Equity trading costs have fallen less than commonly thought. Evidence using alternative trading cost estimators

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Abstract

Equity markets are evolving rapidly. The technology of financial intermediation has changed from monopolistic (manual) market makers to multiple algorithms providing liquidity in competing order books, both visible and dark. Has this changed market quality? To answer this, we need measures of market quality (liquidity) invariant to technological innovation in intermediation. In particular, innovation has led to a huge drop in order sizes due to order splitting. Orders are spread out both in time and across exchanges. We use data from the US and Norway to show that the last two decades' marked fall in average spreads is driven by the decline in transaction sizes. Using alternative estimators of transaction costs less sensitive to trade size, such as the Corwin and Schultz (2012) and Abdi and Ranaldo (2017) high/low estimators, we show that equity market quality has improved less than commonly thought.

The high frequency world of equity trading

Yesterdays monopolistic market maker has been replaced with competing algorithms providing continuous liquidity in numerous separate order books. Is this system an improvement?
Policy perspective: Key question: Have the changes to markets benefitted their end users: Investors trading equities, be they individuals, or mutual funds trading on behalf of the same individual.
Or: Has liquidity improved?
Aspects of liquidity: quantity, costs and time.
Empirically: need measures of market quality relevant for the end users.
Measures should be invariant to changes in the technology of financial intermediation.

Example problem 1: **Quantity**

Over time, a given quantity of trading by end users is supported by a increasing trading between financial intermediaries.

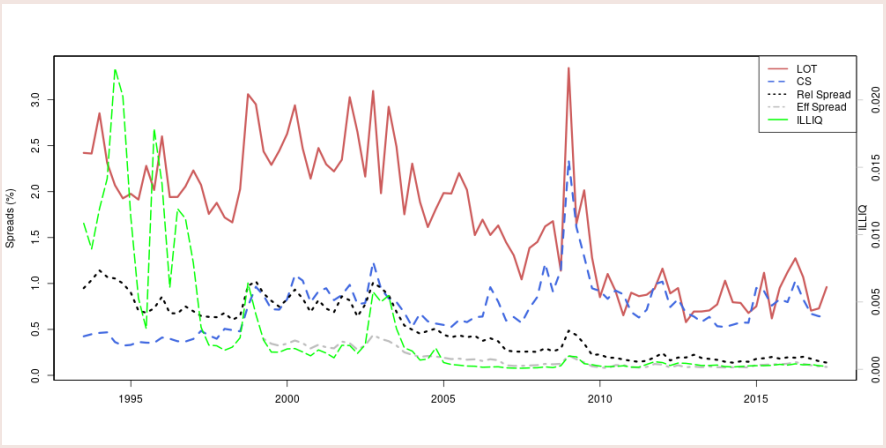
Example problem 2: **Spread measures**

In electronic markets traders to much larger degree than before rely on splitting orders, both across exchanges and across time, in an attempt to minimize price impact.
Dramatic decrease in average trade sizes.
A bid-ask spread estimate is really an estimate of an average transaction cost *for trading an average number of shares*.
As trade sizes fall, spreads fall.

Alternative estimates

Are there alternative liquidity estimates without these problems?
Possibility: Alternative class of estimators that relies on the difference between the highest and lowest trade price during a trading day.
Simple intuition: The highest price during the day is most likely to have been the result of a price improving trade, where the buyer was the active part in pushing the price (and crossing the spread). The highest price is therefore likely to have been at the ask. The opposite argument gives that the lowest price is likely to have been at the bid. The difference between the highest and lowest price therefore includes one (implicit) spread. While these estimators were developed to obviate the need for microstructure data, argue that this class of estimator also is less sensitive to changes in market structure.

Time Series Liquidity Measures, Norway (OBX firms) 1993–2017



The figure shows crossectional averages of quarterly estimates of transaction costs for OSE companies for the period 1993–2017. The OSE numbers are calculated using the 25 largest companies at the OSE (the constituents of the OBX index). Transaction costs are estimated using four methods: *LOT* is the Lesmond et al (1999) spread estimate, *CS* is the Corwin and Schultz (2012) spread estimate, *ILLIQ* is the Amihud measure of price impact, *Spread* is the closing spread, measured as the difference between closing bid and ask divided by the mid-price. The *Effective Spread* is the relative difference between midpoint and execution price, averaged over the day. The measures are calculated on a daily basis and averaged across days in a quarter. The averages are trimmed.

Research Question

Which liquidity estimators are invariant to average transaction sizes?
In particular: What is link between order size and liquidity measures?

- Closing and effective spreads are positively affected by order size?
- High-low estimators and Amihud measure are not affected by order size?

Market place

Oslo Stock Exchange. In contrast to NYSE, trading in Norwegian shares was concentrated at the OSE for much longer, fragmentation chiefly starting with the introduction of MiFID in 2008. The OSE offers a long period with trading where we can identify order sizes for the complete market.

Empirical analysis

- Fixed-effects panel regression analysis (using daily transaction data for OBX stocks over the period 1999-2016)
- Stock splits and lot size revisions: events associated with exogenous changes in order size.
  - Event study approach
  - Difference-in-differences analysis

What do we find?

- The average trade size positively affects the closing and effective spreads, which confirms that the decrease in spreads is to an extent driven by the decrease in order size. The average trade size has a negative effect on the high-low estimators, i.e. transaction costs actually increase as trade sizes fall. As expected, trade size does not affect the Amihud measure.
- The difference-in-differences analyses of stock splits and lot size revisions reveal that the high-low estimators and Amihud measure are unaffected by the changes in average trade size and minimum order size, while spreads are positively affected.

Conclusion

Spreads reflect lowering of trade size rather than market improvement.
High-low estimators are robust to changes in order size.
They are therefore better measures of transaction costs in modern fragmented markets.
Thus, market quality (transaction costs) has improved much less than commonly argued.