High-Frequency Trading: The Academic Evidence

Joel Hasbrouck
Stern School of Business, NYU

Overview and summary

- Most analyses are based on equity markets.
- Broad characteristics of HFTrs
  - Large in size and scope (market coverage)
  - Collocate.
  - A large share of message traffic.
  - Quick reaction to market information.
- Trading styles
  - High rates of order cancellation
  - High turnover
  - Tight position management: net positions are always kept small
  - Often trade passively (like market makers)
    - But often trade actively.

Kirilenko, Andrei A., Albert S. Kyle, Mehrdad Samadi, and Tugkan Tuzun, 2010, *The flash crash: The impact of high frequency trading on an electronic market*

- Market: E-Minis
  - May 6: HFTrs didn't trigger it, but they contributed to it.
- In normal times, HFTrs
  - Behave like market makers
  - Low inventories, high turnover
  - But trade more actively than "traditional MMs"

Menkveld, Albert J., 2012,
High frequency trading and the new-market makers

- Market: Chi-X (European equities)
- Dominated by one large HFTr
- Spreads dropped with the entry of the HFTr
- HFTr makes the bulk of its profits on positions held five seconds or less.
- 80% of its trades are passive

Hasbrouck, Joel, and Gideon Saar, 2011, *Low-latency trading*

- 500 stocks on Nasdaq's Inet system.
- Measure HF activity by measuring automated cancel-and-replace orders in the book.
- Increased HF activity "causes"
  - lower posted and effective spreads
  - Lower short-term volatility
  - Increased depth

The Nasdaq HFT dataset

- Constructed by BATS and Nasdaq, made generally available
- 120 US equities over 2008-2009
- HFTs identified by exchanges as proprietary traders with collocated facilities, high turnover, high rates of cancellations (relative to executions), etc.
- Data record all trades and quotes prevailing at the times of the trades.

Brogaard, Jonathan, 2010, *The activity of high frequency traders*

- HFTrs involved in 68% of dollar volume (sometimes on both sides)
- They're demanding liquidity in 43% of DV, supplying it in 41%.
- Their strategies are correlated.
- Some evidence that they can predict future order flow.

Brogaard, Jonathan, 2012, *High frequency trading and volatility*

- Increased index volatility → increased active HFT
- Increased stock-specific volatility → reduced active HFT
- Increased HFT → reduced volatility

Hendershott, Terrence J., and Ryan Riordan, 2012, *High frequency trading and price discovery*

- HFTrs active trades anticipate subsequent price movements.
- Their trading enhances price discovery and market efficiency.
  - "Prices reflect information more quickly"

Summary of empirical studies

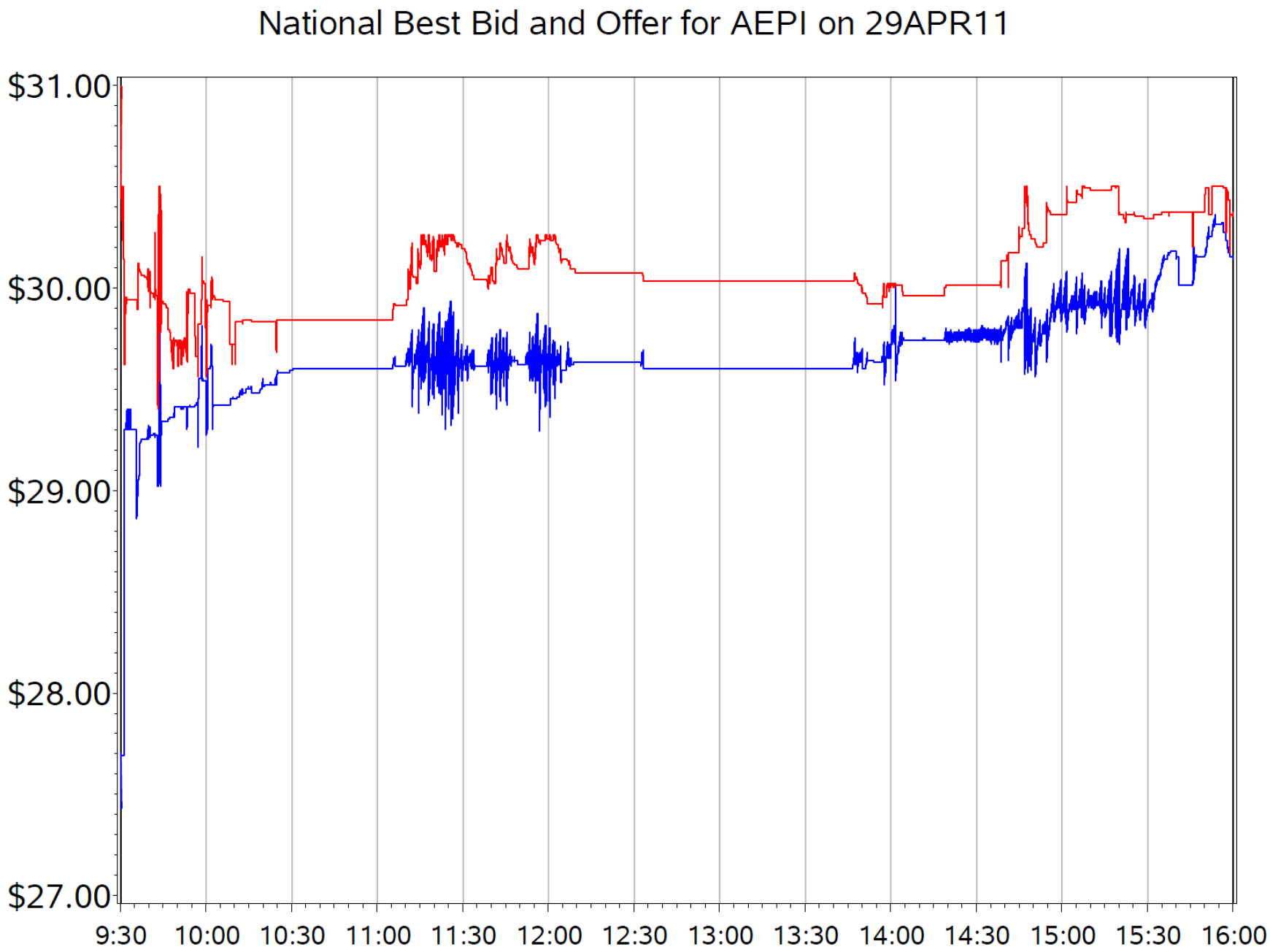
- HFT seems to be benign/beneficial.
- Limitations
  - With respect to what information does HFT increase efficiency?
  - Studies characterize average markets in typical times.
    - Don’t address stability and abnormal volatility.

The contribution of HFT to efficiency

- A market is more efficient when prices reflect information sooner.
- Principle based on fundamental information.
  - We require firms to report promptly material developments.
- What is the value of efficiency when information is an advance signal of another player's pending order?
  - Jarrow, Robert A., and Philip Protter, 2011, *A dysfunctional role of high frequency trading in electronic markets*

HF behavior: the pathological

- We observe …
- Volatility in bids and offers
- Sudden extreme surges in message traffic
- … without apparent fundamental cause


National Best Bid and Offer for AEPI on 29APR11
$31.00
$30.00
$29.00
$28.00
$27.00
9:30
10:00
10:30
11:00
11:30
12:00
12:30
13:00
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14:00
14:30
15:00
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16:00

GNTX on June 12, 2008, 12:10pm to 12:20pm