

Financial AI

Homework 6

Due at 06:00 pm (Korea Standard Time) on Saturday.

Problem 1. Mean-Variance Optimization

(a) Create 3 portfolios (mean-variance optimized, equal weight, value weight) using 30 stocks daily close price data. Rebalance every month. Sample period for estimating mean and variance is (2020-2022). Assume shorting is possible. Report and compare the performance (annualized mean return, annualized return standard deviation, Sharpe ratio, and maximum drawdown) of portfolios.

(b) Compare the performance of 3 portfolios in 2023 (for testing period) in terms of annualized mean return, annualized return standard deviation, Sharpe ratio, and maximum drawdown.

Problem 2.

(a) Does the three portfolio works as expected in testing period too?

(a - additional) Does the return distribution of portfolios in testing period are equal to the return distribution of portfolios in the sample period? How can we test it? If possible, test it and report the result.

(b) Followed by (a) if the portfolio does not work as expected, why? How can we fix the problem?