

# **“Cross-Venue Liquidity Provision: High Frequency Trading and Ghost Liquidity”**

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**Discussion**

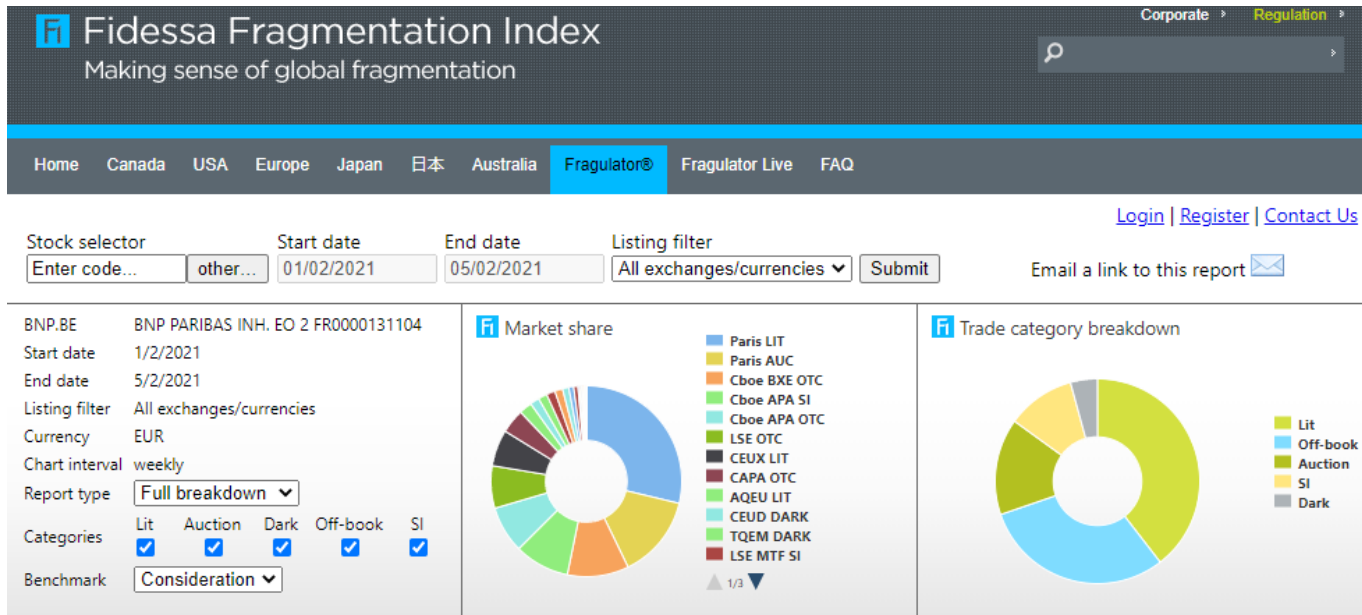
**by**

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# Background

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- Trading in equity markets is fragmented



# Is Market Fragmentation Good or Bad?

- **Pros**

- It creates competition between trading platforms (lower fees)
- It intensifies competition between liquidity providers, which increases consolidated liquidity (e.g., Foucault and Menkveld (2008, JoF), O'Hara and Ye (2011, JFE), Degryse, de Jong and Van Kervel (2015, RoF), Gresse (2017, JFM)).

- **Cons**

- **Artificial liquidity inflation ("Ghost liquidity")**
- Makes routing decisions more complex and prone to agency conflicts for brokers
- Weaken any benefits of price priority (and other secondary priority rules)

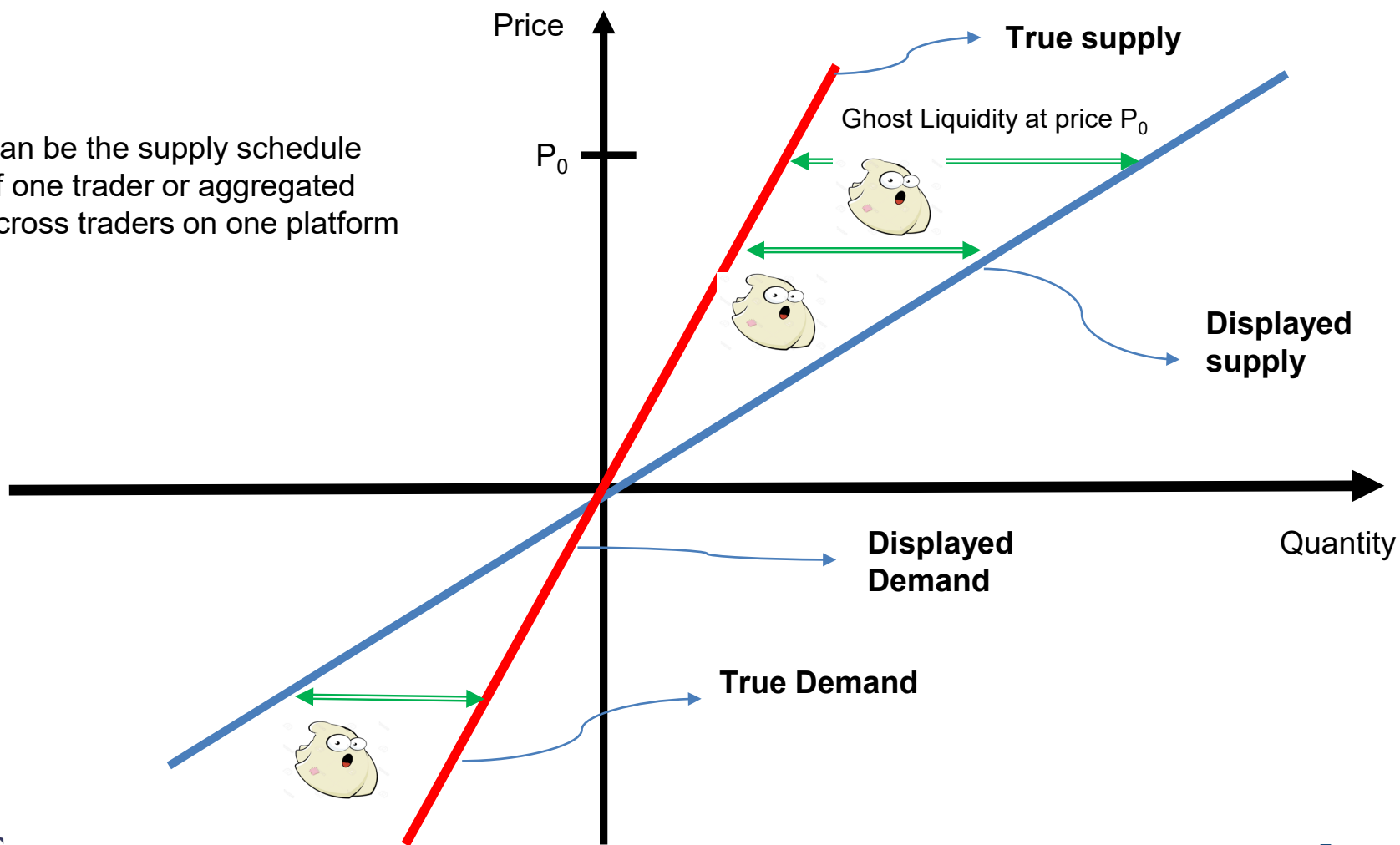
# GHOST LIQUIDITY

- **Traders (agency or prop traders) submit multiple limit orders in multiple trading platforms**
  - For instance, Trader A places two buy limit orders for 1,000 shares for BNP, one on Euronext Paris and one on Cboe
  - But trader A really needs to buy only 1,000 shares
  - After execution of her limit order on one platform, trader A cancels his limit order on the other one.
  - True contribution of trader A to buy side consolidated depth is 1,000 shares, not 2,000

# WHY IS THIS A PROBLEM?

- Existing findings regarding the positive effect of market fragmentation might overestimate the true effect of fragmentation on liquidity
- Make it more difficult for participants to assess the exact state of supply and demand in limit order book
  - May make it more difficult for brokers to get best execution for their clients.
- Increase the ratio of cancellations to trade. Can slow down the speed at which information is disseminated

Can be the supply schedule  
of one trader or aggregated  
across traders on one platform



# GOALS OF THE PAPER

- **Assess the importance of Ghost Liquidity for a stratified sample of 91 stocks listed on 9 European Exchanges (Paris, LSE, Deutsche Börse etc.) in May 2013.**
  - "Satellite" markets: Chi-X, BATS and Turquoise
- **Analyze its determinants (fragmentation, volatility, traders' types, trading volume etc.)**
- **Analyze its effect on trading costs (effective bid-ask spreads)**



# METHODOLOGY

- **Very rich data. The authors can (i) track non-marketable orders submitted in multiple platforms by a given member (388 distinct members) and (ii) classify members according to various criteria:**
  - Local vs Global, Agent vs prop traders, Fast vs Slow, Algos vs High frequency traders, Liquidity supplier vs Liquidity demander
  - The type of a member can vary across stocks.
- **Ghost Liquidity Definition of Ghost Liquidity (broader than just duplicated orders at a given price): Consider the execution of a sell limit order by Member i on trading platform X for stock j at time t.**
  - on platform Y due to execution on X is the reduction in the supply of stock j by Member i on platform Y in the 10 milliseconds (or larger time windows, up to 100 ms) following the trade (net or gross of the volume traded over the 10ms) and normalized by total liquidity supply or trade size.
  - Symmetric for execution of a buy limit order.

## Main Findings

# MAIN FINDINGS

- **The average participant cancels about 20 shares on platform Y for every 100 shares executed on platform X (i.e., its supply is reduced by 100 shares (filled) and 20 shares (unfilled)).**
- **But there are variations across primary markets, satellite markets, stocks and types of members. Namely:**
  - Prop traders (especially HFTs)'s ghost liquidity is larger than for slow traders' and non prop traders' ghost liquidity
  - Liquidity suppliers' ghost liquidity is larger than liquidity takers' ghost liquidity
  - Ghost liquidity is smaller for traders with more extreme inventory positions
  - More shares are cancelled on satellite platforms following a trade on the primary market than vice versa

# MAIN FINDINGS

- **Ghost Liquidity and Trading Costs**
  - There is a positive association between the average daily effective spreads in a stock paid by algo liquidity takers and the average ghost liquidity in this stock (averaged across all trades and members in a day).
  - There is a positive association between the average daily effective spreads in a stock paid by slow liquidity takers and the average daily Ghost Liquidity on the primary venue.

## Comments

# Effects

- **Effect of Ghost Liquidity on market quality.**

- There is a positive association between daily ghost liquidity and effective spreads paid by slow and algo traders. **Not a causal association.**
  - May reflect an omitted variable (e.g., if ghost liquidity reflects optimal risk management for fast market makers, any variable that increases inventory risk and is not controlled for in the analysis)
- **Would it be possible to find an instrument for Ghost Liquidity?** (A shock that varies the extent of Ghost Liquidity without directly affecting bid-ask spreads?).
  - Exogenous shocks to latencies are natural candidates (limit order duplication becomes riskier when latencies increase).
- What would be the ideal experiment to test whether Ghost liquidity is bad or good for market quality? (how to turn on and off the possibility of duplicated limit orders?)

# Mechanism(s)

- **To interpret the findings (especially for policy or market design), it is important to understand why traders (i) duplicate their limit orders and (ii) cancel them.**
  - More generally how traders (dealers and brokers) manage their standing limit orders.
  - There is not much guidance in the economic literature on this question (it focuses on the one-time choice between limit orders and market orders, but not so much on limit order management).
  - The objective functions of dealers and brokers are different  $\Rightarrow$  Optimal order submission and management strategies are likely to be different.
  - Findings here seem to be more consistent with market making strategies (principal orders account for 51% of duplicated orders vs 16% for agents; Table 6).

# Mechanism(s)

- **My hypothesis: Limit order duplication (and ghost liquidity) is an inventory management tool for market makers**
  - Study the evolution of contra side liquidity after cancellations of duplicated limit orders (e.g., after buying 1,000 shares, Trader A cancels buy limit orders but resubmits **duplicated sell limit** orders for 1,000 shares) ⇒ Effect on liquidity is ambiguous.
  - Important Van Kervel finds that cancellations on the one side of LOB X following trades on market Y are followed by resubmissions on the opposite side of LOB X.
- **Asymmetric Information: Execution of buy limit orders for say BNP on Cboe is a signal, which requires to reprice BNP on all platforms (consistent with theory; e.g., Glosten (1994, JoF) and Van Kervel (2015, RFS)).**
  - This generates cancellations of limit orders (duplicated or not) on all platforms as ghost liquidity does.
  - You do not find evidence of this mechanism. This is a bit surprising given the evidence in van Kervel (2015). This should be explored more: (i) Is ghost liquidity affected by adverse selection costs? (ii) Extend the window over which **refill rates** are measured (10 ms might be too short).



# Mechanism(s)

- **Segmentation or Fragmentation?**

- Some traders ("locals"; 22% of all stock/members combination) only operate in one market (the primary market) + even traders who operate in multiple markets ("global") may have a preference for execution in one particular platform (e.g., due to lower trading or clearing fees).
- Optimal search for liquidity may then require posting limit orders in all markets. Limit order duplication/Ghost liquidity is then due to segmentation (some traders exclusively or mainly trade on one platform) rather than fragmentation per se.
- May explain why the extent to which there are "smart routers" in a stock reduce ghost liquidity (Table 7).
- Can you measure the extent to which trading in a stock is segmented? Maybe interesting to directly analyze the role played by segmentation on limit order duplication and the size of ghost liquidity.

# Broad Picture

- **Why is ghost liquidity an issue (the term "ghost" looks like it could be bad)?**
  - Displayed liquidity supply does not correspond to true liquidity supply
- **But if so why is it more an issue than:**
  - **Hidden liquidity:** A significant fraction of liquidity is hidden ("hidden limit orders")
  - **"Latent liquidity":** some traders monitor the market and supply liquidity opportunistically
  - **"Off market liquidity":** A significant amount of liquidity provision is "off market" (e.g., via systematic)
- **All these features makes liquidity measurement based on displayed quotes difficult**

# Conclusions

- **Interesting paper with unique data**
  - Member level data is a plus and rather unique to the study.
  - Clean measurement of Ghost Liquidity
  - Suggest that ghost liquidity is significant but not sufficient to turn around the findings regarding the positive effect of fragmentation on liquidity.
- **Need to better develop and test possible mechanisms that explain limit order duplications.**
  - Would help to understand why there is a positive association between illiquidity and Ghost Liquidity and address policy issues
  - Maybe focus more on limit order duplication in itself, which as a consequence makes liquidity more fleeting (but not the only cause)