Tick Size: Theory and Evidence

Barbara Rindi
Bocconi University and IGIER

Joint work with:
Sabrina Buti (University of Toronto)
Francesco Consonni (Bocconi University)
Yuanji Wen (Deakin University)
Ingrid Werner (Ohio State University)

Outline

• Research questions
  – Motivation
  – Relevance of Tick Size Change
• Theory:
  – Model of Limit Order Book
  – Empirical Predictions
• Empirics:
  – Europe: LSE
  – U.S. : Nasdaq & NYSE
• Conclusions
  – SEC: Recent Proposal for a new Pilot
Tick Size: Minimum Price Improvement

\[ \tau = \text{inside spread} \]

Tick Size Affects Supply and Demand of Liquidity

The seller's choice is between:
- posting at \( A_1 \) a LIMIT SELL ORDER
- hitting \( B_1 \) with a MARKET SELL ORDER

\( \tau = \text{price improvement} \)

\[ v=1 \]
Decimalization

Angel, Harris and Spatt, 2010 and Update 2013

Current scheme in U.S. (post decimalization):
$0.01 for stocks priced $1 and above
$0.0001 for stocks priced below $1.00

Figure 2: Value-Weighted Daily Average Effective Spread, NYSE, 1991-2002

2001 Decimalization


Effective Bid-Ask Spreads from Rule 605 Reports

Source: Public Rule 605 Reports from Thomson, Market orders 100-9,999 shares

Does One Tick-Size Fit All?

- The 2012 JOBS Act puts the focus squarely on the role of the tick size for U.S. capital formation and secondary market liquidity.
- Is the current tick size “too small” for Emerging Growth Companies (EGCs)?
  - Tick Size
  - Limit Orders (LO) => Market Making
  - Liquidity (depth?) and analyst coverage
  - Attract investors to the market => volume => IPOs

- The SEC has been charged with evaluating this hypothesis by the U.S. Congress and therefore recently published the proposed tick size pilot for public comment: http://www.sec.gov/rules/sro/nms/2014/34-73511.pdf
Research Questions

**Market Orders vs Limit Orders?**
- Quoted and Relative Spread?
- BBO Depth and Aggregate Depth?
- Volume?
- Welfare of market participants?

**Relative Tick Size matters?**

\[ \frac{\tau}{v} \quad \downarrow \quad \downarrow \tau \quad \uparrow \quad \uparrow v \]

**Equivalence holds?**

**Stock Characteristics affect outcome?**
- High vs Low-price stocks?
- Liquid vs Less Liquid books?

Our Answers

➢ Theory:

Model of Limit Order Book (LOB) to draw empirical predictions on:

- Large vs small absolute tick size $\Delta$
- Equivalence: absolute tick size $\Delta$ vs asset price $\Delta$
  - liquid vs less liquid books
  - high-priced vs low-priced stocks

➢ Empirics:
  - LSE stocks
  - Nasdaq stocks
  - Nasdaq&NYSE stocks: relative tick size $\Delta$ → Fama-MacBeth

Large Absolute tick size → RDD
Most Related Theoretical Literature

- Seppi (RFS, 1997) \(\rightarrow\) Specialist market
- Cordella and Foucault (JFI, 1999) \(\rightarrow\) Dealers market
- Kadan (JFI, 2006)
- Foucault, Kadan and Kandel (RFS, 2005) \(\rightarrow\) LOB with limit orders being price improving
- Goettler, Parlour and Rajan (JF, 2005) \(\rightarrow\) LOB consider a reduction in tick size from 1/8 to 1/16 and adjust the grid as well as the position of the trading crowd (TC) in such a way that market orders (MO) are encouraged

Evidence on Tick Size Reduction

<table>
<thead>
<tr>
<th>Related Work</th>
<th>Market</th>
<th>Stock</th>
<th>Spread</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahn et al. (JFI, 1996)</td>
<td>AMEX</td>
<td>low-priced &amp; liquid</td>
<td>↓</td>
<td>--</td>
</tr>
<tr>
<td>Ronen &amp; Weaver (JFM, 2001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bacidore (JFI, 1997)</td>
<td>TSE</td>
<td>liquid</td>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>Griffiths et al (JFI, 1998)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glostein &amp; Kavajecz (JFE, 2000)</td>
<td>NYSE/NASDAQ</td>
<td>liquid</td>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>Bessembinder (JFQA, 2003)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jones &amp; Lipson (JFE, 2001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Evidence on Relative Tick Size Reduction

| O’Hara, Saar, Zhong (2014)       | NYSE     | All stocks     | SQuoted SRelative | + | ↓ |
One asset with value $v$ is exchanged over four trading periods: $t = t_1, t_2, t_3, t_4$

- Market opens with an empty book at $t_1$
- Trade size is normalized to one unit
- A trading crowd absorbs any amount of liquidity demanded at $A_2$ and $B_2$
- Time and price priority are enforced
- At each trading round Nature draws one risk neutral trader with a personal valuation of the asset
  - Buy/Sell/No Trade
  - Market/Limit Order $\beta \sim U[0, 2]$

### Traders’ Asset Valuation

- $\beta = 0$
  - Impatient sellers
  - Market order

- $\beta = 1$
  - Patient sellers
  - Limit order

- $\beta = 2$
  - Patient buyers
  - Limit order
  - Impatient buyers
  - Market order
Traders’ Strategy Space

<table>
<thead>
<tr>
<th>Strategy</th>
<th>$H_t$</th>
<th>$U(\cdot)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Sell Order</td>
<td>$-1^{B_{k'}}$</td>
<td>$B_{k'} - \beta v$</td>
</tr>
<tr>
<td>Limit Sell Order</td>
<td>$1^{A_k}$</td>
<td>$p_t(A_k</td>
</tr>
<tr>
<td>No Trade</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Limit Buy Order</td>
<td>$1^{E_k}$</td>
<td>$p_t(B_k</td>
</tr>
<tr>
<td>Market Buy Order</td>
<td>$-1^{A_{k'}}$</td>
<td>$\beta v - A_{k'}$</td>
</tr>
</tbody>
</table>

Optimal Strategy (e.g. Sell Side) - I

- At $t_2$ a seller come to the markets and can choose between a market/limit order to sell, or no trade: $H_t = -1^{B_k}, 1^{A_k}, 0$

- The trader can choose between:
  - a market sell order at $B_2$
  - a limit sell order at $A_2$
  - $(A_2 - \beta v) \Pr(A_2|S_{t_2})$

- This trade-off depends on
  - Current state of the book
  - Future states of the book that affect the order’s execution probability, e.g., $\Pr(A_2|S_{t_2})$
Extensive Form of the Game

Solved by backward induction

Model Solution (I)

- Start by period \( t_4 \):
  \[
  \max_{H_{t_4}(.)} \pi^e [-1^{A_{K'}} - 1^{B_{K'}}, 0 | S_{t_3}, \beta]
  \]

- The outcome of this are the equilibrium strategies \( H_{t_4}^{n} \) which depend on \( \beta \sim U[0,2] \)

- We solve for the \( \beta \)-thresholds which make agents indifferent between two consecutive strategies by equating expected profits from these strategies:
  \[
  \beta_{t_4}^{H_{t_4}^{n-1},H_{t_4}^{n}} : \pi_{t_4}^{e}(H_{t_4}^{n-1}|S_{t_3}) - \pi_{t_4}^{e}(H_{t_4}^{n}|S_{t_3}) = 0
  \]
Model Solution (II)

- This way we can solve for the ex-ante probability that a trader at $t_4$ chooses the $n^{th}$ strategy $H_{t_4}^n$ as this is equal to the probability that $\beta$ lies between the two thresholds which delimit this strategy:

$$
\begin{array}{c}
\Pr(H_{t_4}^n|S_t) = F(\beta_{t_4}^{H_{t_4}^n,H_{t_4}^{n+1}}|S_t) - F(\beta_{t_4}^{H_{t_4}^{n-1},H_{t_4}^n}|S_t)
\end{array}
$$

- At $t_3$ these probabilities are used to compute the execution probabilities of limit orders, and the procedure is repeated up to $t_1$.

---

**Tick Size: Large Absolute Reduction**

Large Tick Reduction: $\tau \rightarrow \frac{\tau}{3}$

- Consider
  - LM: with a large tick all periods, and
  - SM: with the tick size reduced from $t_2$ onwards
t1: empty book $\Rightarrow$ t2: 3 states of book

$H_i = -1^* \Rightarrow \text{Empty} \quad \Rightarrow \quad [\text{Less liquid}]

$H_i = +1^* \Rightarrow 1 \text{ share on } A_i \quad \Rightarrow \quad [\text{Liquid}]

$H_i = +1^* \Rightarrow 1 \text{ share on } A_i \quad \Rightarrow \quad [\text{Liquid}]

• Compute indicators of market quality and welfare from t2 onward for LM
• Compare measures of market quality and welfare across equilibria at t2

Tick Size: Large Absolute Reduction
Empirical Predictions

<table>
<thead>
<tr>
<th>Tick Size</th>
<th>Book</th>
<th>Spread Quoted &amp; Relative</th>
<th>BBO Depth</th>
<th>Total Depth</th>
<th>Volume</th>
<th>Welfare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large reduction</td>
<td>Liquid</td>
<td>$\downarrow$</td>
<td>$\downarrow$</td>
<td>$\uparrow$</td>
<td>$\downarrow$</td>
<td>$\downarrow$</td>
</tr>
<tr>
<td></td>
<td>Less Liquid</td>
<td>$\uparrow$</td>
<td>$\downarrow$</td>
<td>$\downarrow$</td>
<td>$\uparrow$</td>
<td>$\uparrow$</td>
</tr>
</tbody>
</table>

Market Quality Deteriorates
Volume Improves
Market Quality Improves
Volume Deteriorates
Large Absolute Tick Size Reduction
Liquid Books

Traders undercut $A_1$ by posting orders at $a_1$

1. ↓ price improvement from LO ↓ incentive to post LO
2. ↑ execution probability of LO ↑ incentive to post LO

2. > 1. - Liquid Books MOs>LOs - Traders switch MO to LO:
   ↑ LO (supply ask side) and ↓ MO (demand ask side)

MARKET QUALITY & WELFARE?
• Spread
• Total Depth
• Volume
• Welfare

Large Absolute Tick Size Reduction
Less Liquid Books

NO ORDERS posted at $A_1$

NOTHING TO UNDERCUT but FEAR OF BEING UNDERCUT!

↓ incentive to post LO

Traders switch from LO to MO:
↓ LO (liquidity supply) and ↑ MO (liquidity demand)

MARKET QUALITY & WELFARE?
• Spread
• Total Depth and BBO
• Volume
• Welfare
**Relative Tick Size Change**

\[
\frac{\tau}{v}
\]

**EQUIVALENCE HOLDS?**

**YES!**

- Relative Spread
- BBO Depth
- Total Depth
- Volume
- Welfare

..but..

Quoted Spread \(\uparrow\) proportional to asset value

---

**Relative Tick Size Change**

\[
\frac{\tau}{v}
\]

**Large \(\Delta\)**

| A1 | 1+1/2 x 0.1 | 1.05 |
| A2 | 1+3/2 x 0.1 | 1.15 |
| B1 | 1-1/2 x 0.1 | 0.95 |
| B2 | 1-3/2 x 0.1 | 0.85 |

\(v=1\)

| a1 | 1+1/2 x 0.1/3 | 1.02 |
| a2 | 1+3/2 x 0.1/3 | 1.05 |
| a3 | 1+5/2 x 0.1/3 | 1.08 |
| a4 | 1+7/2 x 0.1/3 | 1.12 |
| a5 | 1+9/2 x 0.1/3 | 1.15 |

\(v=3\)

| B1 | 1-1/2 x 0.1/3 | 0.95 |
| B2 | 1-3/2 x 0.1/3 | 0.95 |
| B3 | 1-5/2 x 0.1/3 | 0.92 |
| B4 | 1-7/2 x 0.1/3 | 0.88 |
| B5 | 1-9/2 x 0.1/3 | 0.85 |

\(\tau = \frac{\tau}{3}\)

Tick = 0.1 & \(v=1\)

| A1 | 3+1/2 x 0.1 | 3.05 |
| A2 | 3+3/2 x 0.1 | 3.15 |
| A3 | 3+5/2 x 0.1 | 3.25 |
| A4 | 3+7/2 x 0.1 | 3.35 |
| A5 | 3+9/2 x 0.1 | 3.45 |

\(v=3\)

| B1 | 3-1/2 x 0.1 | 2.95 |
| B2 | 3-3/2 x 0.1 | 2.85 |
| B3 | 3-5/2 x 0.1 | 2.75 |
| B4 | 3-7/2 x 0.1 | 2.65 |
| B5 | 3-9/2 x 0.1 | 2.55 |

9 ticks = 0.9 = PI
Tick Size Increase

Price Reduction = Relative Tick Size Increase

Empirical Predictions

<table>
<thead>
<tr>
<th>Tick Size/Asset Value</th>
<th>Book</th>
<th>Quoted Spread</th>
<th>Relative Spread</th>
<th>BBO Depth</th>
<th>Total Depth</th>
<th>Volume</th>
<th>Welfare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Tick Size Increase</td>
<td>Liquid</td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Less Liquid</td>
<td><img src="down.png" alt="down" /></td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
<td></td>
</tr>
</tbody>
</table>

| Large Price Reduction | Liquid | ![down](down.png) | ![down](down.png) | ![up](up.png) | ![up](up.png) | ![up](up.png) |
|                       | Less Liquid | ![down](down.png) | ![down](down.png) | ![up](up.png) | ![up](up.png) | ![up](up.png) |

Stronger for High-Priced Stocks

<table>
<thead>
<tr>
<th>Tick Size/Asset value</th>
<th>Quoted Spread</th>
<th>Relative Spread</th>
<th>BBO Depth</th>
<th>Total Depth</th>
<th>Volume</th>
<th>Welfare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small TS Increase</td>
<td></td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
</tr>
<tr>
<td>Small Price Reduction</td>
<td><img src="down.png" alt="down" /></td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
<td><img src="up.png" alt="up" /></td>
</tr>
</tbody>
</table>

Regression Discontinuity Design (RDD) and Fama MacBeth Regressions

- Test the effects of an **LARGE absolute tick size** ↑
  - 1 to 1 conformity with model’s predictions for large tick size change for liquid books
    - BBODepth ↑ Quoted & Relative Spread ↑ Volume ↑
  - **European Sample** – LSE Stocks
    - Includes stocks getting across the thresholds of LSE tick size grid
  - **US Sample** – Nasdaq Stocks
    - Includes stocks getting across the USD1 threshold

- Test the effects of a **relative tick size** ↑ (↓ stock price)
  - Exploit the fact that absolute tick size is constant (0.01) for stocks priced above USD1
  - No control for price change so can only test predictions for:
    - BBODepth ↑ Quoted Spread ↓: *do not change with state book and magnitude* \( \Delta p \)
  - **US Sample** – Nasdaq and NYSE Stocks → Fama MacBeth
    - Includes randomly-picked stocks (all above $1) from a sample of 180 stocks stratified by market cap and price
European Market Sample #1

- Sample: LSE stocks during January 2013 – December 2013
  - LSE Tick size Grid: as stock price crosses the threshold, the absolute tick size increases

  **LSE Tick Size Grid**

<table>
<thead>
<tr>
<th>Stock Price</th>
<th>Tick Size</th>
<th>Relative Tick Size: Tick Size / Stock Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GBP</td>
<td>GBX</td>
<td>GBX</td>
</tr>
<tr>
<td>100</td>
<td>10</td>
<td>1000</td>
</tr>
<tr>
<td>50</td>
<td>5</td>
<td>1000</td>
</tr>
<tr>
<td>10</td>
<td>0.1</td>
<td>1000</td>
</tr>
<tr>
<td>0.5</td>
<td>0.05</td>
<td>1000</td>
</tr>
<tr>
<td>0.1</td>
<td>0.01</td>
<td>1000</td>
</tr>
</tbody>
</table>

- Selection criteria:
  - Stocks with price crossing one of the existing thresholds at least once
  - Stocks falling in a segment-price group that has at least 10 stocks

- Final sample:
  - 142 stocks
  - 4 groups

LSE – Regression Discontinuity Design (RDD)

- Quasi-experimental design → the probability of receiving a treatment (tick size) changes discontinuously as a function of an underlying variable (stock price)
- Sharp design → treatment known and depends in a deterministic way on price
LSE Summary Stats

<table>
<thead>
<tr>
<th>Price (GBX)</th>
<th>Number of stocks</th>
<th>Tick Size TS (GBX)</th>
<th>Bid Depth # of shares</th>
<th>Quoted Spread (GBX)</th>
<th>Relative Spread (%)</th>
<th>Volume # of shares</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>41</td>
<td>TS above 1</td>
<td>2667</td>
<td>4.62</td>
<td>0.45</td>
<td>18248</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TS below 0.5</td>
<td>1755</td>
<td>3.97</td>
<td>0.40</td>
<td>18003</td>
</tr>
<tr>
<td>500</td>
<td>60</td>
<td>TS above 0.5</td>
<td>2975</td>
<td>2.53</td>
<td>0.50</td>
<td>18126</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TS below 0.1</td>
<td>1750</td>
<td>2.39</td>
<td>0.48</td>
<td>21046</td>
</tr>
<tr>
<td>100</td>
<td>21</td>
<td>TS above 0.1</td>
<td>12327</td>
<td>0.36</td>
<td>0.35</td>
<td>93660</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TS below 0.05</td>
<td>9047</td>
<td>0.35</td>
<td>0.35</td>
<td>87435</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>TS above 0.05</td>
<td>50084</td>
<td>0.52</td>
<td>3.71</td>
<td>136636</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TS below 0.01</td>
<td>32726</td>
<td>0.38</td>
<td>4.56</td>
<td>142050</td>
</tr>
</tbody>
</table>

LSE – Regression Discontinuity Design (RDD): 500 GBX

- Local linear regression as suggested by Gelman and Imbens (NBER 2014)

\[ y_{i,t} = b_0 + b_1 D_{i,t} + b_2 (price_{i,t} - c) + b_3 (price_{i,t} - c) D_{i,t} + \epsilon_{i,t} \]

where \( D_{i,t} = \begin{cases} 1 & \text{if } price_{i,t} \geq c \\ 0 & \text{otherwise} \end{cases} \)

- \( D_{i,t} \) as the price crosses the threshold, the absolute tick size increases
- \( price_{i,t} \) is reduced by \( c \) to have the threshold at zero. \( c \) is GBX500.
- \( y_{i,t} \) can be bid depth, quoted or relative spread, or volume. Estimation is done using a panel regression with standard errors clustered by stock.

### Predictions for Liquid Books confirmed

<table>
<thead>
<tr>
<th>Bid Depth</th>
<th>Quoted Spread</th>
<th>Relative Spread</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>-0.1072**</td>
<td>-0.0002**</td>
<td>1013.9381</td>
</tr>
<tr>
<td>(2.16)</td>
<td>(3.22)</td>
<td>(1.54)</td>
<td></td>
</tr>
<tr>
<td>Dummy</td>
<td>0.4561***</td>
<td>0.0010***</td>
<td>-10691.7767</td>
</tr>
<tr>
<td>(4.94)</td>
<td>(3.02)</td>
<td>(-3.33)</td>
<td></td>
</tr>
<tr>
<td>Price*Dummy</td>
<td>-1.00</td>
<td>0.0498</td>
<td>0.0001</td>
</tr>
<tr>
<td>(-0.80)</td>
<td>(1.02)</td>
<td>(1.08)</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>33736</td>
<td>33736</td>
<td>33736</td>
</tr>
<tr>
<td>FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.2063</td>
<td>0.7049</td>
<td>0.7062</td>
</tr>
</tbody>
</table>

| Predicates for Liquid Books confirmed |

\( t \) statistics in parentheses
\* \( p < 0.10 \), \*\* \( p < 0.05 \), \*\*\* \( p < 0.01 \)
LSE - RDD ➔ All Groups

\[ y_{i,t} = b_0 + b_1 D_{i,t} + b_2 (price_{i,t} - c) + b_3 (price_{i,t} - c)D_{i,t} + \varepsilon_{i,t} \]

where \( D_{i,t} = \begin{cases} 
1 & \text{if } price_{i,t} \geq c \\
0 & \text{otherwise} 
\end{cases} \)

<table>
<thead>
<tr>
<th>Stock Price</th>
<th>Bid Depth Significance</th>
<th>Bandwidths</th>
<th>Quoted Spread Significance</th>
<th>Bandwidths</th>
<th>Relative Spread Significance</th>
<th>Bandwidths</th>
<th>Volume Significance</th>
<th>Bandwidths</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 GBX</td>
<td>*</td>
<td>(3/3)</td>
<td>*</td>
<td>(2/3)</td>
<td>*</td>
<td>(2/3)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>100 GBX</td>
<td>*</td>
<td>(1/3)</td>
<td>***</td>
<td>(2/3)</td>
<td>***</td>
<td>(2/3)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>500 GBX</td>
<td>***</td>
<td>(2/3)</td>
<td>***</td>
<td>(1/3)</td>
<td>***</td>
<td>(1/3)</td>
<td>-</td>
<td>***</td>
</tr>
<tr>
<td>1000 GBX</td>
<td>***</td>
<td>(2/3)</td>
<td>***</td>
<td>(2/3)</td>
<td>***</td>
<td>(2/3)</td>
<td>-</td>
<td>***</td>
</tr>
</tbody>
</table>

- c: threshold ➔ GBX 10, 100, 500 or 1000 depending on the group.
- \( y_{it} \) can be bid depth, quoted spread, relative spread or volume.
- The bandwidths considered are of 1%, 2% and 3% respectively: 3/3 means that the coefficient is significance for all the three bandwidths.
- Optimal bandwidths: 1000GBX: 2.33%; 500GBX: 2.05%; 100GBX: 2.65%; 10GBX: 2.6%
- Estimation is done using a fixed effect panel regression with standard errors clustered by stock.

Conclusions (I): SEC Pilot?

What can we say about the proposed SEC tick size increase?

AIM of the proposed tick size ➔:

- ➔ Tick Size
- ➔ LO ➔ ➔ Market Making
- ➔ Liquidity (depth?) and analyst coverage
- ➔ Attract investors to the market ➔ ➔ volume ➔ ➔ IPOs

- Our model does not focus on analysts’ coverage but only on liquidity.
- Our results show that the connections above are not so straightforward.
- Clearly aiming at ➔ both market quality and volume is not an easy task, given the trade-off between liquidity supply and liquidity demand.
- Hence it can be achieved ONLY by attracting new trading from other markets in such a way that overall: \( \Delta LO \uparrow > \Delta MO \uparrow \)
**Tick Size Increase**

**From Theory to Empirics**

<table>
<thead>
<tr>
<th>Tick Size</th>
<th>Book</th>
<th>Liquidity Supply</th>
<th>Liquidity Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Quoted Spread</td>
<td>Relative Spread</td>
</tr>
<tr>
<td>Large</td>
<td>Liquid</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Tick Size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase</td>
<td>LSE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less</td>
<td>Liquid</td>
<td>↓</td>
<td>↑</td>
</tr>
</tbody>
</table>

**Effects from Inter-market Competition**

<table>
<thead>
<tr>
<th>Endogenous entry HFTs and other Investors</th>
<th>Market Makers HFTs</th>
<th>O’Hara, Saar and Zhung (2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Takers SORs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conclusions (II)**

**Effects of ↑ tick size (PILOT)**

**LIQUID BOOKS**
1. Model: not supportive of Pilot in terms of total depth
2. Empirics: not supportive of Pilot in terms of volume
3. With endogenous entry of HFTs and other investors, one may assume that market quality would improve but volume would further decrease.

**LESS LIQUID BOOKS**
1. Model: not supportive of Pilot in terms of volume
2. Empirics: supportive of Pilot in terms of depth but no evidence on volume

So: increasing the tick size would probably foster market making by HFT firms but NOT volume and therefore not necessarily more IPOs.

More analysts’ coverage? OSZ (2014) rightly note that HFT firms are not generally in the business to provide equity research! and anyway a 1 year pilot is not long enough to test whether the tick size change will ↑ IPOs!
Thank you!