

Math 5440: Week 6 Assignment

Due Date: March 3, 2023 at 10am

Exercise Stock Returns vs. Price Impact Increments

This assignment assumes that the exercises in Week 5 Assignment have yielded a functioning script.

1. Wrap the script from Week 5 into a function of dt , the date.
2. Loop over values of dt and aggregate variances and covariances into a single table across dates, stocks, halflives, and prediction horizons.

The following exercises concern about the regression $r = \lambda\Delta I + \epsilon$, where ϵ is assumed to be Gaussian and i.i.d:

3. Compute $\lambda = \mathbb{E}[r\Delta I]/E[(\Delta I)^2]$ and in-sample R^2 by stock, halflife, and prediction horizon; that is, run a regression using the data across all dates for each (stock, halflife, prediction horizon) pair. Plot the corresponding distribution; cf. page 36 of Lecture 5.
4. Compute $\lambda = \mathbb{E}[r\Delta I]/E[(\Delta I)^2]$ and out-of-sample R^2 by month, halflife, and prediction horizon; that is run a regression using the data across all stocks for each (month, halflife, prediction horizon) pair and calculate the model R^2 in the next month. Plot the corresponding timeseries; cf. page 37 of Lecture 5.