

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

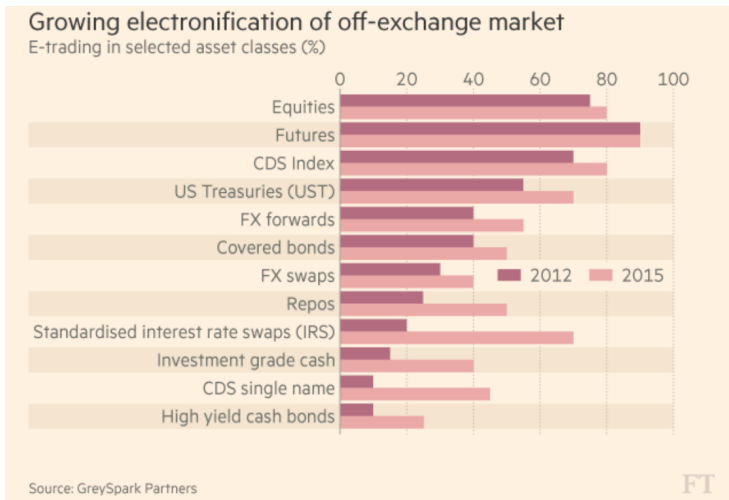
Sebastian Vogel

EPFL and Swiss Finance Institute

sebastian.vogel@epfl.ch

December 21, 2017

Growing Electronification in OTC Markets



Source: [ICAP's future reflects derivatives market in transition](#) , Financial Times, October 5, 2016.

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:

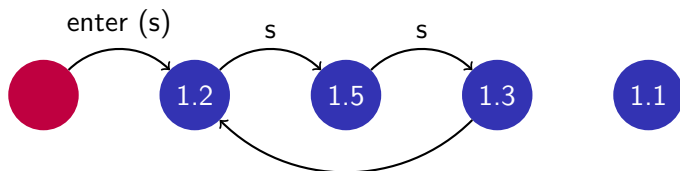
- I model prices and market participation in a hybrid OTC market structure (HM) in which traders can buy an asset either in a bilateral dealer market or on an electronic trading platform.
- I compare results to a pure bilateral market (PBM).

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?

Bilateral Dealer Market

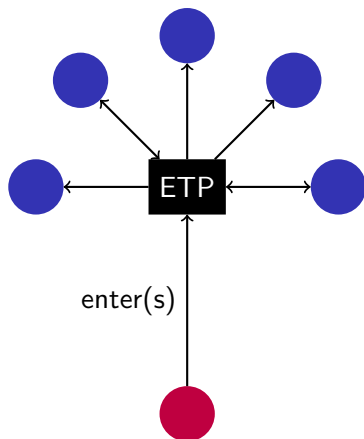
- A number of dealers can deliver an asset to a trader.
- The trader faces a search problem (search potentially costly, search costs s).



Duffie, Dworczak and Zhu (2016)

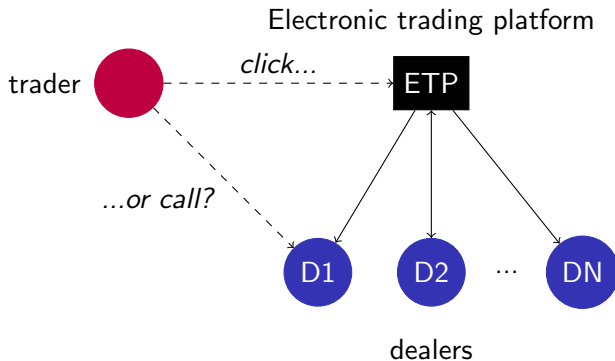
Electronic Trading Platforms

- Trading protocol: request-for-quote (RFQ).
- Dealers' responses are uncertain:
 - costly attention...
 - risk management...
 - collusion?



Hendershott and Madhavan (2015)

The Hybrid Market



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

$$r_b := \mathbb{E}(\min(p_b, r_b)) + s,$$

$$r_p := (1 - (1 - \eta)^N) \cdot \mathbb{E}(\min(q, r_p)) + (1 - \eta)^N r_p + s,$$

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...

The Dealers' Pricing Problem

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

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

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

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

- Perfect Bayesian Nash equilibrium.
- When is it possible to put the optimal strategies of traders and dealers together?
- 2 kinds of PBE's exist under conditions (in general only one equilibrium is 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.
 - $s \rightarrow 0$ or $\mu \rightarrow 1$: introducing a platform is **not profitable** for dealers.
 - $N \rightarrow \infty$: 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 η ...

A Trivial Result?

Additional trading venue in HM (1)

⇒ more quotes (2)

⇒ more competition (3)

⇒ lower markups (4)

⇒ higher market entry and turnover? (5)

- 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!

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.
 - $N \rightarrow \infty$: HM better
 - $s \rightarrow 0$ or $\mu \rightarrow 1$: 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.