Portfolio Optimization Analysis Report

Executive Summary

This report presents a comprehensive portfolio optimization analysis using modern portfolio theory, efficient frontier analysis, and Monte Carlo simulation. The analysis covers 15 diversified assets across multiple asset classes and provides optimal portfolio recommendations for different risk tolerance levels. **Key Findings:**
• Analysis Period: 2 years
• Number of Assets Analyzed: 15
• Risk-Free Rate: 2.0%
• Target Return: 8.0%
• Monte Carlo Simulations: 10,000 runs per portfolio
• Date Range: 2023-09-21 to 2025-09-19

Portfolio Performance Summary

Portfolio	Annual Return (%)	Volatility (%)	Sharpe Ratio	VaR (95%)	CVaR (95%)
Max Sharpe	21.30	8.15	2.368	-0.69	-1.05
Min Volatility	7.86	4.63	1.266	-0.43	-0.67
Risk Parity	7.52	2.92	1.889	-0.24	-0.35
Target Return	7.86	4.63	1.266	-0.43	-0.67

Monte Carlo Simulation Results

Monte Carlo simulation results for 1-year investment horizon (10,000 simulations per portfolio):

Portfolio	Mean Value	Median Value	5% VaR	95% VaR	Loss Probability
Max Sharpe	1.2364	1.2322	1.0764	1.4073	0.005
Min Volatility	1.0818	1.0806	1.0026	1.1661	0.044
Risk Parity	1.0781	1.0781	1.0262	1.1301	0.005
Target Return	1.0816	1.0800	1.0014	1.1649	0.048

Investment Recommendations

Recommended Portfolios:

1. Conservative Investors (Low Risk Tolerance):
→ Portfolio: Risk Parity
→ Expected Return: 7.5%
→ Risk Level: 2.9%
→ Sharpe Ratio: 1.889

2. Balanced Investors (Moderate Risk Tolerance):
→ Portfolio: Max Sharpe
→ Expected Return: 21.3%

→ Risk Level: 8.2%
→ Sharpe Ratio: 2.368

3. Risk-Aware Investors (Focus on Downside Protection):
→ Portfolio: Risk Parity
→ Expected Return: 7.5%
→ Risk Level: 2.9%
→ LPM (Downside Risk): 0.000003

Risk Warnings and Disclaimers

Important Risk Disclaimers:

• Past performance does not guarantee future results
• Market conditions can change rapidly and unpredictably
• Diversification does not eliminate all investment risk
• All investments carry risk of loss
• Consider your personal risk tolerance and investment objectives
• Consult with a qualified financial advisor before making investment decisions
• This analysis is for educational purposes only and not investment advice
• Monte Carlo simulations are based on historical data and normal distribution assumptions
• Actual results may vary significantly from simulated results

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Portfolio Optimization Analysis - Modern Portfolio Theory Implementation