

Quant Club Selections 2025-26: Quant Task

Portfolio Optimization & Backtesting Challenge

Overview

You are given an initial capital of \$10,000 and must construct an optimal portfolio from a curated list of 10 stocks of your choice. The objective is to design a portfolio allocation strategy by assigning weights to each stock and rigorously backtesting its performance over the past two years.

What makes this challenge unique is the flexibility to incorporate any novel parameter or set of parameters—such as volatility, momentum, liquidity, ESG scores, fundamental indicators, or macroeconomic factors—to drive your allocation strategy. However, the chosen parameter(s) must be well-justified, with clear reasoning on why they enhance portfolio construction.

Challenge Details

1. Initial Capital & Stock Universe

You have the flexibility to select a list of 10 stocks for your portfolio. The initial capital for the portfolio will be \$10,000. You may use any data source, such as Yahoo Finance (YFinance), to fetch stock data.

2. Task Requirements

- **Portfolio Construction:** Develop a model to allocate weights across the provided stocks.
- **Parameter Innovation:** Choose one or more parameters (e.g., risk measures, technical indicators, fundamental metrics, macroeconomic factors) that influence your weight assignment.
 - Explain the rationale behind your parameter selection.
 - Discuss the financial theory or market intuition that supports your approach.
- **Backtesting:**
 - Backtest the portfolio strategy using historical data from the past two years.
 - Rebalance the portfolio at a regular frequency (Example - Quarterly, Monthly, etc)
 - Incorporate transaction costs into the analysis.
 - Ensure no look-ahead bias during the rebalancing process (i.e., avoid using future data that would not have been available at the time of decision-making).

3. Evaluation Criteria

- **Performance Metrics:**
 - Sharpe Ratio
 - Drawdown
 - Overall Returns
- **Innovation:** Originality of the parameter(s) used and the approach for weight allocation.
- **Rationale & Transparency:** Clarity and depth of the explanation regarding why the chosen parameter(s) are likely to improve portfolio performance.
- **Presentation:** Clarity of the report, including visualizations of the backtested performance and the reasoning behind decision-making.

4. Submission Guidelines

- **Code & Methodology:** Submit well-documented code along with a detailed write-up of your methodology.
- **Report:** The report should include:
 - Reasoning behind the stocks that you have chosen for your portfolio.
 - An intro to your strategy.
 - Provide a detailed explanation of your chosen parameter(s) and the financial reasoning behind them.
 - Description of the backtesting process and results.
 - Discussion on the limitations and potential improvements of your approach.

5. Additional Encouragement for Creativity

- Participants are encouraged to explore unconventional parameters or hybrid approaches that combine multiple metrics.
- The key is not only to achieve a good backtested performance but also to provide **compelling, theoretically sound reasoning** for your strategy.

Reference: - [Read_1](#), [Read_2](#), [Read_3](#)