Resiliency
Kempf, Mayston, Gehde-Trapp and Yadav

A Discussion

Venky Panchapagesan
IIM Bangalore
December 2015
Relevance of the Topic

• Extremely important in the post-algo world
  ▫ Relevant to regulators/markets
    • When liquidity provision is voluntary (no affirmative obligations)
      • How much do algos exacerbate shocks?
      • How fast does liquidity reappear after shocks?
  ▫ Relevant to practitioners too
    • Order scheduling is a big deal for algos (How to trade a large order over time?)

• Authors make a very good attempt to capture resiliency and its impact
What is Resiliency?

- **Standard theoretical construct**
  - Trader can be informed or uninformed
  - Prices move after a trade
    - Informed trade – remain at the new level
    - Uninformed trade – come back to the old level
  - Resiliency → speed at which prices come back to the old level after a large uninformed trade

- **Literature definitions**
  - Garbade → ‘new orders come in quickly to restore any order imbalance that may have skewed prices’
  - Kyle → ‘speed at which prices tend to converge to pre-liquidation value’
  - Harris → ‘how quickly prices revert to former levels after they change in response to a large (uninformed) order flow’
  - Foucault, Kadan and Kandel → ‘probability that, after a liquidity shock, the spread reverts to its former level before the next transaction’
A Simple Example

Prices increase but so do spreads $\rightarrow$ relative spreads may therefore remain unchanged

Is the market resilient?
- No (Harris/Kyle)
- Yes (this study)
Resiliency Measure

- Use a mean-reverting process (Ornstein-Uhlenbeck) structure
  - \[(\text{Current Liq} - \text{Past Liq}) = \text{Resiliency} \times (\text{Long-run Liq} - \text{Past Liq}) + \text{error}\]
  - How fast does the market move towards the long run average?
  - Half-life of resiliency \(\rightarrow \ln(2)/\text{resiliency measure}\)
Key Things About Market/Data

- **LSE**
  - Market share around 60% during the sample period
  - Smart order routing – getting the best price was only a fiduciary responsibility and not mandated by regulation like RegNMS in the US

- **Large and liquid stocks (FTSE 100)**
  - Tick sizes could be binding (frequency distribution of absolute spreads in ticks could be an interesting chart to see)
  - Some are cross-listed in other markets

- **Market structure**
  - Tick size – step function on price level
  - Trade size compression (distribution of trade sizes?)
  - Hidden and pegged order availability
  - Auto-refresh capabilities of order routing engines
  - Great level of pinging/cancellations making quotations not too representative of actual conditions

- **Order book data**
  - 5-min order book snapshots
General Comments

• To truly test resiliency (and FKK paper) we may need to examine stocks/days where informed trading is less likely

• Analysis during financial crisis
  ▫ Effect of short selling bans
Minor Comments

- Smaller tick size lowers spreads and not raise spreads as alluded to in the paper (p.19)

- Half-life computation (p.13)

- All equations in paper are numbered as 0