

CFRM 543 Final Project

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Introduction

This project aims to both familiarize one with financial modeling packages in R and to use those tools to develop a portfolio that is appealing to investors. The report is divided into five sections.

In the first section, the goal is to achieve superior gains using weekly data for small cap stocks. The work is divided into a global minimum variance portfolio analysis and a maximum quadratic utility analysis. We look into several portfolio strategies by modifying various parameters such as volatility measures, box constraints, and risk tolerance. Reporting consists of both summary plots and important performance statistics. Importantly, the results are reported using a custom performance report that outputs the following:

- Cumulative Return
- Maximum Drawdown
- Annulaized Sharpe Ratio
- Annualized Mean Return
- Annualized Mean Volatility
- Monthly Sharpe Ratio
- Monthly Sortino Ratio
- Monthly Expected Shortfall
- Stable Risk-Adjusted Return Risk Ratio (STARR)

In the second portion of this report, we conduct a similar analysis using a new dataset. The new data consists of 145 stocks and bonds. This is done as in the first section, and both the minimum variance portfolio and the maximum utility portfolio are estimated using the new data.

1	Analysis of Small Cap Weekly Returns
1.1	Global Minimum Variance (Part 1)
1.2	Quadratic Utility (Part 2)
1.3	Expected Shortfall
2	Analysis of 145 Stocks and
2.1	Global Minimum Variance (Part 1)
2.2	Quadratic Utility (Part 2)
3	Best Portfolio Choice
3.1	Small Cap
3.2	Of 145 Stocks
4	Portfolio Strategies
5	Further Potential Analysis
A	R Script for Small Cap Weekly Returns
B	R Script for 145 Stocks