Due date: June 28 23:59, 2021

Question

You are given an intraday trading activity data set of an index future market in `HFData_sample201801.csv`, containing all trades (market orders) and quotes (limit orders) in January 2018. Data sharing is strictly prohibited with anyone outside our ARM course.

- DATETIME: a value representing the number of seconds between January 1, 1960, and the time of the transaction.
- EXPIRATION: The expiration date of the futures contract being traded, denoted as YYYYMM. Contracts expire on the third Friday of the expiration month.
- BUY: This indicator shows if the transaction record is for a buyer "$buyer = 1$" (who goes long the index) or for a seller "$buyer = 0$" (who goes short the index).
- VOLUME: This is the size of the transaction expressed in number of contracts.
- PRICE: The price at which the transaction between buyer and the seller is concluded .
- MARKET_ORDER: equals "Y" if the transaction record is a market order and "N" for a limit order.

Based on our discussions in lecture, with clear explanations, construct the following liquidity measures. You need to submit summary statistics of measures you estimated, and scripts of your estimations e.g. computer program(s). Do NOT submit any data.

1. Compute daily realized spread.

2. Compute daily Amihud price impact by constructing minute-by-minute return and dollar volume.

3. Plot your daily measures over time. Has liquidity improved or deteriorated over time in the sample? Discuss your results.

Bonus. Suggest how one could compute daily *effective* spread from the current data set. Show your results if you could please.