

1. Motivation for Multi-Level OFI

Measuring OFI at multiple depth levels of the order book is important to capture information about the supply and demand dynamics beyond the best bid and ask (Level 1). Although best-level OFI reflects the immediate liquidity imbalance, large resting orders often reside at deeper levels, and the top-level bid and ask prices can be volatile and may not accurately reflect institutional trading intentions. Incorporating multiple depth levels helps reduce noise from fleeting top-of-book changes and leads to a more stable and representative signal of market pressure.

2. Why LASSO Instead of OLS for Cross-Impact

The authors use LASSO regression rather than OLS for estimating cross-impact because the cross-impact matrix tends to be high-dimensional (many stocks) and sparse (small cross-impacts between many stocks). OLS includes all variables and leads to variance inflation when predictors are collinear. In contrast, LASSO imposes an ℓ_1 penalty that sets small coefficients to zero, reducing noise and preventing overfitting.

3. OFI vs. Trade Volume as a Short-Term Return Predictor

OFI captures the directional pressure based on the imbalance between buy and sell orders over short intervals. In contrast, trade volume measures overall activity and can remain high even in a balanced market, offering limited predictive power. Thus, while trade volume reflects the intensity of trading, OFI reflects the net demand pressure, which is more directly linked to short-term price impact.