FE570 - Project

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Empirical analysis of microstructure data.

1. Perform a study of liquidity: compute the spread measures (quoted spread, effective spread, realized spread) in time buckets and study the intra-day liquidity dynamics

```
# Calculate effective spread
quoted_spread <- taq.ethusd$OFR - taq.ethusd$BID

# Calculate midpoint
midpoint <- (taq.ethusd$OFR + taq.ethusd$BID) / 2

# Calculate effective spread
effective_spread <- 2 * abs(taq.ethusd$PRICE - midpoint)

# Set time horizon for future midpoint
future_interval <- 5 * 60   # 5 minutes in seconds

# Shift midpoint by future_interval to estimate future midpoint
future_midpoint <- shift(midpoint, future_interval)

# Calculate realized spread
realized_spread <- 2 * (taq.ethusd$PRICE - future_midpoint)

# Plotting
par(mfrow = c(3, 1))  # Split plots
plot(quoted_spread, type = "l", main = "Quoted Spread", ylab = "Spread", xlab = "Time")
plot(effective_spread, type = "l", main = "Effective Spread", ylab = "Spread", xlab = "Time")
plot(realized_spread, type = "l", main = "Realized Spread", ylab = "Spread", xlab = "Time")
```
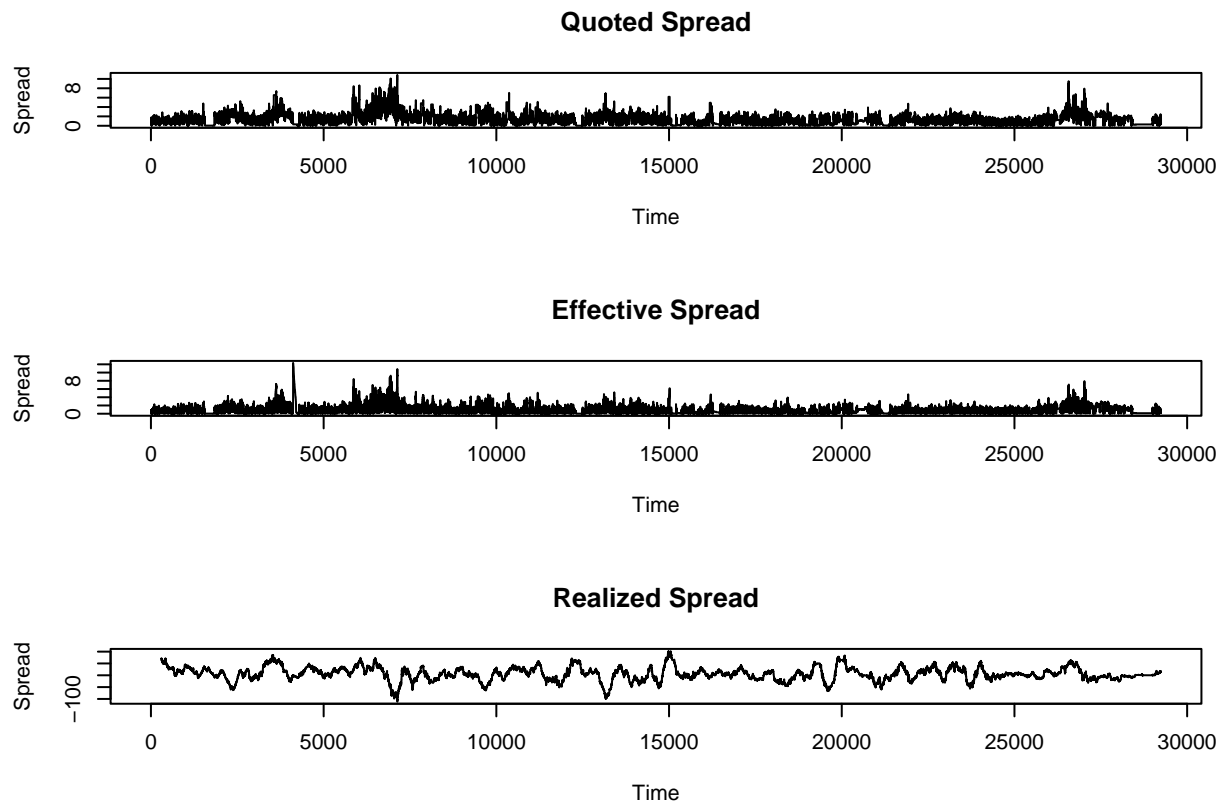
Quoted Spread

Effective Spread

Realized Spread

2. Estimate the volatility using intraday data

3. Estimate the probability of informed trading (PIN measure)