When to Introduce Electronic Trading Platforms in Over-the-Counter Markets?

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December 21, 2017
Growing Electronification in OTC Markets

Bond Markets

- Platform Operator MTS founded in Italy in 1988.
- “Fixed-Income Investors have 99 Ways to Trade One Big Problem” (Bloomberg, April 16, 2016).

CDS markets

- The European Commission starts to investigate against 13 dealer banks in 2011 operators out of the market.
- Banks escaped charges in 2015...
- In a second class action suit a $1.87bn settlement was reached.
What is this about?

What I do:

- I model prices and market participation in a hybrid OTC market structure (HM) in which traders can buy an asset either in a bilateral dealer market or on an electronic trading platform.
- I compare results to a pure bilateral market (PBM).

Research questions:

- Where do different traders trade?
- How do prices look like?
- When do dealers/traders want a hybrid market structure (or a pure bilateral market)?
- What about welfare?
A number of dealers can deliver an asset to a trader. The trader faces a search problem (search potentially costly, search costs $s$).

Duffie, Dworczak and Zhu (2016)
Trading protocol: request-for-quote (RFQ).

Dealers’ responses are uncertain:
  - costly attention...
  - risk management...
  - collusion?

Hendershott and Madhavan (2015)
The Hybrid Market

Electronic trading platform

trader \(\text{click...} \) ETP

...or call?

dealers

D1 \(\ldots\) DN
The Model

Traders:
- Continuum $[0, 1]$ of traders.
- Want to buy asset that they value at $v \in \mathbb{R}$.
- A fraction $\mu \in (0, 1)$ of traders is fast.
- Slow traders have search costs $s > 0$.

Dealers:
- $\mathbb{N} \ni N \geq 2$ dealers who can provide the asset at cost $c \in \mathbb{R}$, with $v > c + s$.
- Each dealer responds to an RFQ with exogenous probability $\eta \in (0, 1)$.

Trading venues:
- One platform
- One bilateral market ($N$ dealers)
The Traders’ Search Problem

**Fast traders**: Canvass the entire market and take the lowest price (if below \( v \))!

**Slow traders**:  
- trickier... As in Weitzman (1979), define reservation prices \( r_b, r_p \) that solve

\[
\begin{align*}
    r_b & := \mathbb{E}(\min(p_b, r_b)) + s, \\
    r_p & := (1 - (1 - \eta)^N) \cdot \mathbb{E}(\min(q, r_p)) + (1 - \eta)^N r_p + s,
\end{align*}
\]

where \( p_b \): (random) price in the bilateral market
\( q \): (random) lowest quote on the platform.

- Assume \( r_p < r_b =: r \).

- **Optimal strategy**: Go to platform first, search until offer less than \( r \), if \( r < v \! \)!

- If \( r = v \) continue searching with probability \( \gamma \in (0, 1] \), to be determined...
Facts:

- Distributions $G$ and $H$ according to which dealers quote cannot have any atoms.
- The suprema of their supports are equal to $r$.
- Let $k_p := 1 - \mu$ and $k_b := (1 - \eta)^N \gamma (1 - \mu) / N$. On their respective supports, $G$ and $H$ must satisfy

\[
(p - c) \left[ k_b + \mu (1 - H(p))^{N-1} (1 - \eta G(p))^N \right] = (r - c) k_b \tag{1}
\]

\[
(p - c) \left[ k_p (1 - \eta G(p))^{N-1} + \mu (1 - H(p))^N (1 - \eta G(p))^{N-1} \right] = (1 - \eta)^{N-1} (r - c) k_p. \tag{2}
\]

- Under some conditions, solutions to (2) and (1) indeed exist, such that $H$ and $G$ are monotone increasing.
Equilibrium

- Perfect Bayesian Nash equilibrium.
- When is it possible to put the optimal strategies of traders and dealers together?
- 2 kinds of PBE’s exists under conditions (in general only one equilibrium possible for given parameters).
High-Level Implications

- Total **trading volume increases** if a platform is introduced.
- Expected **markups become lower** for both kinds of traders.
- $s \to 0$ or $\mu \to 1$: Introducing a platform is **not profitable** for dealers.
- $N \to \infty$: Introducing a platform is **profitable** for dealers.

- Due to higher turnover, an HM is always **more efficient**.
- In the HM, dealers can increase profits by **collectively choosing** an appropriate $\eta$...
A Trivial Result?

Additional trading venue in HM

$\Rightarrow$ more quotes

$\Rightarrow$ more competition

$\Rightarrow$ lower markups

$\Rightarrow$ higher market entry and turnover?

- Step (2) not necessarily the case (under different assumptions).
- Assume $N$ dealers are on the platform and $N$ dealers are in the bilateral market.
- Then less quoting activity, lower markups and higher market participation in the HM is possible!
- The specific kind of competition matters!
Micro-Level Implications:

On Turnover:
- Fast traders trade relatively more in the bilateral market (compared to slow traders).
- Turnover in the bilateral market decreases, if a platform is introduced.

Price dispersion due to competition for fast traders:
- Platform may lead to higher price dispersion in the bilateral market.
Characteristics of market participants affect which structure dealers find more attractive.

- $N \to \infty$: HM better
- $s \to 0$ or $\mu \to 1$: PBM better

An HM always leads to more efficient trades.

Even if the HM has been introduced, dealers have incentives to keep markups high and turnover inefficiently low.