DSC412-project_Tharun Mandadi

Title: Markowitz model with large simulation and sensitivity analysis

Summary: The primary aim of this project is to apply Markowitz model to establish minimum variance portfolio and most efficient portfolio. While having to use a large number of assets in the portfolio with unique combinations of those assets, it is also crucial to optimize the efficiency in obtaining the unique weights, return, and variance for all the portfolios that are intended to use. Lastly, relevant sensitivity will be carried out to assess the risk

1. Data Collection

Gather historical price data for a large number of assets (e.g., stocks, bonds, ETFs).Consider using Yahoo Finance.

2. Data Preprocessing

Clean and preprocess the data to handle missing values, adjust for stock splits, and normalize returns.

3. Return and Covariance Calculation

Calculate expected returns and the covariance matrix for the asset universe.

4. Optimization Algorithm Implementation

Implement an optimization algorithm (e.g., nonlinear programming) to determine optimal asset weights for the minimum variance and efficient portfolios. Maximizing return, minimizing variance

5. Sensitivity Analysis

Conduct sensitivity analyses by varying input parameters (e.g., expected returns, risk aversion) and observing changes in portfolio weights and risk metrics.