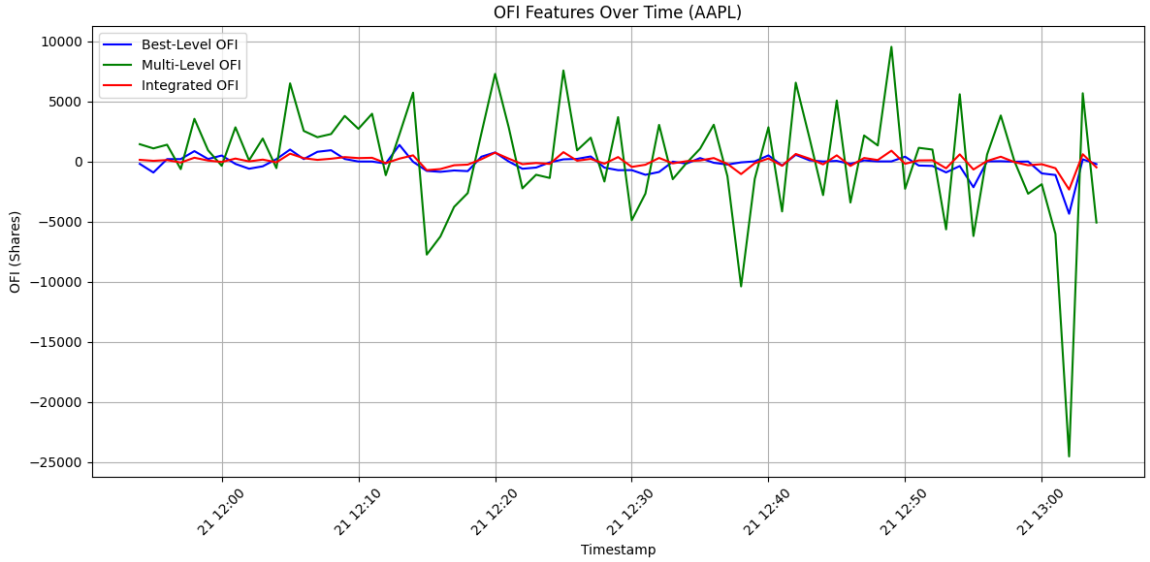
Order Flow Imbalance TASK 1 Q&A



Q1: What's the motivation behind measuring OFI at multiple depth levels of the order book?

Ans: The top level (level 0) reflects only the best bid and ask, which may not fully represent the market's overall buying or selling pressure. Deeper levels (1–9) contain additional orders that influence liquidity and price formation. This provides a holistic view of market sentiment. The paper finds that OFI at deeper levels (level 2 or beyond) often has comparable or greater explanatory power for short-term price changes than level 0 alone. Deeper levels have varying liquidity and their OFI reveals how liquidity shifts affect market stability. Large OFI swings at deeper levels (as shown in the figure above) signal significant order or cancellation activity, which is critical for risk management and trading strategies.

Q2: Why do the authors use Lasso regression rather than OLS for estimating cross-impact?

Ans: The authors employ LASSO (Least Absolute Shrinkage and Selection Operator) regression over Ordinary Least Squares (OLS) to estimate cross-asset OFI impacts, addressing the complexities of high-dimensional, multi-asset environments. LASSO's L1 regularization mitigates overfitting by shrinking insignificant coefficients to zero, ensuring sparsity and selecting only meaningful predictors, such as the effect of one asset's OFI on another's returns. This is critical when modeling numerous assets. In contrast, OLS, without regularization, risks overfitting, unstable estimates, and inclusion of noisy predictors, making it less suitable for capturing the sparse, significant cross-asset relationships.

Q3: Why is OFI considered a better predictor of short-term returns than trade volume?

Ans: Order Flow Imbalance (OFI) is considered a better predictor of short-term returns than trade volume because it captures the directional pressure of order flow (net buying versus selling) in the limit order book (LOB)

$$\delta \mathrm{OFI}_{i,n}^{m} = \mathrm{OF}_{i,n}^{m,b} \; - \; \mathrm{OF}_{i,n}^{m,a},$$

where $\mathrm{OF}_{i,n}^{m,b}$ and $\mathrm{OF}_{i,n}^{m,a}$ are bid- and ask-side flows at level m. providing a more nuanced and dynamic measure of market sentiment and liquidity shifts. Unlike trade volume, which only reflects the quantity of executed trades without distinguishing between buying and selling, OFI accounts for both executed and unexecuted orders (additions, cancellations) across multiple LOB levels, making it more sensitive to the supply demand dynamics that drive price movements. This makes OFI particularly effective for predicting short-term returns, especially at high frequencies like minute and microsecond intervals .