

# Prescient Coding Challenge: Portfolio Optimisation

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The goal was to create a portfolio of the given equities universe that would outperform the traditional equally-weighted portfolio. To achieve this, the portfolio was dynamically re-balanced every month based on the most recent data. The optimisation process aimed to minimise the Conditional Value at Risk (CVaR) (confidence level of 95%) while targeting a specific return level of 0.6% per month, by using the historical mean return and sample covariance matrix.

CVaR is a risk measure that quantifies the potential loss that an investment or portfolio may experience beyond a certain confidence level, i.e. it focuses on the magnitude of losses that may occur in the worst-case scenarios, i.e. tail risk. We chose CVaR as a risk measure in this case because it provides a more conservative estimate of downside risk compared to traditional measures like standard deviation, which only considers the dispersion of returns around the mean, and so improves the portfolio's resilience during adverse market conditions.

We used a rolling 5-year window of data at each time point to incorporate the most recent information while maintaining a sufficient historical perspective. This provided a more sensitive response to recent changes in the portfolio returns than using the entire period, which is particularly useful in volatile markets. Using a longer period of historical data may have included periods that are not representative of the current market environment, which

may have led to sub-optimal portfolio weights being chosen.