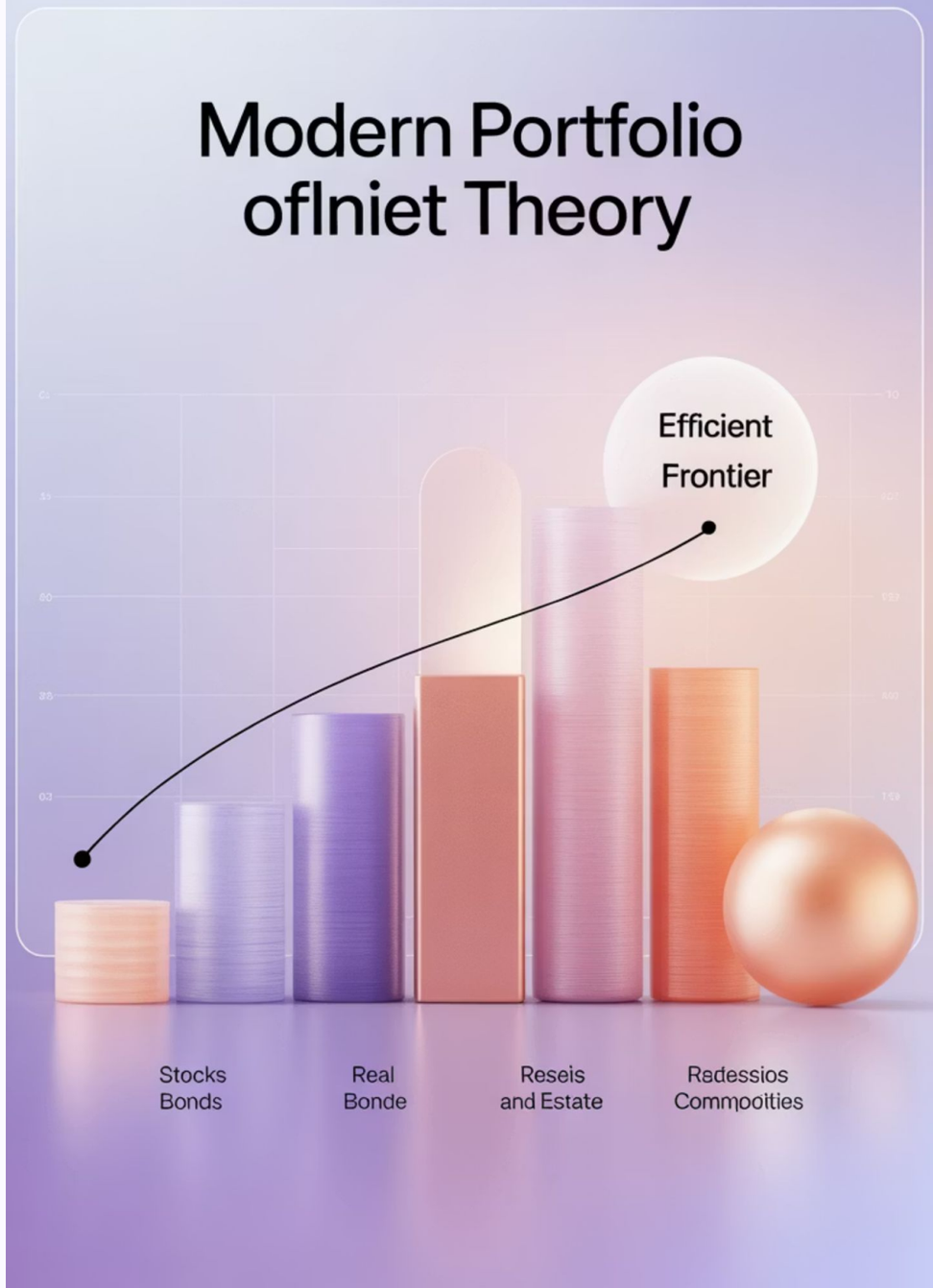
Portfolio Theory and Asset Allocation

Welcome to week 5. This presentation explores the fundamentals of Modern Portfolio Theory and effective asset allocation strategies. We'll examine how diversification works to reduce risk, understand the mathematics behind portfolio construction, and review practical examples of well-designed portfolios.



Introduction to Modern Portfolio Theory

Modern Portfolio Theory (MPT), developed by Harry Markowitz in 1952, revolutionized investment management by providing a framework for maximizing returns for a given level of risk.

Key principles of MPT include:

Risk and Return Relationship

Investors require higher expected returns to compensate for taking on additional risk

Portfolio Diversification

Combining assets with different correlation patterns can reduce overall portfolio risk

Efficient Portfolios

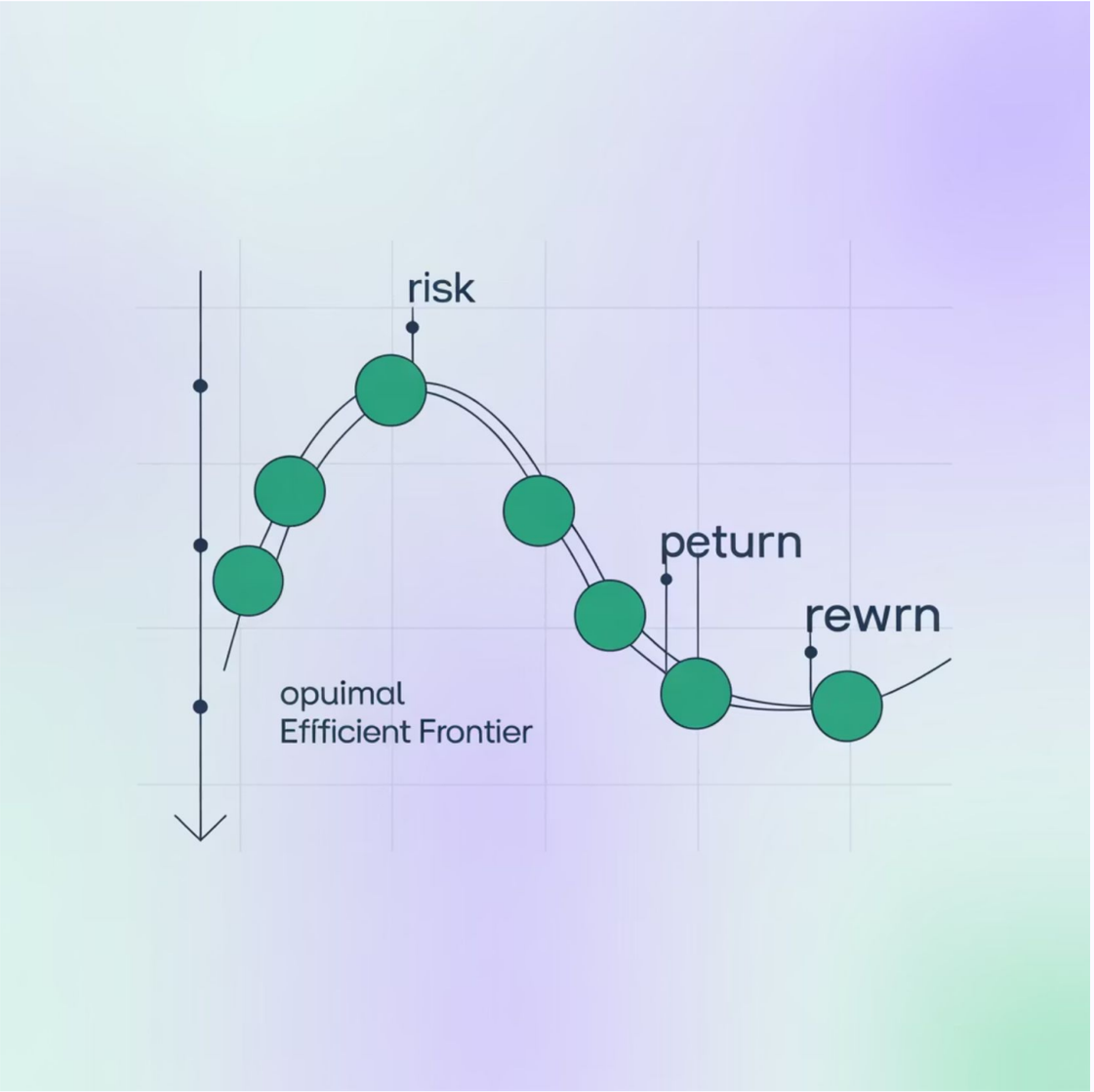
An optimal portfolio maximizes expected return for a given level of risk

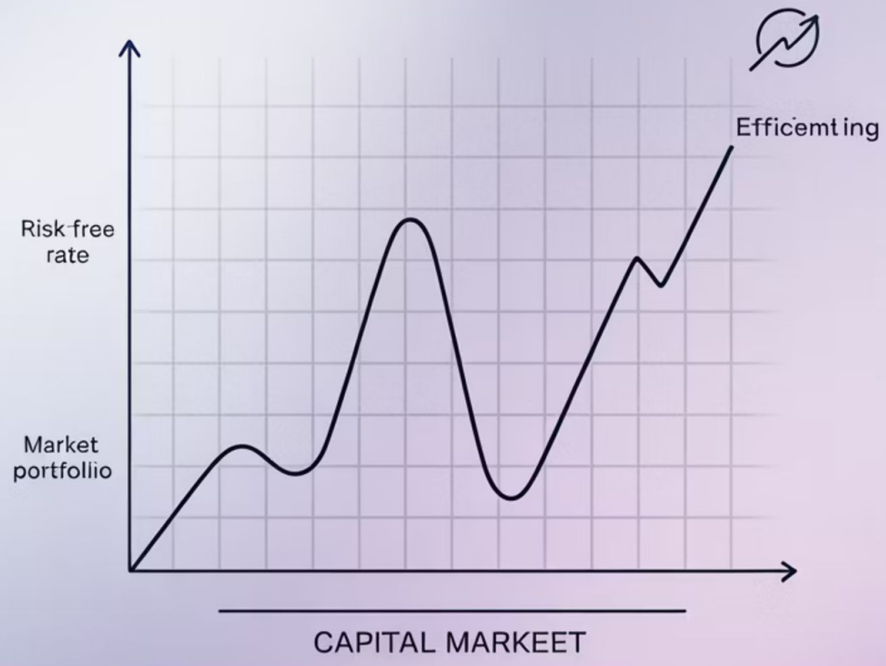
The Efficient Frontier Explained

The Efficient Frontier represents the set of optimal portfolios that offer the highest expected return for a defined level of risk, or the lowest risk for a given level of expected return.

Each point on the curve represents a portfolio with a specific asset allocation. Portfolios below the curve are suboptimal, while portfolios above the curve are theoretically impossible to construct.

The shape of the frontier demonstrates how diversification can improve the risk-return profile beyond what individual assets can achieve alone.





Capital Market Line and Optimal Portfolio

The Capital Market Line (CML) represents the risk-return tradeoff when a risk-free asset is combined with the market portfolio.

Risk-Free Asset

Treasury bills or other guaranteed investments with zero risk

Market Portfolio

The tangency portfolio on the efficient frontier that maximizes the Sharpe ratio

Optimal Portfolio

The combination of risk-free asset and market portfolio that best matches an investor's risk tolerance

Asset Allocation Strategies

Strategic Asset Allocation

Long-term approach based on expected returns, risk tolerance, and time horizon

- Set target allocations for each asset class
- Periodic rebalancing to maintain targets
- Typically reviewed annually or after major life events

Tactical Asset Allocation

Medium-term adjustments to take advantage of market conditions

- Temporary deviations from strategic allocation
- Based on market forecasts and valuation metrics
- Aims to enhance returns or reduce risk

Dynamic Asset Allocation

Continuous portfolio adjustments based on changing market conditions

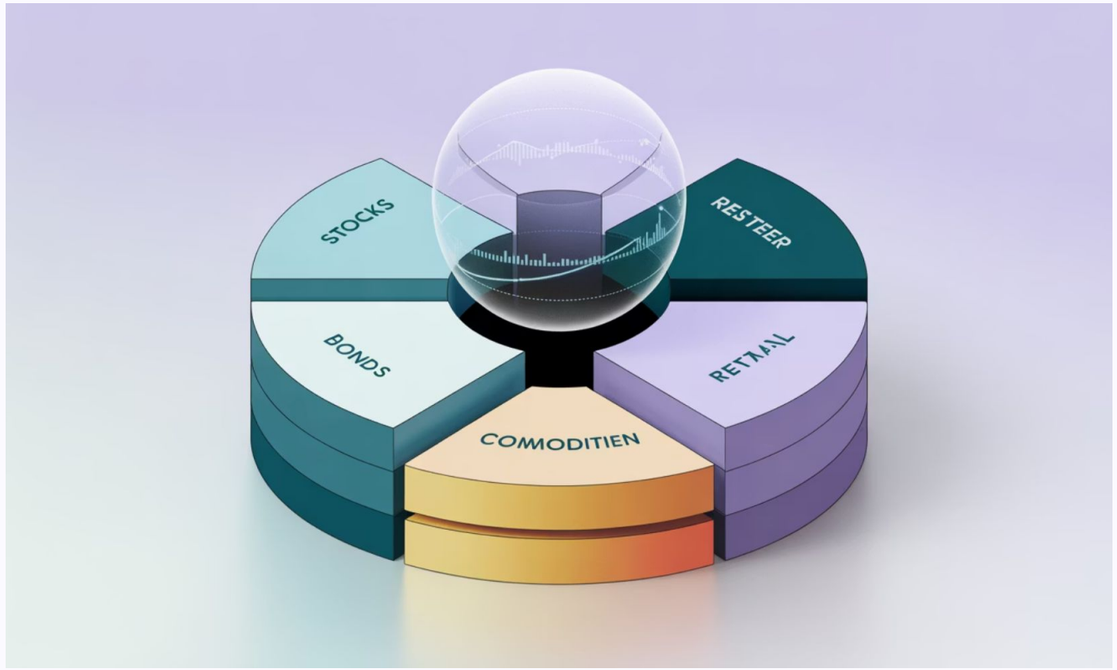
- Responsive to market trends and volatility
- May use quantitative models and algorithms
- Seeks to optimize risk-adjusted returns

Diversification: Risk Reduction in Practice

Benefits of Diversification

- Reduces unsystematic (company-specific) risk
- Smooths portfolio performance across market cycles
- Provides exposure to different growth opportunities
- Protects against severe losses in any single investment

Research shows that a portfolio with 25-30 uncorrelated securities can eliminate most unsystematic risk, leaving only market risk.



Effective diversification requires investments across different:

- Asset classes (stocks, bonds, alternatives)
- Geographic regions
- Industry sectors
- Investment styles

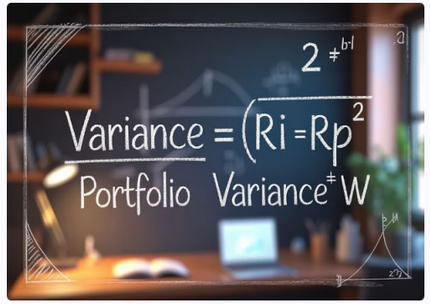
Portfolio Risk and Return Calculation

The mathematics behind portfolio construction involves calculating expected returns, variances, and covariances between assets.

Portfolio Return

$E(Rp) = \Sigma(wi \times E(Ri))$

The weighted average of expected returns of individual assets



Portfolio Risk

$\sigma p^2 = \Sigma\Sigma(wi \times wj \times \sigma i \times \sigma j \times \rho ij)$

Accounts for correlations between assets, not just weighted average of individual risks

These calculations demonstrate why diversification works: when assets are not perfectly correlated, portfolio risk is less than the weighted average of individual asset risks.

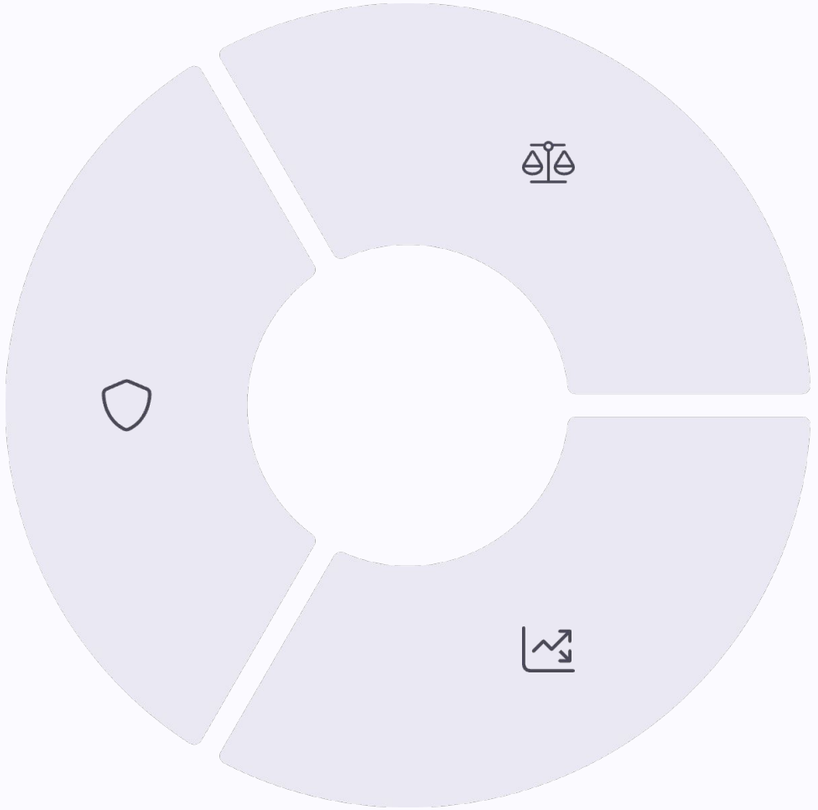
Real Portfolio Examples

Conservative Portfolio

20% Stocks, 60% Bonds, 15% Cash, 5% Alternatives

Expected Return: 4-6%

Risk Level: Low



Balanced Portfolio

50% Stocks, 40% Bonds, 5% Cash, 5% Alternatives

Expected Return: 6-8%

Risk Level: Moderate

Growth Portfolio

70% Stocks, 20% Bonds, 0% Cash, 10% Alternatives

Expected Return: 8-10%

Risk Level: High

These sample portfolios illustrate how asset allocation shifts based on risk tolerance and investment objectives. Each represents a different point along the efficient frontier.