. You want to pack light, but at the same time, you need essentials clothing for different conditions, some emergency supplies, and maybe a few extras to make the journey enjoyable. A well-packed bag ensures you are prepared for any situation without being weighed down. Investing works the same way. No one can predict the future of financial markets with certainty. Some investments may bring high returns but come with high risk, while others offer stability but lower profits. Just like packing wisely for a trip, investors must carefully choose their assets, balancing risk and return to create a portfolio that suits their financial goals. Think about a farmer growing different crops in a field. If they plant only one type, a sudden drought or pest attack could destroy everything. But by growing a mix of crops some that need less water, some that grow quickly, and some that are resistant to pests, they reduce the chances of a complete loss. Diversification in investing follows the same principle, spreading investments across different assets to minimise risk.

## Discussion

### 2.2.1 Steps in Portfolio Building

Building an investment portfolio is a structured process that involves careful planning and strategic decision-making. A well-constructed portfolio ensures that an investor's financial objectives, risk tolerance, and time horizon are aligned with appropriate investment choices. The process is not just about selecting random stocks or bonds but about developing a balanced approach to investing that maximises returns while minimising risks. A portfolio serves as a roadmap for achieving financial goals, whether it is wealth accumulation, capital preservation, or income generation. The composition of a portfolio differs from person to person, depending on individual financial situations, market conditions, and investment preferences. Some investors may prioritise growth, focusing on high-return assets like equities, while others may prefer stability and opt for bonds or fixed-income securities. Regardless of the approach, the key to success lies in following a systematic process of portfolio construction that incorporates asset allocation, diversification, investment selection, continuous monitoring, and periodic rebalancing. Constructing a strong investment portfolio requires a well-thought-out approach that aligns an investor's financial objectives, risk tolerance, and time horizon with appropriate investment choices. The approach to effective portfolio building is as follows:

- Building an investment portfolio to maximise returns and minimise risks

1. **Establish Your Investment Profile:** Begin by defining your financial goals, which could range from retirement planning and purchasing a home to funding education or other significant expenditures. Clarifying these objectives provides a foundation for your investment strategy. Next, assess your risk tolerance and the degree of variability in investment returns you are willing to withstand. This involves evaluating your tolerance level with potential market fluctuations and losses. Additionally, determine your investment time horizon,

which is the period over which you plan to invest to achieve your financial goals. A longer time horizon may allow for a higher risk tolerance, as there is more time to recover from potential market downturns.

2. **Determine Your Asset Allocation:** Asset allocation involves distributing your investment capital across various asset classes, such as equities (stocks), fixed income (bonds), and cash equivalents, to align with your risk tolerance and investment objectives. Equities typically offer higher return potential but come with increased volatility, while bonds and cash equivalents generally provide more stable returns with lower risk. The goal is to create a balanced mix that suits your individual financial situation and goals.

3. **Diversify Within Asset Classes:** Diversification means spreading your investments within each asset class to reduce specific risks. For equities, this could mean investing across various sectors, industries, and geographic regions. For fixed income, consider a range of bond types with different maturities and credit qualities. Diversification aims to reduce the impact of any single investment's underperformance by spreading risk across multiple assets, ensuring that losses in one area are offset by gains in another.

4. **Select Specific Investments:** Once your asset allocation and diversification strategies are defined, choose specific investment vehicles that align with these plans. Options include individual stocks, bonds, mutual funds, exchange-traded funds (ETFs), and other securities. Each investment should be evaluated based on how it fits within your overall strategy, considering factors such as expense ratios, historical performance, and alignment with your investment goals.

5. **Implement and Monitor Your Portfolio:** After selecting your investments, implement your strategy by allocating your capital accordingly. Regularly monitor your portfolio's performance to ensure it remains aligned with your objectives and risk tolerance. This includes staying informed about market conditions and being prepared to adjust as necessary.

6. **Rebalance Periodically:** Over time, market movements can cause your portfolio's asset allocation to drift from your original plan. Periodic rebalancing involves realigning your portfolio to its intended asset allocation

- Effective portfolio building involves defining financial goals, assessing risk tolerance, and determining the investment time horizon

by buying or selling assets as needed. This practice helps maintain your desired risk level and ensures that your investment strategy remains on track to meet your financial goals.

Constructing a strong investment portfolio requires discipline, research, and a well-defined strategy. It is not a one-time activity but an ongoing process that involves monitoring, adjusting, and refining investment choices to ensure they remain in line with financial objectives and market conditions. Regular assessment and rebalancing of the portfolio help maintain the desired level of risk and return, preventing any major deviations from the original investment plan. Additionally, investor psychology plays a major role in portfolio management. Emotional decision-making, such as panic selling during market downturns or excessive risk-taking during bullish phases, can disrupt portfolio performance. A well-planned and disciplined approach to portfolio construction helps investors stay focused on long-term goals rather than reacting impulsively to short-term market movements. By following the structured steps of portfolio building, investors can improve their financial stability and work towards achieving their wealth-building aspirations. A well-managed portfolio provides not only financial security but also peace of mind, knowing that investments are strategically positioned for growth and stability over time.

- Managing investor psychology and avoiding impulsive decisions

## 2.2.2 Portfolio Theory

Portfolio theory is a fundamental concept in finance that guides investors in constructing optimal portfolios by balancing risk and return. Modern Portfolio Theory (MPT), introduced by Harry Markowitz in the 1950s, revolutionised investment strategies by showing that diversification can effectively reduce risk. It suggests that investors can achieve an optimal portfolio by selecting a mix of assets with varying correlations, ensuring that the overall risk of the portfolio is lower than the sum of individual asset risks. The theory quantifies risk using statistical measures like variance and standard deviation, helping investors align their portfolios with their risk tolerance and return expectations. The MPT represents the set of optimal portfolios offering the highest return for each level of risk. Investors aim to position their portfolios on this frontier to maximise performance while maintaining acceptable risk levels. Diversification plays a key role in MPT, as investing

- MPT emphasises diversification to balance risk and return

in a variety of assets with differing market responses helps mitigate unsystematic risk and enhance overall returns.

Despite its significance, MPT is based on certain assumptions, such as rational investor behaviour, efficient markets, and the normal distribution of returns, which may not always hold in real-world scenarios. To address these limitations, Post-Modern Portfolio Theory (PMPT) emerged, introducing measures like downside risk to reflect investor concerns better. Portfolio theory has had a huge impact on modern investment strategies, shaping how financial advisors and portfolio managers allocate assets to achieve the best possible risk-adjusted returns. By leveraging quantitative analysis and considering asset correlations, they construct portfolios positioned along the efficient frontier, optimising return potential while managing risk. Although refinements and alternative theories have evolved, the core principles of portfolio theory continue to be central to investment decision-making, helping investors navigate financial markets with a structured, risk-conscious approach.

### 2.2.3 Portfolio Management

Portfolio management is the strategic process of selecting and overseeing a collection of investments to meet specific financial objectives while balancing risk and return. This practice is essential for both individual and institutional investors aiming to optimise their investment portfolios. The primary goal of portfolio management is to align investments with the investor's financial goals, risk tolerance, and investment horizon. Portfolio management can be categorised based on the level of investor involvement and management style:

1. **Active Portfolio Management:** Managers actively make investment decisions to outperform specific benchmarks, relying on research, forecasts, and their judgment to buy and sell assets.

2. **Passive Portfolio Management:** This approach aims to replicate the performance of a particular index or benchmark, involving minimal trading and focusing on long-term investment.

3. **Discretionary Portfolio Management**: The portfolio manager has full authority to make investment decisions on behalf of the client based on agreed-upon objectives and risk tolerance.

- MPT shapes investment strategies through diversification and risk-return optimisation

- Portfolio management involves strategically selecting and overseeing investments

4. **Non-Discretionary Portfolio Management:** The manager provides investment advice, but the client makes the final decisions regarding investments.

Portfolio management is a dynamic and continuous process that requires a clear understanding of financial goals, risk tolerance, and market conditions. By employing a structured approach, investors can effectively navigate the financial markets to achieve their desired outcomes. Four key components of portfolio management are portfolio analysis, portfolio selection, portfolio revision, and portfolio evaluation. Each plays a key role in optimising investment returns while minimising risks.

### 2.2.3.1 Portfolio Analysis

Portfolio analysis is a critical process in investment management, involving the systematic evaluation of an investment portfolio's composition, performance, and alignment with an investor's financial objectives and risk tolerance. This complete assessment helps in making informed decisions to optimise returns while effectively managing associated risks. Portfolio analysis involves examining the various assets within a portfolio to understand their collective behaviour and impact on overall performance. The primary objectives are to assess how well the portfolio meets the investor's goals, ensure diversification to reduce risk and identify opportunities for improvement. By analysing factors like asset allocation, individual asset performance, and correlations between assets, investors can make strategic adjustments to increase portfolio efficiency.

**The key components of Portfolio Analysis are as follows:**

1. **Asset Allocation:** This involves distributing investments across various asset classes (e.g., equities, fixed income, cash equivalents) to balance risk and return. Proper asset allocation is key, as it determines the portfolio's risk profile and potential returns.

2. **Diversification:** Spreading investments across different sectors, industries, and geographic regions helps reduce exposure to any single economic event. Diversification aims to minimise the impact of individual asset volatility on the overall portfolio.

- Portfolio management is a continuous process

- Portfolio analysis involves systematically evaluating a portfolio's composition

3. **Risk Assessment:** Evaluating the risk associated with each asset and the portfolio as a whole is essential. Metrics such as standard deviation, beta coefficients, and value-at-risk (VaR) are commonly used to quantify risk levels.

4. **Performance Evaluation:** Analysing returns relative to benchmarks or indices helps determine if the portfolio is meeting expectations. Performance metrics like the Sharpe ratio, which measures risk-adjusted return, provide information about the performance of the asset.

5. **Correlation Analysis:** Understanding how assets move in relation to one another is essential. Low or negative correlations between assets can increase diversification benefits, as the poor performance of one asset may be offset by the strong performance of another.

**Steps in Conducting Portfolio Analysis**

1. **Define Investment Objectives:** Clearly define financial goals, time horizons, and risk tolerance. This foundational step guides the entire analysis process.

2. **Data Collection:** Gather detailed information on each investment, including historical performance, volatility, and other relevant metrics.

3. **Performance Measurement:** Calculate returns over various periods and compare them to appropriate benchmarks to assess relative performance.

4. **Risk Evaluation:** Utilise statistical tools to measure the risk associated with individual assets and the portfolio collectively.

5. **Review Asset Allocation:** Examine the current distribution of assets to ensure alignment with investment objectives and risk tolerance.

6. **Rebalancing Strategy:** Determine if adjustments are needed to maintain the desired asset allocation, considering factors like market movements and changing financial goals.

Portfolio analysis helps investors make informed decisions by providing insights into asset performance and risk exposure. It improves risk management by identifying potential threats and ensuring better capital preservation. Additionally, it helps in performance optimisation, allowing investors to reallocate funds from underperforming assets to more profitable ones.

• Portfolio analysis includes asset allocation to improve diversification benefits

• Portfolio analysis involves a rebalancing strategy to maintain optimal distribution

Regular analysis ensures that the portfolio remains aligned with financial goals, adapting to changing market conditions and personal objectives. Despite its advantages, portfolio analysis faces challenges such as data reliability, where incomplete or inaccurate information can lead to flawed decisions. Market volatility also poses a risk, as unpredictable fluctuations impact portfolio performance. Additionally, behavioural biases can lead investors to make emotional decisions rather than data-driven choices. Addressing these challenges requires disciplined strategies and continuous monitoring to maintain an effective portfolio. Portfolio analysis is an indispensable tool for investors seeking to achieve their financial objectives while managing risk effectively. By systematically evaluating asset allocation, diversification, risk, and performance, investors can make informed decisions to optimise their portfolios. Regular analysis and rebalancing are essential to adapt to changing market conditions and personal financial goals, ensuring long-term investment success.

- Portfolio analysis guides informed decision-making

## 2.2.3.2 Portfolio Selection

Portfolio selection is the process of constructing an investment portfolio that aligns with an investor's financial objectives, risk tolerance, and investment horizon. The primary aim is to optimise returns while managing risk through strategic asset allocation and diversification. At its core, portfolio selection involves choosing a mix of investment assets that collectively seek to achieve the investor's desired balance between risk and return. This process requires a comprehensive understanding of various asset classes, their potential returns, associated risks, and how they interact within a portfolio. By diversifying investments across different asset classes, investors can reduce the impact of any single asset's underperformance on the overall portfolio.

- Optimising returns through strategic asset allocation and diversification

**The portfolio selection process typically includes several key steps:**

1. **Establishing Financial Goals and Risk Tolerance:** Investors begin by clearly defining their financial objectives, such as capital appreciation, income generation, or capital preservation. Concurrently, they assess their risk tolerance—the degree of variability in investment returns they are willing to withstand.

2. **Asset Allocation:** Based on the identified goals and risk tolerance, investors decide on the proportion of their portfolio to allocate to various asset classes. This strategic distribution is key, as different asset classes exhibit distinct risk and return characteristics.

3. **Security Selection:** Investors choose securities within each asset class that align with their strategy, ensuring they enhance the portfolio's risk-return profile.

4. **Portfolio Optimisation:** Investors employ quantitative methods to construct an efficient portfolio—one that aims to maximise expected return for a given level of risk. This step often involves utilising models like Modern Portfolio Theory (MPT), which emphasises the benefits of diversification.

5. **Performance Monitoring and Rebalancing:** Regular assessment of the portfolio's performance is essential to ensure alignment with the investor's objectives. Periodic rebalancing may be necessary to adjust for market movements and maintain the desired asset allocation.

- Portfolio selection involves defining financial goals and risk tolerance

Modern Portfolio Theory (MPT): Introduced by economist Harry Markowitz in 1952, Modern Portfolio Theory provides a foundational framework for portfolio selection. MPT says that an investor can construct an "efficient" portfolio that offers the maximum expected return for a given level of risk by considering the correlation between asset returns. The theory emphasises the importance of diversification, suggesting that combining assets with varying correlations can reduce overall portfolio risk.

- MPT guides portfolio selection by promoting diversification

Despite the structured methodologies used in portfolio selection, investors face several challenges that can affect the effectiveness of their investment strategies. One of the primary challenges is the difficulty in accurately estimating expected returns and associated risks. Financial markets are inherently uncertain; factors like economic fluctuations, inflation, interest rate changes, and geopolitical events significantly impact asset performance, complicating return forecasts. Additionally, dynamic market conditions pose another major problem, as market trends and investor sentiment can shift rapidly, affecting asset prices and leading to unexpected volatility. Another critical challenge is the presence of behavioural biases, where investors may make irrational decisions influenced by emotions, overconfidence, or herd mentality. These biases

- Difficulty in accurately estimating expected returns and associated risks

may lead to poor decisions, such as taking excessive risks or holding onto underperforming assets. Furthermore, achieving an optimal level of diversification without diluting potential returns is a complex task. While diversification helps reduce risk, over-diversification can lead to diminished portfolio performance, as excessive asset holdings may lessen the impact of high-performing investments. Lastly, transaction costs, tax implications, and regulatory constraints add another layer of complexity, requiring investors to constantly monitor and adjust their portfolios to remain efficient. Addressing these challenges requires a disciplined approach, ongoing market analysis, and the ability to adapt to changing financial environments. Portfolio selection is a key component of effective investment management, requiring a thoughtful balance between risk and return. By systematically assessing financial goals and risk tolerance and employing strategic asset allocation and diversification, investors can construct portfolios tailored to their unique needs. Continuous monitoring and adaptability to changing market conditions further improve the potential for achieving long-term investment success.

### 2.2.3.3 Portfolio Revision

Portfolio revision refers to the process of making changes to an existing investment portfolio to ensure it remains aligned with an investor's financial goals, risk tolerance, and market conditions. Investors often create a portfolio based on a carefully planned asset allocation strategy. However, due to changes in market dynamics, economic conditions, and personal financial circumstances, a portfolio may deviate from its original allocation. Regular portfolio revision helps to realign investments, optimise returns, and maintain the desired level of risk exposure. The process of portfolio revision can involve rebalancing asset classes, selling underperforming securities, acquiring new investment opportunities, or adjusting holdings based on changing financial objectives. It is an essential practice for both individual and institutional investors to ensure that their portfolios continue to perform efficiently. A well-executed revision strategy enhances returns, mitigates risks, and aligns investments with long-term goals.

There are two primary strategies for portfolio revision: active revision strategy and passive revision strategy. The choice of strategy depends on an investor's financial objectives, risk appetite, and market outlook.

- Investors face challenges in portfolio selection

- Portfolio revision involves adjusting investments to align with financial goals

1. **Active Revision Strategy**: The active revision strategy involves frequent and proactive adjustments to the portfolio to take advantage of market opportunities and reduce risks. Investors and fund managers, using this approach, continuously monitor the financial markets, economic indicators, and company performance to make informed decisions. The objective is to buy undervalued assets, sell overvalued ones, and adjust asset allocations dynamically. Active portfolio revision requires extensive research, market analysis, and expertise to make timely buy or sell decisions. This strategy is often used by institutional investors, hedge funds, and active fund managers aiming to outperform the market. However, it also comes with higher transaction costs and tax implications due to frequent trading.

2. **Passive Revision Strategy:** In contrast to the active approach, a passive revision strategy involves making portfolio changes infrequently. Investors following this strategy typically revise their portfolios based on a pre-determined schedule or when the asset allocation significantly deviates from the target. The main goal is to maintain the original investment strategy with minimal intervention.: Passive revision strategies are often used by long-term investors who prefer a "buy-and-hold" approach. This strategy reduces transaction costs and tax liabilities, making it a cost-effective method for portfolio management. Index funds and exchange-traded funds (ETFs) commonly employ passive strategies, where portfolio adjustments are made periodically rather than frequently.

Although portfolio revision is important for optimising returns and managing risks, several constraints may affect the process. These constraints can impact the effectiveness of revision strategies and should be carefully considered before making investment decisions. Every time an investor buys or sells securities, transaction costs are involved, such as brokerage fees, commissions, and bid-ask spreads. Frequent portfolio revisions can lead to higher costs, which may reduce overall returns. Investors need to balance the benefits of revision with the associated costs to ensure that portfolio adjustments do not diminish profitability. One of the significant challenges in portfolio revision is the impact of capital gains taxes. When investors sell assets that have appreciated in value, they may be subject to capital gains tax, reducing the net returns from

**Sidebar notes (left column):**

- Active revision strategy involves frequent and proactive adjustments

- Investors revise their portfolios based on a pre-determined schedule

- Portfolio revision strategies include active and passive approaches

the portfolio. To minimise tax liabilities, investors can use tax-efficient strategies such as tax-loss harvesting, where losses from certain investments are used to offset gains from others. Certain investment instruments and financial markets impose restrictions on the frequency or volume of trading. For instance, mutual funds may have rules limiting how often investors can buy or sell shares within a specific period. Similarly, institutional investors must comply with regulatory guidelines that dictate portfolio adjustments, making it challenging to implement frequent revisions. Liquidity and volatility significantly affect portfolio revisions. In highly volatile markets, quick adjustments may lead to substantial losses. Similarly, in illiquid markets, it may be not easy to sell assets at a fair price, affecting the effectiveness of portfolio adjustments. Investors must carefully assess market conditions before making revision decisions to avoid unfavourable outcomes.

Portfolio revision is an integral part of investment management, ensuring that an investor's portfolio remains well-balanced and aligned with their financial goals. By employing suitable revision strategies and understanding the constraints, investors can optimise returns and manage risks effectively. Whether through active or passive approaches, portfolio revision should be conducted systematically to adapt to changing market conditions and financial circumstances. A well-maintained portfolio not only increases long-term wealth creation but also provides financial stability and security.

### 2.2.3.4 Portfolio Evaluation

Portfolio evaluation is an important process in investment management, focusing on assessing the performance of an investment portfolio to ensure alignment with the investor's objectives and risk tolerance. This evaluation includes various metrics and methodologies to provide a holistic view of a portfolio's effectiveness. At its core, portfolio evaluation involves analysing the returns generated by the portfolio relative to the risks undertaken. This analysis helps investors and portfolio managers determine the success of their investment strategies and make informed decisions about future adjustments.

- Portfolio revision faces constraints

- Portfolio revision ensures portfolios stay aligned with financial goals

- Portfolio evaluation assesses performance to ensure alignment with investor objectives

**The key components of portfolio evaluation are:**

1. **Performance Measurement:** This involves calculating the returns of the portfolio over a specific period. Returns can be measured in absolute terms or relative to a benchmark index, offering insights into the portfolio's performance.

2. **Risk Assessment:** Evaluating the risk associated with the portfolio is important. This includes analysing the volatility of returns and understanding the potential for losses. Common risk metrics include standard deviation and beta, which measure the portfolio's sensitivity to market movements.

3. **Risk-Adjusted Return Metrics:** To gain a more accurate picture of performance, it is essential to consider risk-adjusted return measures. Notable metrics include:

   - Sharpe Ratio: This ratio assesses the return earned per unit of risk, calculated by dividing the portfolio's excess return over the risk-free rate by its standard deviation. A higher Sharpe ratio indicates better risk-adjusted performance.

   - Treynor Ratio: Similar to the Sharpe ratio, the Treynor ratio evaluates returns earned in excess of the risk-free rate per unit of systematic risk, represented by beta. It provides insight into how well the portfolio compensates investors for taking on market risk.

   - Jensen's Alpha: This metric measures the excess return of the portfolio over the expected return predicted by the Capital Asset Pricing Model (CAPM). A positive alpha indicates that the portfolio has outperformed the market after adjusting for risk.

4. **Benchmarking:** Comparing the portfolio's performance against relevant benchmarks is a fundamental aspect of evaluation. Benchmarks serve as standards, reflecting the performance of a specific segment of the market that aligns with the portfolio's investment strategy. For instance, a portfolio focused on large-cap U.S. equities might use the S&P 500 Index as its benchmark. This comparison helps determine whether the portfolio is underperforming or outperforming its peers.

5. **Performance Attribution:** Understanding the sources of returns is key for effective portfolio management. Performance attribution breaks down the portfolio's

- Portfolio evaluation involves measuring performance

- Portfolio evaluation ensures investment effectiveness

returns to identify the impact of various factors, such as asset allocation, sector selection, and individual security selection. This analysis helps pinpoint the strengths and weaknesses of the investment strategy, facilitating more informed decision-making.

6. **Frequency of Evaluation:** The frequency of portfolio evaluation should align with the investor's time horizon and the investment philosophy of the portfolio manager. Regular evaluations enable timely adjustments to the investment strategy, ensuring that the portfolio remains aligned with the investor's objectives and risk tolerance.

- Investors ensure their portfolios are well-positioned to meet financial goals

Portfolio evaluation is an indispensable process in investment management, providing insights into the effectiveness of investment strategies and guiding necessary adjustments. Investors can ensure their portfolios are well-positioned to meet financial goals by systematically measuring performance, assessing risk, utilising risk-adjusted return metrics, benchmarking, and conducting performance attribution.

## Summarised Overview

Building an investment portfolio is a structured and strategic process designed to align an investor's financial goals, risk tolerance, and time horizon with appropriate investment choices. A well-constructed portfolio ensures a balance between risk and return while maintaining financial stability. The process involves several key steps: establishing an investment profile, determining asset allocation, diversifying within asset classes, selecting specific investments, implementing and monitoring the portfolio, and periodically rebalancing to maintain the desired asset allocation.

Portfolio theory, particularly Modern Portfolio Theory (MPT), introduced by Harry Markowitz in the 1950s, emphasises the importance of diversification to minimise risk while maximising returns. The theory advocates for constructing portfolios based on statistical measures such as variance and standard deviation to position investments along the efficient frontier. Although MPT has limitations, such as assuming rational investor behavior and market efficiency, its principles have significantly shaped contemporary investment strategies. Post-Modern Portfolio Theory (PMPT) has emerged to address some of MPT's shortcomings by incorporating downside risk measures to better reflect investor concerns.

Portfolio management involves overseeing a collection of investments to achieve financial objectives while balancing risk and return. The key objectives include capital appreciation, income generation, and risk reduction. There are different approaches

to portfolio management: active management focuses on outperforming benchmarks through active decision-making, passive management replicates index performance with minimal trading, discretionary management grants full decision-making authority to a portfolio manager, and non-discretionary management involves advisory services with the final decision left to the investor. The portfolio management process includes four core components: portfolio analysis, selection, revision, and evaluation. By following structured portfolio-building and management strategies, investors can optimise their financial outcomes and maintain long-term investment stability.

Portfolio analysis is a systematic process of evaluating an investment portfolio's composition, performance, and alignment with an investor's goals. It involves assessing asset allocation, diversification, risk levels, and performance metrics to optimise returns while minimising risks. Key aspects include examining the mix of assets, understanding their interrelationships, and making necessary adjustments to improve efficiency. Effective portfolio analysis helps in informed decision-making, better risk management, and improving overall investment returns. Despite its advantages, challenges such as data reliability, market volatility, and behavioural biases can impact its effectiveness.

Portfolio selection is the process of constructing an investment portfolio that aligns with an investor's financial objectives and risk appetite. The steps involved include defining financial goals, determining risk tolerance, asset allocation, security selection, and portfolio optimisation. Modern Portfolio Theory (MPT), introduced by Harry Markowitz, emphasises diversification as a method to reduce overall risk by combining assets with different correlations. However, challenges such as estimating expected returns, dealing with market volatility, overcoming behavioural biases, and balancing diversification with profitability can make portfolio selection complex. Addressing these challenges requires disciplined strategies, ongoing market analysis, and adaptability.

Portfolio revision strategies include active and passive approaches. Active revision involves frequent trading to capitalise on market opportunities, while passive revision follows a pre-determined schedule with minimal intervention. Constraints such as transaction costs, tax implications, regulatory restrictions, market liquidity, and volatility can impact portfolio revision. A well-executed revision strategy helps in maintaining portfolio efficiency and achieving long-term financial stability.

## Assignments

1. Critically evaluate the process of portfolio construction and management.
2. How does Modern Portfolio Theory influence investment decisions?
3. Discuss the role of active and passive portfolio management strategies.
4. Discuss the key components of portfolio management.

## Suggested Reading

1. Damodaran, A. (2012). *Investment Valuation: Tools and Techniques for Determining the Value of Any Asse*t (3rd ed.). Wiley.
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4. Malkiel, B. G. (2020). *A Random Walk Down Wall Street*: *The Time-Tested Strategy for Successful Investing* (13th ed.). W. W. Norton & Company.
5. Mitra, D. (2018). *Portfolio Management in Emerging Markets.* Sage Publications India.

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1. Bodie, Z., Kane, A., & Marcus, A. J. (2020). *Investments* (12th ed.). McGraw-Hill Education.
2. Elton, E. J., Gruber, M. J., Brown, S. J., & Goetzmann, W. N. (2017). *Modern Portfolio Theory and Investment Analysis* (9th ed.). Wiley.
3. Markowitz, H. (1952). *Portfolio selection. The Journal of Finance*, 7(1), 77-91.
4. Reilly, F. K., & Brown, K. C. (2021). *Investment Analysis and Portfolio Management* (11th ed.). Cengage Learning.
5. Singh, Y. P. (2019). *Investment Management and Portfolio Theory: A Modern Approach.* Oxford University Press India.

# Space for Learner Engagement for Objective Questions

Learners are encouraged to develop objective questions based on the content in the paragraph as a sign of their comprehension of the content. The Learners may reflect on the recap bullets and relate their understanding with the narrative in order to frame objective questions from the given text. The University expects that 1 - 2 questions are developed for each paragraph. The space given below can be used for listing the questions.

# PORTFOLIO THEORIES AND MEASURES

## Learning Outcomes

After completing this unit, learners will be able to:

*   discuss Markowitz portfolio theory

*   know Sharpe's single index model

*   understand the effectiveness of Treynor's ratio

## Background

Imagine you have just received a bonus and want to invest it in the stock market. You ask a few friends for advice one suggests putting all your money into a single promising stock, while another advises spreading it across multiple stocks to minimise risk. Meanwhile, a third friend warns you that not all stocks are equally risky and that some investments are better suited to certain economic conditions. With so many different opinions, you start wondering: What is the right way to invest wisely? Investing is not just about choosing random stocks; it is about understanding how different assets work together and how risk and return are connected. Some investments carry high risk but offer the potential for high returns, while others are safer but provide lower returns. The challenge lies in balancing these factors to create an investment portfolio that suits your financial goals. This is where portfolio theories and risk measurement tools come into play, helping investors make informed decisions based on data rather than guesswork. Think of a chef preparing a perfect dish. Using just one ingredient might not give the best flavour, but combining different ingredients in the right proportion enhances the taste while maintaining balance. Similarly, a smart investor does not put all their money into a single stock but diversifies investments strategically. This diversification helps in reducing risk while maximising potential returns.

## Discussion

### 2.3.1 Markowitz Portfolio Theory (MPT)

Markowitz Portfolio Theory (MPT), developed by Harry Markowitz in 1952, is a framework that revolutionised the field of investment and risk management. Prior to Markowitz's work, investors largely focused on selecting individual securities based on their expected returns without considering how they interacted with other assets in a portfolio. Markowitz introduced portfolio diversification, showing that investments should be evaluated based on their collective impact on portfolio risk and return rather than in isolation. The core principle of MPT is that investors can construct an efficient portfolio by selecting assets that maximise returns for a given level of risk or minimise risk for a given level of expected return. This is achieved by analysing statistical properties such as expected returns, variance (a measure of risk), and correlation between asset returns. By carefully combining assets with different risk-return profiles and low or negative correlation, investors can reduce overall portfolio risk without necessarily compromising returns. Markowitz's work laid the foundation for Modern Portfolio Theory, shaping how institutional and individual investors manage their investments. His contributions were so influential that he was awarded the Nobel Prize in Economics in 1990. Today, MPT is the foundation of financial decision-making, helping investors construct portfolios that align with their risk tolerance and financial goals. Despite some limitations, such as assumptions of rational investors and normally distributed returns, the theory continues to be widely applied in financial markets.

- Revolutionised investment strategies, earning Markowitz the Nobel Prize

The core principles of Markowitz Portfolio Theory are :

1.  **Risk and Return Assessment:** MPT says that each investment has an expected return and an associated risk, typically measured by the standard deviation of

its returns. Investors are assumed to be risk-averse, preferring higher returns and lower risk.

2. **Diversification**: A central point of MPT is that holding a variety of non-perfectly correlated assets can reduce the overall risk of the portfolio. This is because the individual asset risks offset each other, leading to a more stable return profile.

3. **Efficient Frontier:** This concept represents a set of optimal portfolios offering the highest expected return for each level of risk. Portfolios on this frontier are efficient, as they provide the best possible return for their risk level.

4. **Optimal Portfolio Selection:** Investors choose portfolios based on their risk tolerance, aiming for the point where their individual indifference curve (reflecting their risk-return preference) is tangent to the efficient frontier. This tangency point signifies the optimal portfolio for that investor.

> • Selecting portfolios aligned with individual risk tolerance for optimal returns

A portfolio's expected return is the weighted sum of its individual asset returns.:

$$E(R_p) = \sum_{i=1}^{n} w_i E(R_i)$$

Here, $E(R_p)$ is the expected return of the portfolio, $w_i$ is the weight of asset i in the portfolio, and $E(R_i)$ is the expected return of asset i.

The portfolio's risk (variance) is determined by:

$$\sigma_p^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} w_i w_j \sigma_{ij}$$

> • Expected portfolio return is the weighted sum of individual asset returns

Where $\sigma_{ij}$ represents the covariance between assets i and j. This formula explains the importance of asset correlations in portfolio risk assessment.

MPT operates under several key assumptions:

• Investors prefer less risk for a given return level.

• Asset returns are normally distributed, allowing for the use

of mean and variance as proxies for return and risk.

- The model considers a single investment period, simplifying the analysis.

- All available information is reflected in asset prices, implying no arbitrage opportunities.

The Markowitz Model, or Modern Portfolio Theory (MPT), operates on the principle of optimising a portfolio by balancing risk and return. It suggests that investors should not look at individual securities in isolation but rather consider how each asset interacts with others in a diversified portfolio. By analysing the statistical properties of asset returns, such as expected return, variance, and covariance, the model helps investors construct an 'efficient portfolio' that minimises risk for a given level of expected return. The steps involved in MPT are as follows.

- **Estimating Expected Returns and Risk:** The first step in applying the Markowitz Model is to estimate the expected return and risk (variance or standard deviation) of each asset in consideration. The expected return is calculated as the weighted average of possible returns based on historical data, while risk is measured by the standard deviation of returns. Since investors prefer higher returns with lower risk, this step is important in identifying potentially attractive investment options.

- **Understanding Correlation and Covariance**: A key concept in the Markowitz Model is how different assets move relative to each other. This relationship is measured by covariance and correlation. If two assets have a high positive correlation, they tend to move in the same direction, whereas a negative correlation indicates that when one asset gains, the other is likely to lose. Selecting assets with low or negative correlation reduces portfolio risk by offsetting losses with gains.

- **Constructing the Portfolio**: Once the expected returns, variances, and covariances are determined, investors assign different weights to assets in the portfolio. The goal is to distribute investments in a way that optimises returns while keeping risk at a minimum. Mathematically, the portfolio's expected return is the weighted sum of individual asset returns, while the portfolio variance (risk) is computed using the variance-covariance matrix. By carefully selecting asset weights, investors can create a well-diversi-

• MPT assumes investors prefer lower risk

• MPT focuses on optimising portfolios

fied portfolio that reduces unsystematic risk (firm-specific risk).

- **The Efficient Frontier**: Using the estimated risk and return values, Markowitz developed the concept of the efficient frontier, which represents a set of optimal portfolios that offer the highest possible return for each level of risk. Portfolios below the efficient frontier are suboptimal as they either carry excess risk or yield lower returns. Rational investors should aim to construct portfolios that lie on this frontier to maximise returns without taking on excess risk.

- **Selecting the Optimal Portfolio:** Every investor has a unique risk appetite. Some may be risk-averse, preferring lower risk and moderate returns, while others may be risk-seeking, willing to take on higher volatility for potentially greater gains. The Markowitz Model helps investors determine the best portfolio based on their individual risk tolerance.

- **Portfolio Adjustment and Rebalancing:** The Markowitz Model assumes a single-period investment horizon, but in practice, portfolios require continuous monitoring and rebalancing. As market conditions change, asset correlations may shift, affecting the portfolio's risk-return profile. Investors may need to reallocate funds periodically to maintain an optimal portfolio that aligns with their financial goals.

- MPT involves estimating expected returns and risks

Markowitz's work laid the foundation for models like CAPM and APT, refining our understanding of risk, return, and asset pricing and cementing MPT's role in modern finance. MPT represents a shift in investment management, providing a systematic and quantitative approach to portfolio selection. However, real-world applications of MPT face challenges, such as market volatility, unexpected economic shocks, and difficulties in accurately predicting future returns and correlations. Despite these limitations, Markowitz's framework remains one of the most widely used models in finance, influencing the development of passive investing, index funds, and asset allocation strategies. While no single model can fully predict or control market movements, MPT provides investors with a structured and logical approach to portfolio management. As financial markets evolve, new variations of portfolio theory continue to emerge, but Markowitz's

- MPT laid the groundwork for models like CAPM and APT

fundamental principles still serve as the backbone of modern investment strategies.

## 2.3.2 Sharpe's Single Index Model

Sharpe's Single Index Model (SIM), introduced by Nobel laureate William F. Sharpe in 1963, is an approach to understanding the relationship between individual security returns and market movements. By simplifying the complexities in portfolio analysis, the SIM provides investors with a practical tool for assessing risk and return. At its core, the Single Index Model explains that the return of a particular security is influenced by the overall market's performance and factors unique to that security. This relationship is mathematically represented as:

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

Where:

- $R_i$ denotes the return of security i.

- $\alpha_i$ represents the security's alpha, indicating its expected return independent of market movements.

- $\beta_i$ is the beta coefficient, measuring the sensitivity of the security's return to market returns.

- $R_m$ m signifies the return of the market index.

- $\epsilon_i$ captures the residual error, reflecting the unsystematic risk unique to the security.

This equation suggests that a security's return is a combination of its inherent performance $\left(\alpha_i\right.$ its reaction to market dynamics $\left(\beta_i R_m\right)$, and random factors specific to the firm $\left(\epsilon_i\right)$.

The SIM operates on several key assumptions:

- The model assumes a direct, linear correlation between a security's return and the market's return.

- It differentiates between systematic risk (market-related) and unsystematic risk (specific to the individual firm).

- All investors are presumed to share homogenous expectations regarding future returns and risks associated with securities.

**Sidebar notes:**

- SIM simplifies portfolio analysis by linking a security's return to market performance

- SIM states that a security's return is influenced by $\alpha_i$, $\beta_i R_m$, and $\epsilon_i$

• The sensitivity of a security's return to market movements $(\beta_i)$ is considered stable over time.

• The model assumes that trading occurs without incurring costs or tax implications.

A key aspect of the SIM is its distinction between two types of risks:

• Systematic Risk: This pertains to broader economic factors affecting all securities, such as changes in interest rates or inflation. The model quantifies this as $\beta_i^2 \sigma_m^2$, where $\sigma_m^2$ is the variance of the market returns.

• Unsystematic Risk: These are risks unique to a specific company, like management decisions or product recalls. Represented by $\sigma_{\epsilon_i}^2$, this risk can be mitigated through diversification.

The total variance of a security's return $(\sigma_i^2)$ is thus:

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

In constructing an optimal portfolio using the SIM, investors typically:

1. Determine each security's alpha $(\alpha_i)$, beta $(\beta_i)$, and unsystematic risk $(\sigma_{\epsilon_i}^2)$.

2. Calculate the excess return-to-beta ratio to prioritise securities offering higher returns relative to their systematic risk.

3. Identify a threshold where adding more securities does not proportionally enhance the portfolio's expected return.

4. Distribute investments based on the weights derived from the above analyses, ensuring diversification to minimise unsystematic risk.

By following this methodology, investors can develop portfolios that align with their risk tolerance and return objectives, using the information provided by Sharpe's Single Index Model.

Sharpe's Single Index Model is a valuable tool in modern portfolio management, offering a structured approach to assessing risk and return. By simplifying security analysis through a single market index, the model provides a practical

and efficient way to construct portfolios. It helps investors distinguish between systematic risk, which is natural to the market and cannot be diversified away, and unsystematic risk, which can be reduced through diversification. Despite its limitations, such as the assumption of a constant beta and the exclusion of other macroeconomic factors, the SIM remains widely used due to its efficiency and straightforward methodology. While the Single Index Model may not be a comprehensive solution for all investment scenarios, it remains a fundamental concept in security analysis. When combined with other analytical techniques and real-world market information, it serves as a powerful tool for investors looking to balance risk and return efficiently.

### 2.3.3 Treynor Ratio

Investment performance evaluation is a major aspect of portfolio management, as investors seek to maximise returns while managing risk effectively. One of the key measures used for assessing risk-adjusted performance is the Treynor Ratio, developed by American economist Jack L. Treynor in 1965. This helps investors understand how efficiently a portfolio generates returns relative to the market risk it undertakes. Unlike simple return metrics, the Treynor Ratio incorporates systematic risk, measured by beta, to evaluate the efficiency of an investment strategy. By considering market risk exposure, the Treynor Ratio provides a clearer picture of a portfolio's performance per unit of risk. This makes it especially valuable for comparing different investment portfolios and making strategic decisions. Investors often use this ratio to determine whether they are being adequately compensated for the risks associated with their investments. The Treynor Ratio is particularly useful for well-diversified portfolios, where unsystematic risk has been minimised, leaving only market-related risk as the primary factor affecting returns.

The Treynor Ratio is calculated using the following formula:

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

Where:

- $R_p$ = Return of the portfolio
- $R_f$ = Risk-free rate
- $\beta_p$ = Beta of the portfolio

- SIM simplifies portfolio construction

- Treynor Ratio assesses how efficiently a portfolio generates returns

The risk-free rate $(R_f)$ represents the return of an investment with zero risk, associated with government bonds or Treasury bills. The portfolio's beta $(\beta_p)$ measures its sensitivity to market movements, indicating how much the portfolio's returns are expected to fluctuate relative to the broader market. A higher Treynor Ratio suggests that the portfolio is delivering greater excess returns per unit of market risk, indicating more efficient performance. Conversely, a lower or negative Treynor Ratio implies that the portfolio is not adequately compensating for the level of risk assumed, signalling potential inefficiencies or underperformance.

**Example**

Consider two portfolios: Portfolio A and Portfolio B.

- **Portfolio A:**
- Return $(R_p)$: 10%
- Risk-free rate $(R_f)$: 2%
- Beta $(\beta_p)$: 1.2
- **Portfolio B:**
- Return $(R_p)$: 8%
- Risk-free rate $(R_f)$: 2%
- Beta $(\beta_p)$: 0.8

Calculating the Treynor Ratio for each:

- Portfolio **A:** $\dfrac{10\% - 2\%}{1.2} = \dfrac{8\%}{1.2} = 6.67\%$

- Portfolio **B:** $\dfrac{8\% - 2\%}{0.8} = \dfrac{6\%}{0.8} = 7.5\%$

Despite Portfolio A having a higher absolute return, Portfolio B exhibits a higher Treynor Ratio, indicating it provides better risk-adjusted returns relative to its market risk.

The Treynor Ratio serves as a tool for portfolio managers,

investors, and analysts who seek to measure the risk-adjusted return of an investment portfolio. By focusing exclusively on systematic risk (beta), the Treynor Ratio helps assess whether a portfolio adequately rewards investors for the market risk it assumes. A higher Treynor Ratio indicates a better risk-return trade-off, whereas a lower ratio suggests that the portfolio may not be adequately compensating investors for the risks undertaken. However, while the Treynor Ratio is a useful tool for evaluating diversified portfolios, it has certain limitations. It does not account for unsystematic risk, which could be a key factor in portfolios that are not well-diversified. Additionally, as it depends on historical data for beta and returns, its predictive power is limited in dynamic market conditions. Despite these drawbacks, the Treynor Ratio remains a widely used and respected metric in the field of security analysis and portfolio management. When used alongside other performance measures, such as the Sharpe Ratio and Jensen's Alpha, it provides investors with a complete view of portfolio performance. The Treynor Ratio helps investors make strategic and risk-conscious decisions, enhancing portfolio management and long-term financial success.

### 2.3.3.1 Treynor Ratio vs. Sharpe Ratio

While both the Treynor Ratio and the Sharpe Ratio are used to evaluate risk-adjusted returns, they differ in their treatment of risk components.

- **Treynor Ratio:** Focuses solely on systematic risk (beta), making it particularly useful for well-diversified portfolios where unsystematic risk is minimal.

- **Sharpe Ratio:** Considers total risk, encompassing both systematic and unsystematic risks, by using standard deviation as the risk measure.

The choice between these ratios depends on the portfolio's diversification level and the specific risk factors an investor aims to assess.

| Feature | Treynor Ratio | Sharpe Ratio |
| --- | --- | --- |
| Risk Considered | Market risk (Beta) | Total risk (Standard Deviation) |

- Treynor Ratio measures risk-adjusted returns based on systematic risk

- The choice depends on portfolio diversification and the specific risks an investor wants to assess.

| | | |
|---|---|---|
| Best for | Well-diversified portfolios | Any portfolio, diversified or not |
| Measures | Return per unit of systematic risk | Return per unit of total risk |
| Applicability | More suitable for comparing different diversified portfolios | Useful for comparing portfolios regardless of diversification level |
| Risk Metric Used | Beta (Sensitivity to market movements) | Standard deviation (Overall volatility) |
| Use Case | Investors evaluating market risk-adjusted returns | Investors considering total volatility of returns |

• Treynor Ratio suits well-diversified portfolios, while the Sharpe Ratio is ideal for less diversified portfolios

• Sharpe Ratio is more practical

Neither the Treynor Ratio nor the Sharpe Ratio is superior; rather, their usefulness depends on the investment context and the type of risk an investor prioritises. For institutional investors and fund managers handling large, well-diversified portfolios, the Treynor Ratio is a better metric as it isolates market risk and provides a clearer picture of how well the portfolio is rewarded for its exposure to market movements. For individual investors or those managing portfolios that are not fully diversified, the Sharpe Ratio is more practical since it accounts for total risk and provides a more complete risk-return assessment. In practice, many investors use both ratios to gain a clear understanding of their investment performance, ensuring that they are making informed, strategic, and well-balanced investment decisions.

## Summarised Overview

MPT revolutionised investment and risk management by introducing the concept of portfolio diversification. Before MPT, investors primarily focused on individual securities without considering their interaction within a portfolio. Markowitz demonstrated that investors should evaluate investments collectively, maximising returns for a given risk level or minimising risk for a specific expected return. The theory emphasises statistical properties such as expected returns, variance (risk measure), and asset return correlation. By diversifying assets with low or negative correlation, overall portfolio risk can be reduced without necessarily compromising returns. The core principles of MPT include risk and return assessment, diversification, the efficient frontier, and optimal portfolio selection. The expected return of a portfolio is a weighted sum of individual asset returns, while portfolio risk is determined using a variance-covariance matrix.

Sharpe's Single Index Model (SIM), developed by William Sharpe in 1963, simplifies portfolio analysis by establishing a linear relationship between a security's return and market movements. The model breaks down risk into systematic (market-related) and unsystematic (firm-specific) risk, emphasising diversification to minimise unsystematic risk. SIM assumes homogeneous investor expectations, stable beta coefficients, and negligible transaction costs. The model assists investors in portfolio construction by ranking securities based on the excess return-to-beta ratio and allocating investments accordingly.

The Treynor Ratio, introduced by Jack L. Treynor in 1965, is a key performance metric for evaluating portfolios based on risk-adjusted returns. Unlike simple return measures, the Treynor Ratio considers systematic risk, making it useful for comparing different investment strategies. The formula incorporates the portfolio's return, risk-free rate, and beta, helping investors determine if they are being adequately compensated for the risk undertaken. The Treynor Ratio is particularly valuable for well-diversified portfolios where market risk is the primary determinant of returns.

## Assignments

1. Critically analyse Markowitz Portfolio Theory.
2. Discuss Sharpe's Single Index Model.
3. Explain about the Treynor Ratio.

## Suggested Reading

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4. Sharpe, W. F. (1963). *A Simplified Model for Portfolio Analysis. Management Science,* 9(2), 277-293.

5. Treynor, J. L. (1965). *How To Rate Management of Investment Funds. Harvard Business Review,* 43(1), 63-75.

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Learners are encouraged to develop objective questions based on the content in the paragraph as a sign of their comprehension of the content. The Learners may reflect on the recap bullets and relate their understanding with the narrative in order to frame objective questions from the given text. The University expects that 1 - 2 questions are developed for each paragraph. The space given below can be used for listing the questions.

# PORTFOLIO STRATEGIES AND INDEX CONSTRUCTION

## Learning Outcomes

After completing this unit, learners will be able to:

- understand the concept of passive equity portfolio management

- discuss different index portfolio construction techniques

- know the concept of tracking error

## Background

Imagine you are on a road trip to a destination you have never visited before. You have two choices: you can either take the wheel, navigate unknown roads, and make decisions at every turn, or you can rely on a GPS that guides you along the most efficient route. While the first option gives you complete control, it also comes with uncertainties and the risk of making wrong turns. The second option, though less adventurous, ensures a smoother and more predictable journey. Investing in the stock market presents a similar choice. Some investors actively seek opportunities, frequently buying and selling stocks in an effort to outperform the market. Others prefer to take a structured approach, following a well-defined index that reflects the overall market's performance. This is known as Passive Equity Portfolio Management, a strategy designed to provide steady returns by mimicking a benchmark index rather than trying to outguess the market. Just as a GPS calculates the best route, passive investors use index portfolio construction techniques to create well-diversified portfolios that align with market indices. However, even in a passive strategy, there can be slight deviations from the index, measured by a concept called tracking error. Understanding these techniques and how closely a portfolio follows its benchmark is crucial for evaluating its effectiveness.

## Keywords

## Discussion

### 2.4.1 Passive Equity Portfolio Management Strategy

- Passive equity portfolio management replicates a market index

Passive equity portfolio management is an investment approach that aims to replicate the performance of a stock market index, such as the S&P 500 or FTSE 100, rather than outperforming it through active stock selection. This strategy is grounded in the belief that markets are generally efficient, making it challenging to consistently achieve higher returns than the overall market. By copying the holdings of a chosen index, investors can achieve market returns while benefiting from lower costs and reduced portfolio turnover. There are several methods to implement a passive equity portfolio management strategy.

1. **Index Funds:** These mutual funds aim to replicate the returns of a specific index by purchasing securities in the same proportions as the index. This approach offers investors broad market exposure with relatively low management fees.

- Uses methods like index funds, ETFs, and index derivatives to replicate market indices

2. **Exchange-Traded Funds (ETFs):** ETFs are open-ended funds traded on public exchanges. They track specific indices and provide investors with the flexibility of trading like individual stocks, combined with the diversification benefits of mutual funds. ETFs generally have lower expense ratios than actively managed funds.

3. **Index Futures and Options:** Investors can use futures contracts or options based on stock market indices to gain exposure to market movements. These derivatives enable strategic positioning but come with increased complexity and risk due to market fluctuations and leverage effects.

To effectively track an index, passive managers employ various replication techniques as follows.

- **Full Replication:** This method involves holding all the securities in the index in proportion to their weights. While it ensures close tracking, it can be costly and impractical for indices with a large number of constituents.

- **Stratified Sampling:** Managers select a representative sample of securities from different sectors or segments of the index. This approach reduces transaction costs while aiming to maintain the index's overall characteristics.

- **Optimisation:** Advanced mathematical models are used to construct a portfolio that closely matches the index's performance with a limited number of securities. This technique seeks to minimise tracking errors while considering constraints like liquidity and transaction costs.

**Advantages of Passive Equity Portfolio Management**

- **Cost Efficiency:** Passive strategies typically incur lower management fees due to minimal trading activity and the absence of active research expenses.

- **Transparency:** Investors have clear visibility into the holdings of index funds or ETFs, as these are designed to mirror the underlying index.

- **Diversification:** By replicating an index, investors gain exposure to a broad range of securities, reducing unsystematic risk associated with individual stocks.

- **Performance Consistency:** Passive strategies aim to match market returns, eliminating the risk of underperformance relative to the benchmark.

Passive equity portfolio management offers a straightforward and cost-effective approach to investing by aligning portfolios with specific market indices. This strategy provides broad market exposure, reduced costs, and consistent performance relative to the chosen benchmark. However, investors should carefully consider their individual financial goals, risk tolerance, and investment horizons when deciding if a passive approach aligns with their objectives.

## 2.4.2 Portfolio Construction Techniques

Portfolio construction is an aspect of investment management that involves selecting a mix of financial assets to optimise returns while managing risk. Investors, whether individuals or institutions, seek to create portfolios that align with their

**Sidebar notes:**

- Passive managers use full replication, stratified sampling, and optimisation techniques

- Replicating market indices with minimal trading and research expenses

- Passive equity portfolio management aligns portfolios with market indices

financial goals, risk tolerance, investment horizon, and market outlook. Portfolio construction is both an art and a science, balancing theoretical models with practical considerations. A well-constructed portfolio is designed to achieve diversification, minimise risk exposure, and maximise potential returns under varying market conditions. The fundamental principle behind portfolio construction is that different asset classes, such as equities, bonds, commodities, and alternative investments, respond differently to economic cycles and market fluctuations. By strategically allocating investments across these assets, investors can increase returns while reducing overall portfolio risk. Various techniques have been developed to construct and manage investment portfolios effectively. These range from traditional asset allocation methods, such as strategic and tactical asset allocation, to more advanced approaches like risk parity, factor-based investing, and machine learning-driven techniques. Each of these methods has its advantages and is suitable for different types of investors, depending on their risk appetite and return expectations.

**The Portfolio Construction techniques are:**

1. **Strategic Asset Allocation (SAA)**: SAA involves setting long-term target allocations for various asset classes based on an investor's risk tolerance, investment horizon, and financial goals. This approach maintains these allocations over time, with periodic rebalancing to correct market movements that may have caused drift from the original targets.

2. **Tactical Asset Allocation (TAA):** TAA allows for short-term adjustments to asset allocations based on market conditions or economic outlooks. Investors may temporarily overweight or underweight certain asset classes to capitalise on perceived opportunities, aiming to increase returns or reduce risks.

3. **Risk Parity:** This technique allocates capital based on the risk contribution of each asset class, aiming for each to contribute equally to the portfolio's overall risk. By balancing risk rather than capital, risk parity seeks to achieve more stable returns across varying market environments.

4. **Diversification:** Diversification spreads investments across various asset classes, sectors, and geographies to reduce exposure to any single risk factor. A well-diversified portfolio can reduce the impact of

- Portfolio construction involves selecting a mix of assets to optimise returns and manage risk

- Each methods has its advantages and is suitable for different types of investors

underperformance in any one area, thereby improving the potential for stable returns.

5. **Factor-Based Investing:** This approach involves selecting securities based on specific characteristics or 'factors' that have been historically associated with higher returns, such as value, momentum, or low volatility. By targeting these factors, investors aim to achieve better risk-adjusted returns.

6. **Hierarchical Risk Parity (HRP):** HRP employs machine learning techniques, such as hierarchical clustering, to construct diversified portfolios. By understanding the hierarchical structure of asset correlations, HRP aims to create more robust portfolios that can outperform traditional mean-variance optimisation methods.

7. **Black-Litterman Model:** This sophisticated model combines investor views with market equilibrium to determine optimal asset allocation. By integrating subjective expectations with objective market data, the Black-Litterman Model helps in constructing portfolios that reflect both personal information and broader market conditions.

8. **Risk Budgeting:** Risk budgeting involves allocating risk, rather than capital, across various components of a portfolio. By setting risk limits for different asset classes or strategies, investors can control the overall risk profile and ensure that no single investment disproportionately affects the portfolio's performance.

9. **Active vs. Passive Management:** Active management means selecting securities with the goal of outperforming the market, relying on research and analysis. Passive management, on the other hand, aims to copy the performance of a specific index or benchmark, offering lower costs and broad market exposure. The choice between active and passive strategies depends on the investor's objectives, beliefs about market efficiency, and cost considerations.

10. **Rebalancing:** Regular rebalancing involves adjusting the portfolio back to its target asset allocation to maintain the desired risk and return characteristics. This process addresses the changes in asset values over time and ensures alignment with the investor's strategic objectives.

- Portfolio construction techniques aim to optimise returns while managing risk

Portfolio construction is a dynamic and evolving process that requires careful planning, regular monitoring, and periodic rebalancing to ensure that the investment strategy remains aligned with an investor's financial objectives. The success of a portfolio lies not just in its construction but in its ongoing management. Regular rebalancing, risk assessment, and performance reviews are essential to adapting to market changes and achieving consistent, long-term investment growth. By applying a well-structured approach to portfolio construction, investors can navigate market uncertainties, reduce risks, and increase the potential for sustainable wealth creation.

### 2.4.3 Tracking Error

Tracking error is a fundamental concept in portfolio management that measures how closely an investment portfolio follows the performance of a benchmark index. It is particularly relevant for passive investment strategies, such as index funds and exchange-traded funds (ETFs), which aim to replicate the returns of a specific index. A lower tracking error indicates that the portfolio is effectively copying the benchmark, while a higher tracking error suggests deviations due to factors such as fees, trading strategies, and market conditions. Tracking error is a key metric for both investors and fund managers. For investors, it provides insight into the consistency and reliability of a fund in delivering benchmark-matching returns. For fund managers, it serves as an essential tool to assess and refine portfolio strategies. While passive funds attempt to minimise tracking errors to ensure alignment with the index, actively managed funds may accept or even seek tracking errors in pursuit of higher returns. Understanding tracking errors helps investors make informed decisions about risk, fund selection, and the efficiency of different investment strategies. Tracking error is commonly defined as the standard deviation of the difference between a portfolio's returns and the returns of its benchmark over a specified period.

Several factors influence tracking error. They are as follows.

1. **Management Fees and Expenses:** Costs associated with managing the portfolio can cause its performance to lag behind the benchmark, leading to tracking errors.

2. **Cash Flows:** Inconsistent timing of investor contributions and withdrawals can disrupt the portfolio's

alignment with the benchmark.

3. **Dividend Reinvestment:** Delays or differences in reinvesting dividends compared to the benchmark can result in performance discrepancies.

4. **Rebalancing Practices:** The frequency and methodology of rebalancing the portfolio to match the benchmark can introduce tracking errors.

5. **Sampling Methods:** Some portfolios use a representative sample of the benchmark's securities rather than full replication, which can lead to differences in performance.

6. **Corporate Actions:** Events like mergers, acquisitions, or spin-offs affecting securities in the benchmark may not be immediately mirrored in the portfolio, causing deviations.

- Effective management practices align portfolio performance with the benchmark

A low tracking error is generally desirable for passive investment strategies, as it indicates that the portfolio closely follows its benchmark, providing investors with the expected market exposure. Conversely, a high tracking error suggests that the portfolio's returns are more volatile relative to the benchmark, which may be acceptable or even sought after in actively managed funds aiming to outperform the index. However, for passive funds, a high tracking error could signal inefficiencies in portfolio management. To minimise tracking errors, portfolio managers can adopt several practices.

- Managers can improve the portfolio's efficiency

- **Full Replication:** Holding all the securities in the benchmark index in the same proportions can help ensure close tracking.

- **Optimised Sampling:** When full replication is impractical, selecting a representative sample of securities that closely matches the benchmark's characteristics can be effective.

- **Efficient Rebalancing:** Regularly adjusting the portfolio to reflect changes in the benchmark while considering transaction costs can help maintain alignment.

- Strategies reinforce portfolio efficiency and minimise tracking error

- **Cost Management:** Keeping management fees and other expenses low, can reduce their impact on tracking errors.

Understanding and managing tracking errors is essential for portfolio managers, particularly those overseeing passive

- Managing factors like fees and rebalancing optimises performance and risk-adjusted returns

investment strategies. By closely monitoring the factors that contribute to tracking error and implementing strategies to reduce its impact, managers can ensure that their portfolios effectively replicate the desired benchmarks, providing investors with predictable and reliable returns. Tracking error is an essential metric in portfolio management, providing valuable information about how consistently an investment portfolio mirrors its benchmark. A clear understanding of tracking errors enables investors to evaluate fund performance and select the right investment vehicles based on their risk tolerance and return expectations. For passive funds, minimising tracking error is key to ensure alignment with the benchmark. In contrast, actively managed funds may embrace some level of tracking error to generate excess returns. By effectively managing the factors that contribute to tracking errors, such as fees, trading strategies, and rebalancing practices, portfolio managers can optimise performance and ensure better risk-adjusted returns for investors.

## Summarised Overview

Passive equity portfolio management is an investment strategy aimed at replicating the performance of a specific stock market index rather than outperforming it. This strategy operates under the assumption that markets are generally efficient, making it difficult to consistently achieve higher returns. The primary methods used to implement passive equity management include index funds, exchange-traded funds (ETFs), and derivatives such as index futures and options. These investment vehicles offer advantages such as lower costs, transparency, diversification, and consistent performance relative to the benchmark.

Portfolio construction is a major component of investment management, involving the selection of assets to optimise returns while managing risk. Various techniques are used to construct portfolios, including strategic and tactical asset allocation, risk parity, diversification, factor-based investing, hierarchical risk parity, and the Black-Litterman Model. Strategic asset allocation (SAA) focuses on maintaining fixed asset allocations over time, whereas tactical asset allocation (TAA) allows for short-term adjustments based on market conditions. Risk parity allocates investments based on their risk contribution, while factor-based investing selects securities based on characteristics like value and momentum. More advanced techniques, such as hierarchical risk parity and the Black-Litterman Model, integrate data-driven insights and investor expectations into portfolio construction. Regular rebalancing is essential to maintain the desired risk-return profile.

Tracking error is a key metric in portfolio management that measures how closely an investment portfolio follows its benchmark. A lower tracking error indicates effective replication, whereas a higher tracking error suggests deviations caused by factors such as management fees, cash flows, dividend reinvestment, and sampling methods. To minimise tracking error, portfolio managers may employ strategies such as full replication, optimised sampling, efficient rebalancing, and cost management. Understanding tracking error is critical for evaluating fund performance, particularly for passive funds that aim to align closely with a benchmark.

## Assignments

1. Discuss the passive equity portfolio management.
2. Analyse the role of portfolio construction techniques.
3. Explain the significance of tracking error. Support your discussion with a relevant example.

## Suggested Reading

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സർവ്വകലാശാലാഗീതം

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വിദ്യയാൽ സ്വതന്ത്രരാകണം
വിശ്വപൗരരായി മാറണം
ഗ്രഹപ്രസാദമായ് വിളങ്ങണം
ഗുരുപ്രകാശമേ നയിക്കണേ

കൂരിരുട്ടിൽ നിന്നു ഞങ്ങളെ
സൂര്യവീഥിയിൽ തെളിക്കണം
സ്നേഹദീപ്തിയായ് വിളങ്ങണം
നീതിവൈജയന്തി പാറണം

ശാസ്ത്രവ്യാപ്തിയെന്നുമേകണം
ജാതിഭേദമാകെ മാറണം
ബോധരശ്മിയിൽ തിളങ്ങുവാൻ
ജ്ഞാനകേന്ദ്രമേ ജ്വലിക്കണേ

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SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

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