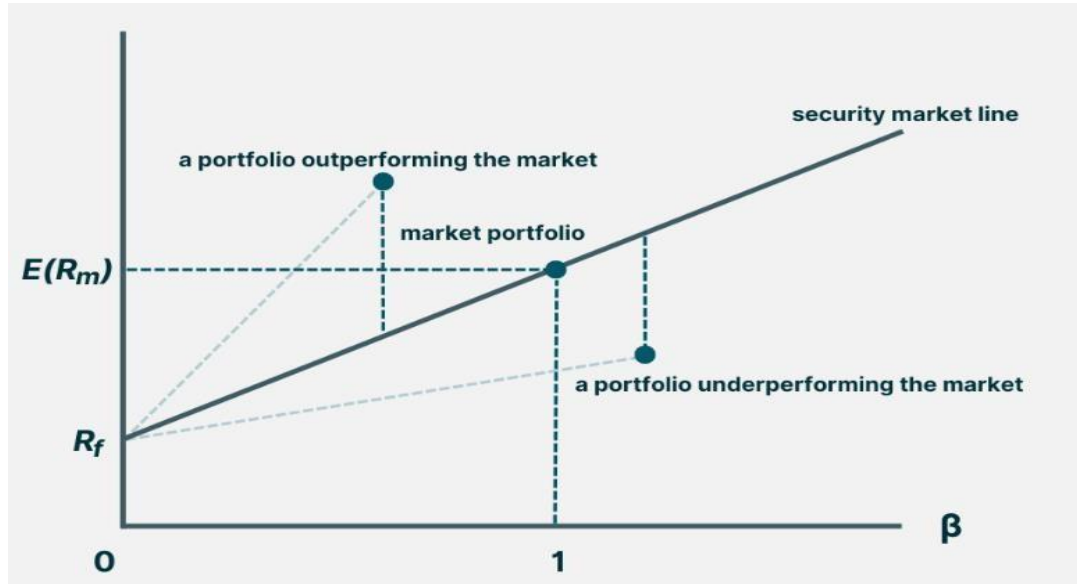# UNIT-4

CAPM

The **Capital Asset Pricing Model (CAPM)** is a cornerstone in modern financial theory. It provides a framework for understanding the relationship between risk and expected return, helping investors and firms make informed decisions about investments and pricing.

Key Formula:

$$ER_i = R_f + \beta_i(ER_m - R_f)$$

where:

ER_i = expected return of investment

R_f = risk-free rate

β_i = beta of the investment

$(ER_m - R_f)$ = market risk premium

Assumptions

- **Investors are rational and risk-averse**:
  - Rationality ensures that decisions aim to optimize returns for a given level of risk.
  - Risk aversion means investors prefer safer investments unless adequately compensated for taking on more risk.
- **Markets are efficient**:
  - Prices instantly adjust to reflect all available information.
  - No investor can consistently "beat the market" through strategies like stock-picking or timing.
- **No transaction costs or taxes**:
  - Simplifies calculations by assuming ideal conditions where investment decisions are uninfluenced by costs.
- **Diversified portfolios**:
  - Only market risk (systematic risk) matters, as diversifiable risks are eliminated in a properly diversified portfolio.

- o The "market portfolio" is considered the benchmark.
- **Risk-free borrowing and lending**:
  - o Investors can leverage or invest in risk-free assets at a uniform rate, simplifying modeling of returns and portfolio construction.

Practical Applications of CAPM

- **Portfolio Management**:
  - o Guides investors in balancing risk and return, aiding in the construction of optimal portfolios.
- **Cost of Equity Calculation**:
  - o A critical component in determining a company's cost of capital, especially for discounted cash flow (DCF) valuation.
- **Security Pricing**:
  - o Helps identify whether a security is overvalued or undervalued based on its expected return compared to its risk.

MULTIPLE FACTOR MODELS

APT

The **Arbitrage Pricing Theory (APT)** is an alternative to the Capital Asset Pricing Model (CAPM) that provides a more flexible framework for understanding asset pricing. It was developed by economist Stephen Ross in 1976 and is based on the idea that asset returns can be explained by multiple macroeconomic or firm-specific factors.

Applications of APT

- **Asset Pricing**:
  - o APT helps explain variations in asset returns using multiple risk factors.
- **Portfolio Management**:
  - o Guides diversification strategies by identifying key risk drivers.
- **Arbitrage Opportunities**:
  - o Highlights mispricing that can be exploited for profit.

APT v/s CAPM

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

Aspect	Arbitrage Pricing Theory (APT)	Capital Asset Pricing Model (CAPM)
Definition	A multi-factor model that explains asset returns using multiple macroeconomic or firm-specific factors.	A single-factor model that explains asset returns based on their sensitivity to market risk (beta).
Risk Factors	Uses multiple risk factors such as inflation, interest rates, GDP growth, and others relevant to the asset.	Considers only one risk factor: the asset's sensitivity to market movements (systematic risk).
Focus	Explains returns based on multiple economic and market factors.	Explains returns based on market risk (beta) only.

Assumptions	- No arbitrage opportunities exist. - Returns are linear with respect to the chosen factors. - Investors consider multiple risk factors.	- Investors are risk-averse and seek to maximize utility. - The market is efficient. - All investors hold the market portfolio.
Number of Factors	Multiple factors, determined empirically or based on economic theory.	A single factor, the market portfolio (beta).
Flexibility	Flexible and can accommodate different factors for different assets.	Inflexible, assumes all returns are driven by market risk.
Ease of Use	More complex, requires identifying and estimating multiple factors and sensitivities.	Simpler, as it only involves estimating beta.
Application	Used in advanced financial modeling, especially where specific factors are known to influence returns.	Commonly used in basic portfolio theory and to estimate cost of equity.

MUTUAL FUNDS

A **mutual fund** is a professionally managed investment vehicle that pools money from multiple investors to create a diversified portfolio of stocks, bonds, or other securities. Each investor holds shares representing proportional ownership of the fund's holdings. Mutual funds aim to provide individual investors with access to diversified investments, reducing risk compared to holding individual securities. Most mutual funds are **open-ended**, meaning they issue new shares as investors buy in and redeem shares when investors sell.

CLASSIFICATION OF MUTUAL FUND SCHEME BY STRUCTURE AND OBJECTIVE

1. **Classification by Structure**
a. **Open-Ended Funds**
   - **Definition**: Investors can buy or sell units at any time without a fixed maturity period.
   - **Features**:
     o High liquidity; units can be redeemed at prevailing Net Asset Value (NAV).
     o Suitable for investors seeking flexibility.
   - **Examples**: Equity funds, debt funds, hybrid funds.
b. **Closed-Ended Funds**
   - **Definition**: Units can only be bought during the initial offer period and redeemed at the fund's maturity.
   - **Features**:
     o Fixed maturity period (e.g., 3, 5, or 10 years).
     o Units may be traded on stock exchanges.
   - **Examples**: Fixed maturity plans (FMPs).
c. **Interval Funds**
   - **Definition**: A hybrid of open-ended and closed-ended funds, allowing buying or selling at specific intervals.
   - **Features**:
     o Units can be purchased or redeemed only during predefined windows.
     o Suitable for investors with semi-flexible liquidity needs.
2. **Classification by Investment Objective**
a. **Growth Funds**
   - **Objective**: Capital appreciation over the long term by investing in equities.

- **Target Audience**: Investors with high risk tolerance and a long-term horizon.
- **Examples**: Equity funds, sectoral funds.

b. **Income Funds**
   - **Objective**: Provide regular income by investing in debt securities like bonds.
   - **Target Audience**: Conservative investors seeking stable returns.
   - **Examples**: Debt funds, bond funds.

c. **Balanced Funds (Hybrid Funds)**
   - **Objective**: Offer a mix of growth and income by investing in both equities and bonds.
   - **Target Audience**: Moderate risk investors looking for a balanced risk-return profile.
   - **Examples**: Balanced funds, target-date funds.

d. **Tax-Saving Funds (ELSS)**
   - **Objective**: Provide tax benefits under Section 80C while generating returns through equity investments.
   - **Target Audience**: Investors seeking tax-saving opportunities with potential for long-term growth.
   - **Example**: Equity Linked Savings Scheme (ELSS).

e. **Money Market Funds**
   - **Objective**: Preserve capital and provide short-term liquidity by investing in money market instruments.
   - **Target Audience**: Investors looking for low-risk, short-term parking of funds.
   - **Examples**: Treasury bills, certificates of deposit.

f. **Index Funds**
   - **Objective**: Mimic the performance of a specific market index (e.g., S&P 500, Nifty 50).
   - **Target Audience**: Passive investors aiming for market-linked returns at lower costs.

g. **Sector or Thematic Funds**
   - **Objective**: Focus on specific sectors or themes like technology, healthcare, or infrastructure.
   - **Target Audience**: Investors with a strong belief in the growth of specific industries or themes.
   - **Examples**: Technology funds, renewable energy funds.

ADVANTAGES AND DISADVANTAGES

Advantages of Mutual Funds

1. **Diversification**: Reduces the impact of individual security performance on overall returns.
2. **Professional Management**: Managed by experts who monitor markets and make informed investment decisions.
3. **Liquidity**: Investors can buy or sell shares easily in open-ended funds.
4. **Affordability**: Allows small investors to access diversified portfolios.
5. **Transparency**: Regular disclosures about portfolio holdings and performance.

Limitations of Mutual Funds

1. **Management Fees**: Charges like expense ratios can reduce net returns.
2. **Lack of Control**: Investors have no direct say in individual investment choices.
3. **Market Risk**: Returns depend on market performance and may not be guaranteed.
4. **Tax Implications**: Distributions can lead to taxable events even if the investor doesn't sell shares.

INVESTING THROUGH MUTUAL FUNDS

1. **Define Your Financial Goals**
   - Determine your investment objectives (e.g., saving for retirement, buying a house, children's education).
   - Identify your risk tolerance (low, moderate, or high).

2. **Choose the Right Type of Mutual Fund**
   - **Equity Funds**: Ideal for long-term capital appreciation.
   - **Debt Funds**: Suitable for income generation and lower risk.

- **Hybrid Funds**: Balance growth and stability by investing in both equities and bonds.
3. **Select a Fund**
   - Research funds based on past performance, expense ratios, and fund manager expertise.
   - Compare funds within the same category to choose the most suitable one.
4. **Decide on the Investment Mode**
   - **Lump-Sum Investment**: Invest a large amount at once.
   - **Systematic Investment Plan (SIP)**: Invest small amounts regularly, reducing the impact of market volatility through rupee cost averaging.
5. **Open an Account**
   - Register with a mutual fund company, online investment platform, or financial advisor.
   - Complete the Know Your Customer (KYC) process.
6. **Monitor and Review**
   - Regularly review the performance of your mutual fund to ensure it aligns with your goals.
   - Rebalance your portfolio if necessary.

Beta and Its Role in Portfolio Risk and Return

What is Beta?

- **Beta (β)** is a measure of an asset or portfolio's sensitivity to movements in the overall market.
- It quantifies **systematic risk**, which is the inherent market risk that cannot be mitigated through diversification.
- Beta is integral to the **Capital Asset Pricing Model (CAPM)**, which estimates the expected return of an asset based on its beta and market risk premium.

Interpreting Beta Values

a. **β = 1**:
   a. The asset's returns move in tandem with the market.
   b. If the market changes by 1%, the asset is expected to change by the same percentage.
b. **β > 1**:
   a. The asset is more volatile than the market.
   b. Example: If β = 1.5, a 1% increase in the market leads to a 1.5% increase in the asset's returns.
c. **β < 1 (but > 0)**:
   a. The asset is less volatile than the market, offering relative stability.
   b. Example: If β = 0.8, a 1% market increase results in a 0.8% increase in the asset's returns.
d. **β = 0**:
   a. The asset is uncorrelated with the market.
   b. Example: Cash or risk-free securities have a beta of 0.
e. **β < 0**:
   a. The asset moves inversely to the market.
   b. Example: Some hedging instruments like gold or inverse ETFs.

Role of Beta in Portfolio Risk

1. **Measuring Systematic Risk**:
   a. Beta helps investors evaluate how much of a portfolio's risk is due to overall market movements.
   b. It is crucial for understanding how the portfolio might respond to changes in the market.
2. **Portfolio Diversification**:
   a. Combining assets with varying beta values allows investors to balance risk:
      i. **High-beta assets**: Suitable for higher growth potential in bullish markets.
      ii. **Low-beta assets**: Add stability during volatile or bearish market conditions.
3. **Volatility Management**:

a. The **overall portfolio beta** is calculated as the weighted average of individual asset betas.
b. Investors can adjust portfolio beta to align with their **risk appetite**:
    i. High-beta portfolios for aggressive investors.
    ii. Low-beta portfolios for conservative investors.

Role of Beta in Portfolio Return:

1. **Expected Return Calculation:**
   - Using CAPM, beta helps calculate the **expected return**
   - Higher beta leads to higher expected returns due to increased exposure to market risk.

2. **Risk-Reward Trade-Off:**

   - High-beta portfolios carry greater risk but offer potential for higher returns.
   - Low-beta portfolios are safer but may yield lower returns.

3. **Market Predictions:**

   - Beta helps predict how much a portfolio or asset is likely to gain or lose in response to market changes.