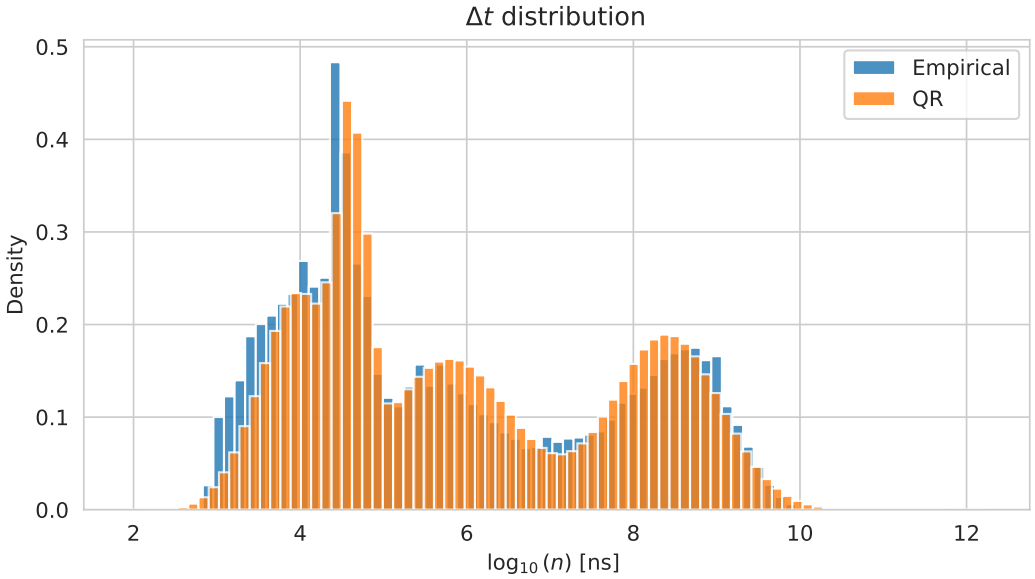
Queue-Reactive Model: Empirical vs Simulated

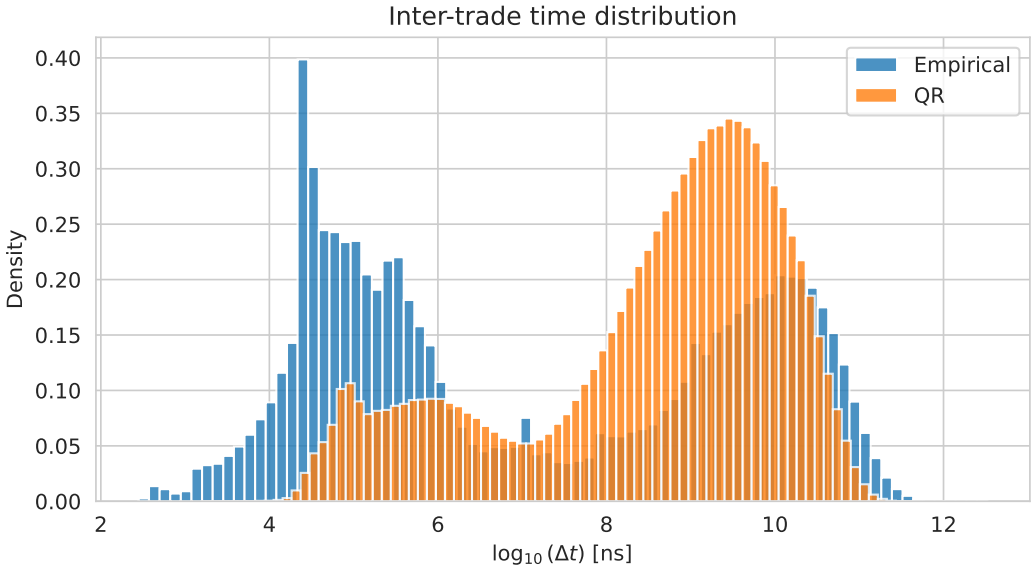
Time Between Events

Distribution of $\log_{10}(\Delta t)$ in nanoseconds for all order book events.



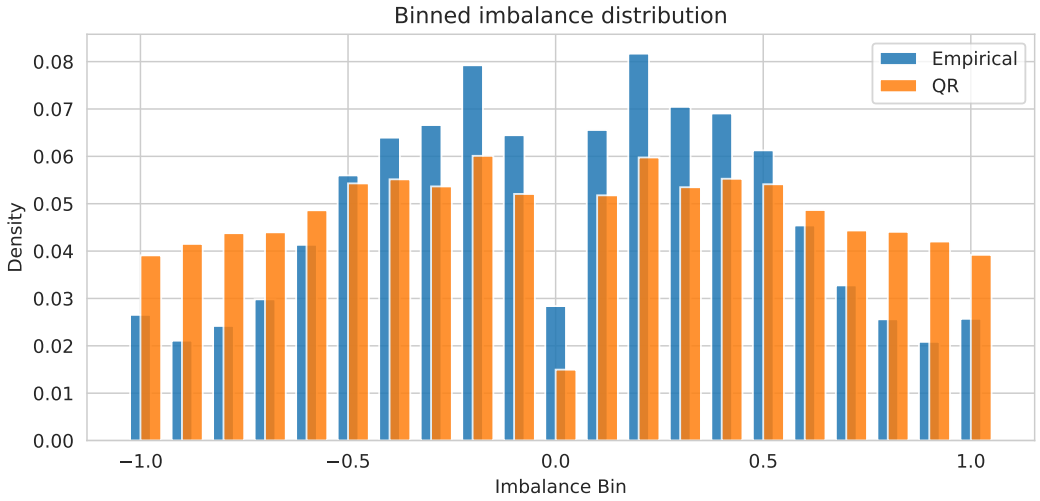
Inter-Trade Time

Distribution of $\log_{10}(\Delta t)$ filtered to trades only.



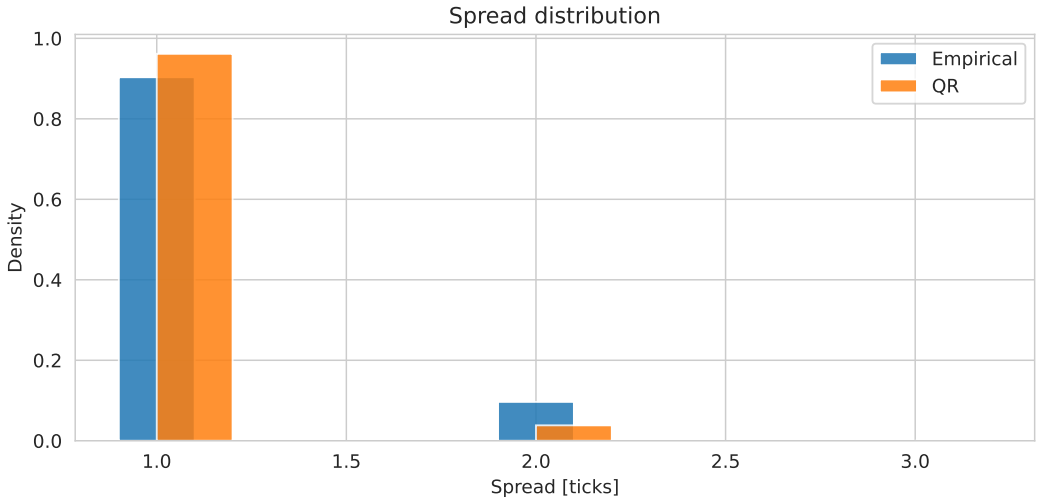
Order Book Imbalance

Binned imbalance $I = \frac{Q^b - Q^a}{Q^b + Q^a}$ at the best bid/ask levels.



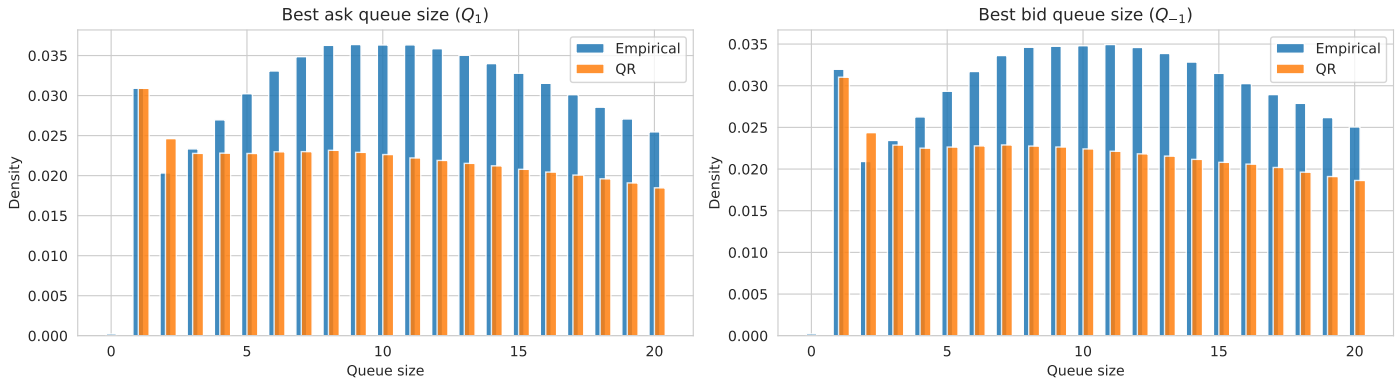
Spread Distribution

Distribution of bid-ask spread in ticks.



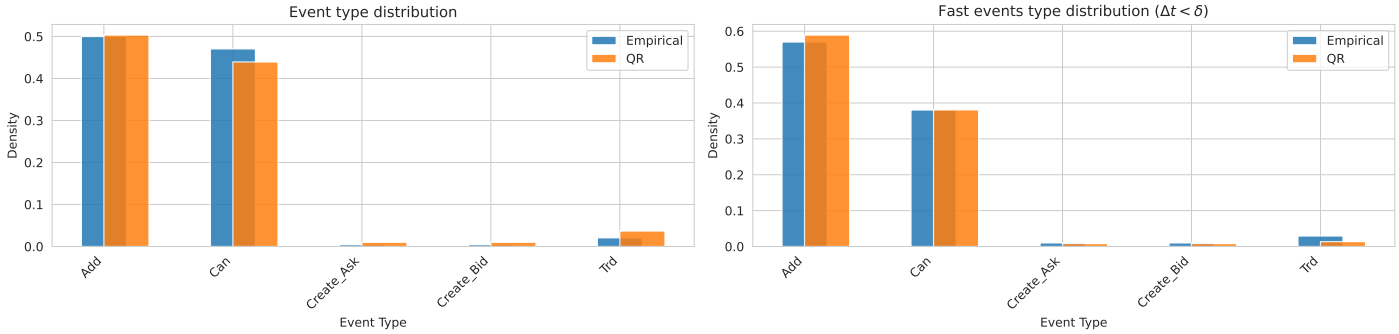
Queue Size at BBO

Distribution of queue sizes at best bid (Q_{-1}) and best ask (Q_1).



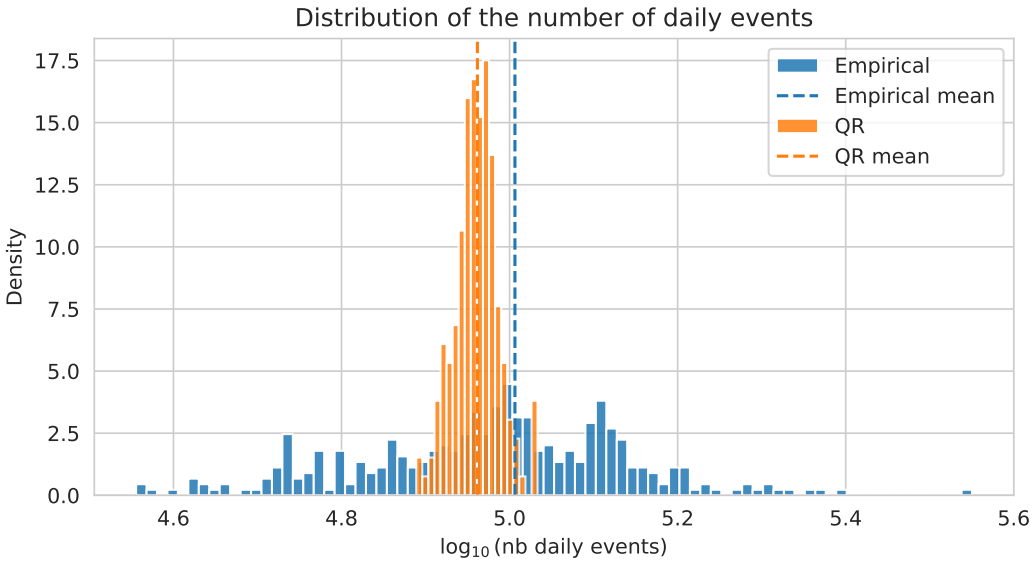
Event Type Distribution

Left: all events. Right: fast events only ($\Delta t < \delta$).



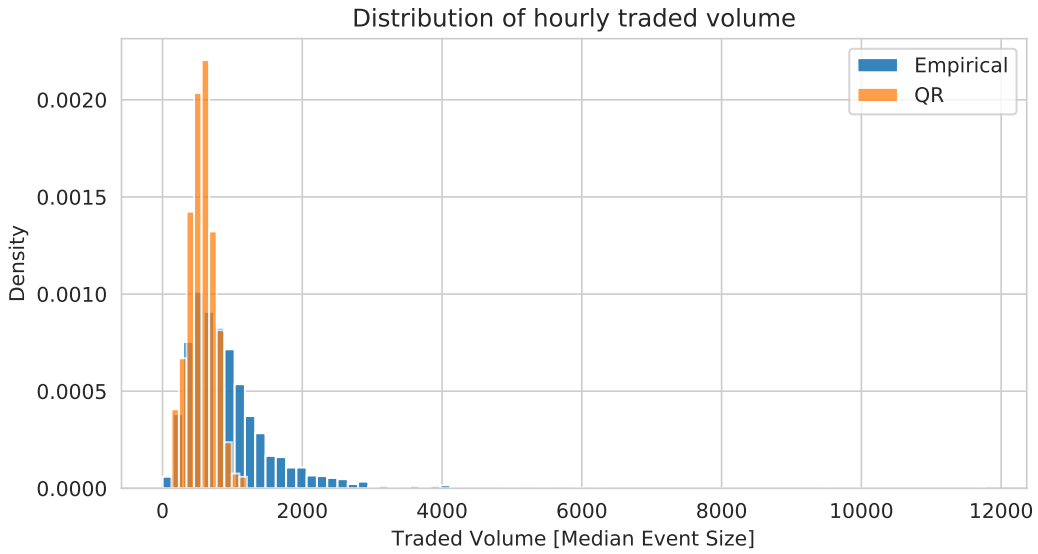
Daily Event Count

Number of events per trading day (log scale).



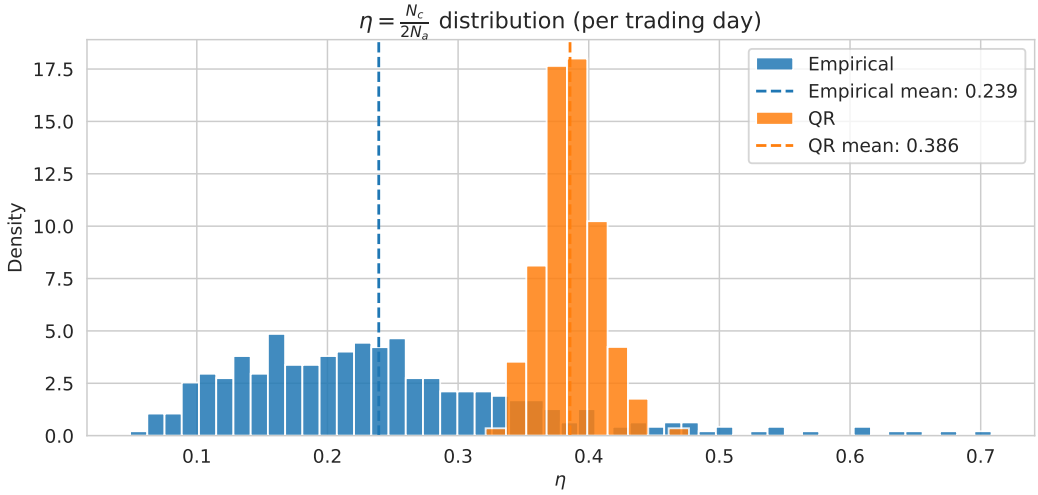
Hourly Traded Volume

Distribution of hourly traded volume in median event size units.



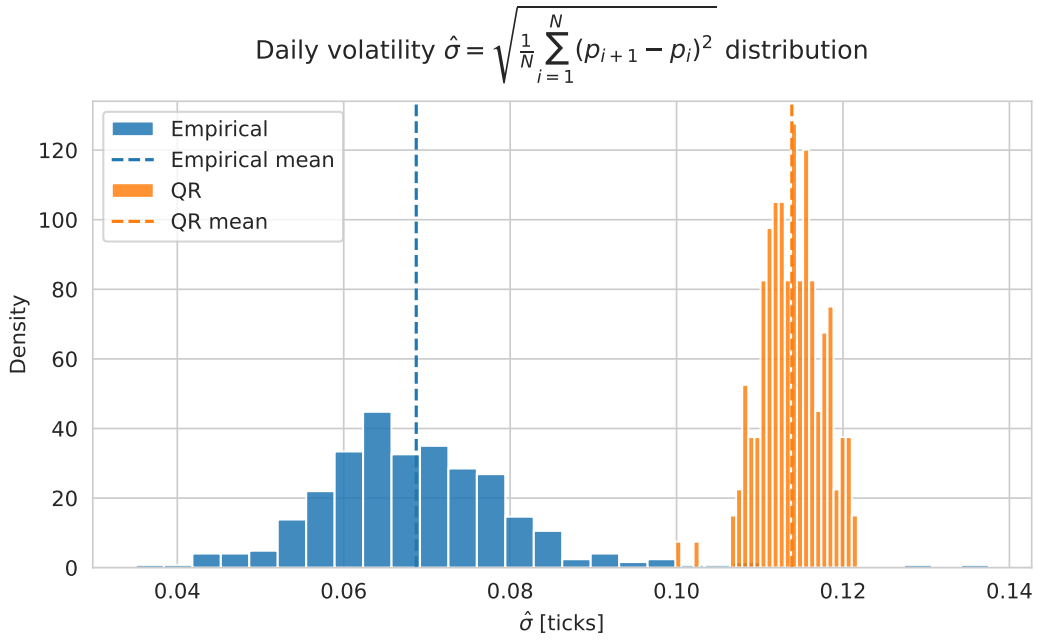
Eta Coefficient

$\eta = \frac{N_c}{2N_a}$ where N_c is the number of mid-price continuations and N_a the number of alternations per day.



Daily Volatility

Volatility: $\hat{\sigma} = \sqrt{\frac{1}{N}\sum_i (\Delta p_i)^2}$ in ticks.



Alpha PnL

Expected alpha times future price change: $\mathbb{E}\left[\alpha_t \cdot (P_{t+\Delta t} - P_t)\right]$ vs horizon, comparing with and without an Impact model.