Modern Portfolio Optimization Using Excel: A Sri Lankan Equity Case Study

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Objective

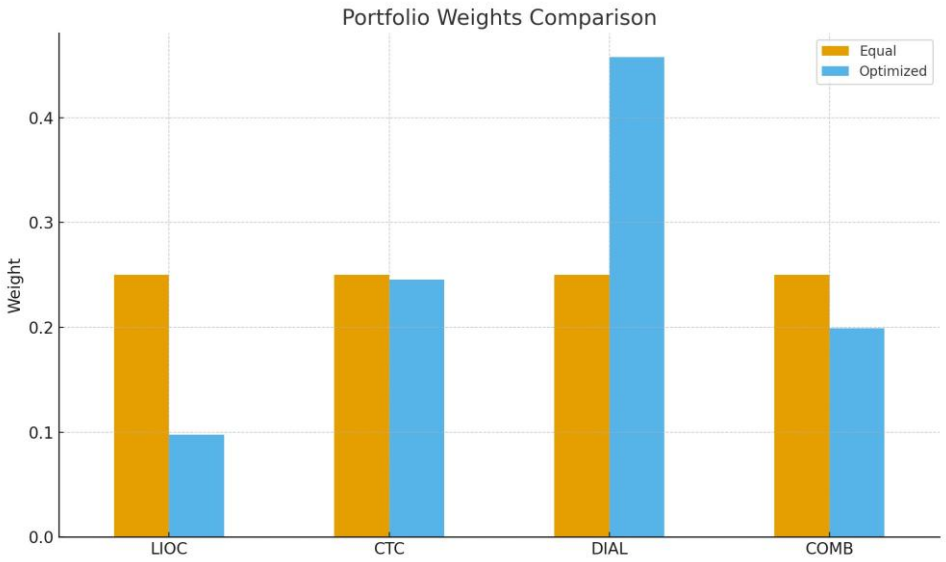
This study extends the small investor portfolio analysis by applying Modern Portfolio Theory (MPT) to optimize asset weights using the Sharpe ratio approach. The goal is to achieve the highest possible risk-adjusted return for a given level of risk, with the risk-free rate set at 0.03.

Data & Methodology

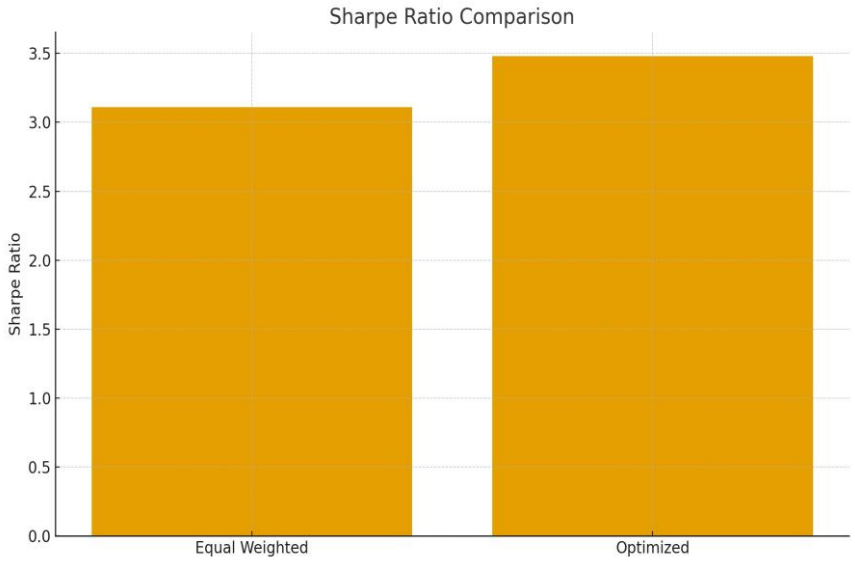
Four highly liquid stocks listed on the Colombo Stock Exchange (CSE)—LIOC, CTC, DIAL, and COMB—were selected. Historical monthly return data were used to estimate expected returns and covariances. Excel's Solver tool was employed to maximize the Sharpe ratio under full investment and non-negative weight constraints.

Results

Equal-weighted portfolio: Expected return = 0.3429, SD = 0.1006, Sharpe ratio = 3.11.



Optimized portfolio: Expected return = 0.3126, SD = 0.0812, Sharpe ratio = 3.48.



Interpretation & Conclusion

The optimized portfolio demonstrates superior risk-adjusted performance with a Sharpe ratio of 3.48, indicating better utilization of risk compared to the equal-weighted approach. Optimization reduced overall portfolio volatility while maintaining a strong expected return. This result highlights how Modern Portfolio Theory provides a practical framework for small investors to achieve balanced and efficient diversification in emerging markets like Sri Lanka.