Group Y

Optimizing the EURO STOXX 50 Portfolio Using Modern Portfolio Theory

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Research Problem:

The EURO STOXX 50 index, a key benchmark for European equity markets. While this index provides broad market exposure, its static weighting scheme may not always deliver optimal risk-adjusted returns. The research problem addresses how we can optimize the portfolio weights of all 50 stocks to maximize returns. Additionally, the study evaluates how the optimized portfolio would have performed relative to the original index over the last five years.

Motivation:

The EURO STOXX 50 index, with its fixed weights, does not dynamically adapt to changes in individual stock performance or economic conditions.

This static approach may result in suboptimal returns during volatile periods or economic shifts. By applying Modern Portfolio Theory, the portfolio can be tailored to reduce overall risk (volatility) while maintaining or improving returns. Results of this work can be used for private investment activities.

Why a relational database:

Relational databases allow for a thourough modelling and normalization of the provided data and thereby help to minimize the storage of redundant data. In addition the relational model is suited appropriately for including historic data, which plays a major role in financial analysis. Referential integrety also ensures that if the deletion of datapoints also accounts for related data in other connected tables.

The next steps are to collect and preprocess data for EURO STOXX 50 stocks, including historical prices, sector, and country details, followed by designing and populating the relational database. Once the database is ready, implement portfolio optimization using the Markowitz model, analyze performance metrics, and prepare visualizations and a report to present findings.

Required Dataset

Index_Constituents: Stocks, their sectors, countries, and weights in the EURO STOXX 50 index

Country_Data: Country-level data

Sector_Data: Sector-level data

Optimized_Portfolio: Optimized stock weights and their contribution to portfolio performance.

Historical_Prices: Daily prices, returns, and volume for all stocks over the past five years.

Dataset Source:

For historical prices for all stocks and index:
Yahoo Finance
Index component:
Yahoo Finance
Sector information:
Kaggle

More details (e.g. financial ratios/company profile) can also be derived from Yahoo Finance via Phyton