Is Market Fragmentation Harming Market Quality?

by Maureen O'Hara and Mao Ye

Discussion: Emiliano Pagnotta

NYU Stern

WFA, June 22, 2010

The Impact of Fragmentation on Market Quality

Why is this an interesting empirical question?

- Fragmentation is not a past phenomenon! After NMS 2005 regulation NYSE % volume in NYSE-listed stocks dropped from 79.1% (2005) to 25% (2009).
- Similar trends in other markets and countries. US equity markets may help anticipating consequences elsewhere.
- Net effects are controversial
  - Theory identifies costs and benefits. Overall assessment of its consequences naturally reduces to measuring the size of each
  - Without quantitative assessment difficult to guide policymakers
- Several previous empirical papers but
  - Previous evidence on very different US equity exchange industry landscape
  - Data limitations (studies more limited in scope)

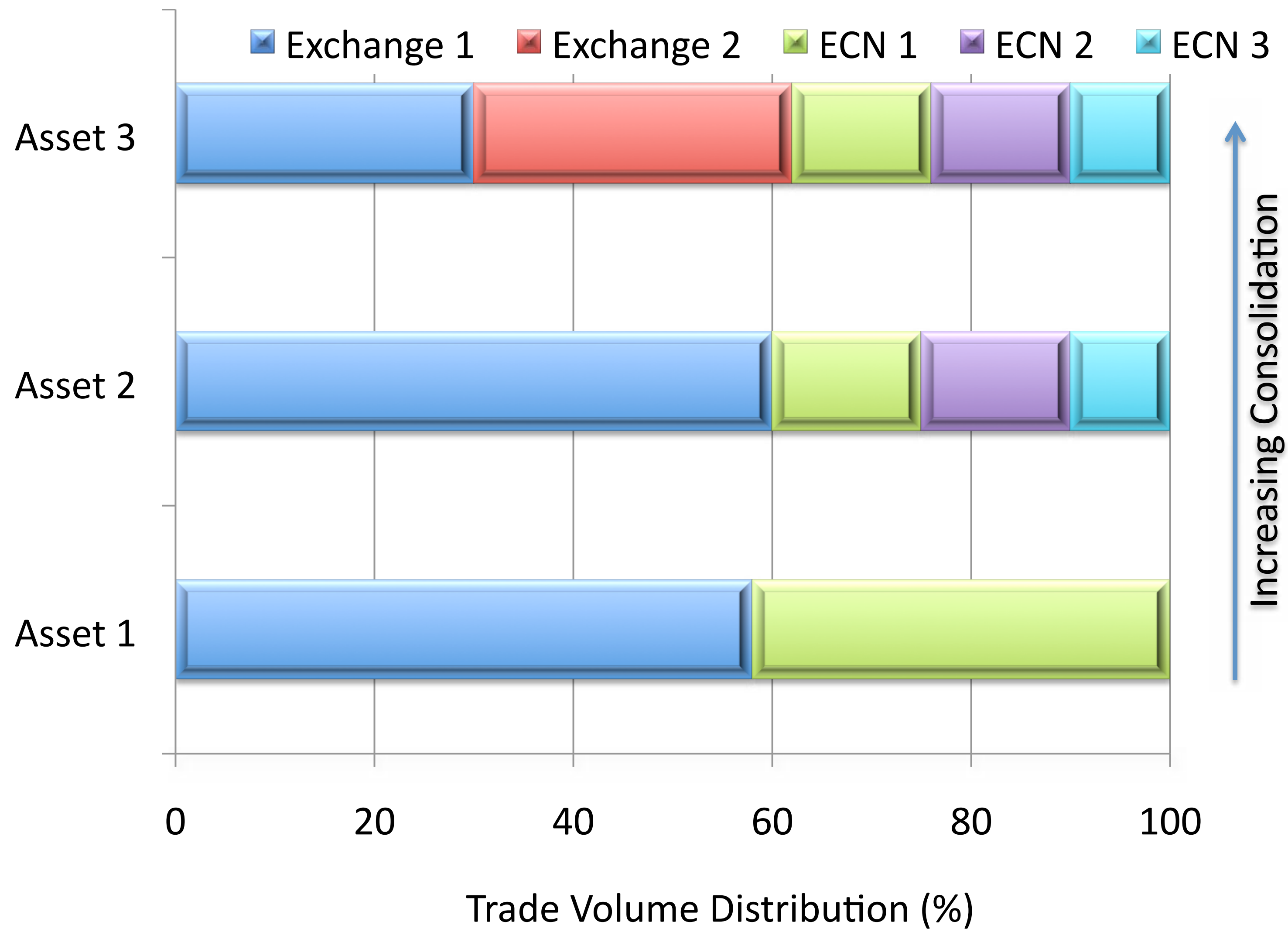
Approach and Results

$$Y = g(X, \cdot) + u$$

- Main Challenges (i) measuring "X" (ii) Endogeneity
- Main Innovation: Measurement of "X"
  - Newly available TRF data. Can identify off-exchange trading volume by asset.
  - Superior to previous studies (e.g. Bennett Wei 06: proxying "X" by listing exchange)
- Main Results
  - When measured by off-exchange volume, more fragmented stocks have (i) lower spreads, faster exec. (ii) higher short term volatility and prices closer to a RW
  - Main Policy Implication: Regulations preventing fragmentation should be reconsidered/removed.

Empirical Challenges (1)

Measuring Fragmentation


Exchange 1
Exchange 2
ECN 1
ECN 2
ECN 3
Asset 3
Asset 2
Asset 1
Increasing Consolidation
0
20
40
60
80
100
Trade Volume Distribution (%)

Empirical Challenges (1)

Measuring Fragmentation

- Cannot observe off-exchange individual center volume.
- But can observe trade in exchanges. Alternative:

$$
\begin{aligned}
X_{(i)} &= \gamma\left(\frac{V_{TRF(i)}}{V_{Total(i)}}, H_{EX(i)}\right) \\
X_{(i)} &= \left\{\frac{V_{TRF(i)}}{V_{Total(i)}}, H_{EX(i)}\right\}
\end{aligned}
$$

  $H_{EX(i)}$ Herfindahl index asset *i* (e.g. McInish Wood 1996)
- Interesting to check whether the magnitude of the effects increases

Empirical challenges (2)

Endogeneity

- Issue: other factors related to fragmentation may be driving market quality measures.
- Example 1: Authors use firm size in the matching sample scheme
- Example 2: Market quality measures may be driven by intensity of competition between High Frequency Traders (e.g. Hendershott Jones Menkveld 2009; Pagnotta Philippon 2010).
  - Say, competition higher for certain assets off-exchange (co-location costs, etc.) then they can appear as more volume fragmented
- Example 3: Fragmentation may be related to the likelihood of asymmetric information events.
  - Say, less likely info then more likely to fragment (Madoff-like business)
- Alternative: matching schemes using measures such as ratio of trades to messages (say from BATS, Nasdaq's ITCH) and PIN estimates.

Policy Implications (1)

Reasons to be a little skeptical

- Market Design highly heterogeneous across Trading Venues (liquidity rebates and fees, designated dealers,...). Hard to distill "pure" effect of Fragmentation (e.g. Ahmihud et al 2003, which favors consolidation)
- Risk of underestimating costs
  - Routing systems, smart routing services
  - Information processing costs for investors
  - Social costs: sum of sunk costs in running multiple venues may be bigger than additional value creation

Policy Implications (2)

Reasons to be a little skeptical

- Paper focuses on market quality under "normal" conditions
- Other market functions: stability when facing big shocks, minimizing ex-ante systemic risks
- Learning substantially more complex under distress. If complexity is high enough investors can take precautionary suboptimal decisions (e.g. Caballero Simsek 2009)
- Market Coordination failures. E.g. circuit breakers functionalities during May 6, potential systemic consequences

Looking Beyond

- Switch focus from disparate market quality measures to Welfare
- One way to go: adapting the empirical technology in Hollifield Miller Sandas Slive 06
  - US equity markets ideal setting given microstructure
  - Profit from papers' fragmentation measures
  - Data demanding. Can start focusing on assets with little trade on NYSE