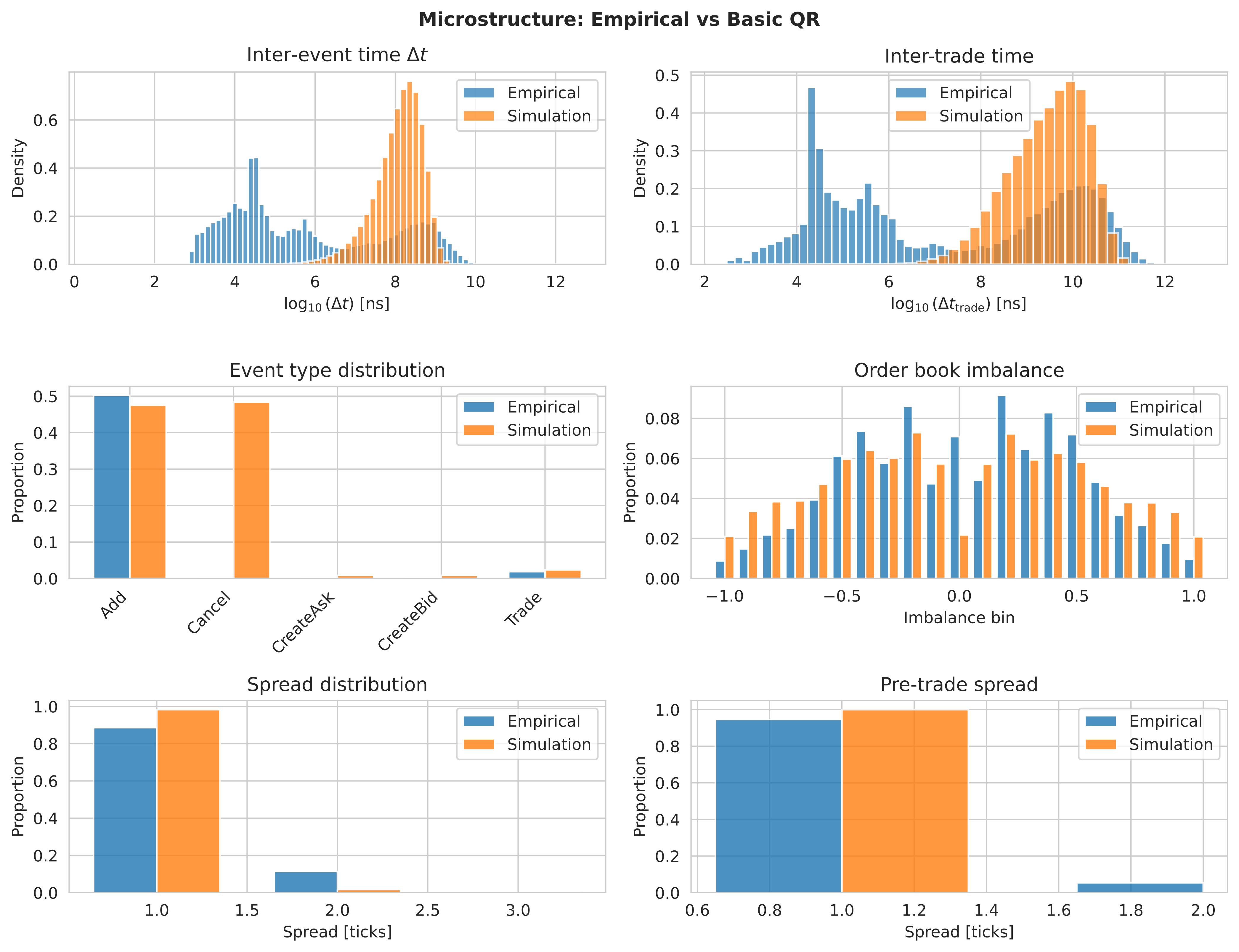
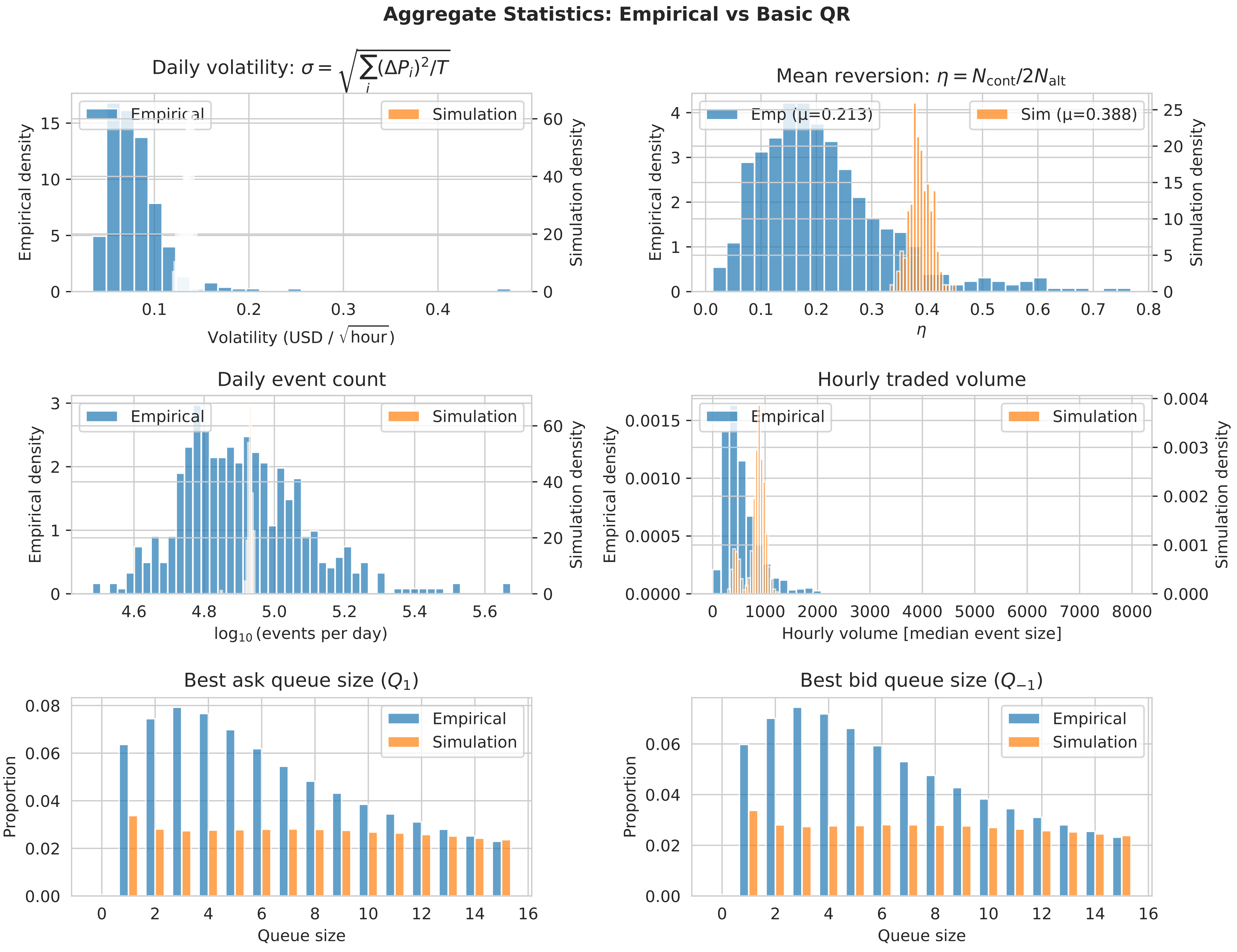
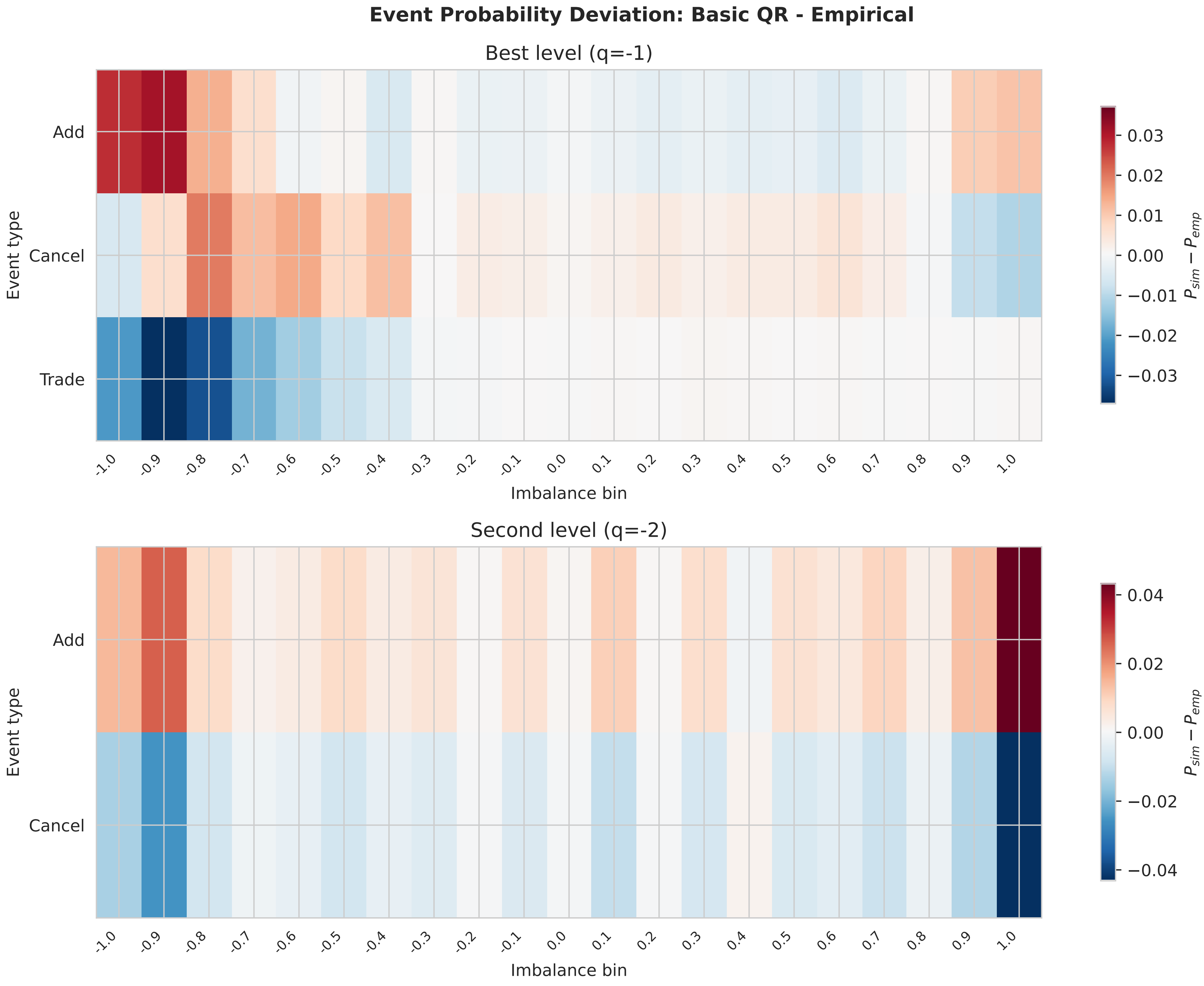


Microstructure: Empirical vs Basic QR
Inter-event time Δt
Density
log10 (Δt) [ns]
Inter-trade time
log10 (Δt_trade) [ns]
Event type distribution
Proportion
Add
Cancel
CreateAsk
CreateBid
Trade
Order book imbalance
Imbalance bin
Spread distribution
Spread [ticks]
Pre-trade spread
Empirical
Simulation



Aggregate Statistics: Empirical vs Basic QR
Daily volatility: $\sigma = \sqrt{\sum_i (\Delta P_i)^2 / T}$
Empirical
Simulation
Empirical density
Simulation density
Volatility (USD / $\sqrt{\text{hour}}$)
Mean reversion: $\eta = N_{\text{cont}} / 2N_{\text{alt}}$
Emp (μ=0.213)
Sim (μ=0.388)
η
Daily event count
$\log_{10}$ (events per day)
Hourly traded volume
Hourly volume [median event size]
Best ask queue size (Q_1)
Best bid queue size (Q_{-1})
Proportion
Queue size


Event Probability Deviation: Basic QR - Empirical
Best level (q=-1)
Add
Cancel
Trade
Event type
-1.0
-0.9
-0.8
-0.7
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Imbalance bin
0.03
0.02
0.01
0.00
−0.01
−0.02
−0.03
$P_{sim} - P_{emp}$
Second level (q=-2)
Add
Cancel
Event type
-1.0
-0.9
-0.8
-0.7
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Imbalance bin
0.04
0.02
0.00
−0.02
−0.04
$P_{sim} - P_{emp}$