

# "A Hollowed-Out Market"?

A NEW REPORT EXAMINES CONCERNS ABOUT MARKET LIQUIDITY

By Crystal Detamore-Rodman

From the rise of high-frequency trading to the influence of dark pools, recent developments have raised many concerns about market liquidity. A new report from CFA Institute examines the implications for investors and policymakers. To highlight the report's key findings, two experts—Sviatoslav Rosov, CFA, analyst for capital markets policy at CFA Institute, and Dennis Dick, CFA, a proprietary trader and market structure consultant with Bright Trading—shared their perspectives in a joint interview.

**What is "adverse selection," and who is hurt by it (i.e., large institutional investors, retail investors, etc.)? Is this a major problem?**

**SVIATOSLAV ROSOV:** Adverse selection in this context is the idea that participants on traditional exchange venues (such as NASDAQ or LSE [London Stock Exchange]) see their orders executed only when they are on the wrong side of the trade. The basic narrative of adverse selection is that the orders of uninformed investors are being chosen, or adversely selected against, for trading by informed market participants.

Retail investors, the textbook example of uninformed investors, typically do not interact with exchange venues (where most adverse selection occurs). Their orders tend to be routed to broker/dealers for internal execution via either payment-for-order-flow arrangements (in the US) or competitive retail flow markets (in the UK). We currently see trading costs for retail investors at historic lows. For institutional investors, the issue of adverse selection is a bigger concern since they typically do trade on exchange venues.

A market maker posting quotes on an exchange also faces this problem—as does anyone posting a standing limit order—and may widen her spread in order to account for the probability of

being taken advantage of by informed investors. This is the traditional reason why adverse selection is considered bad for market quality: It can widen spreads. However, in modern markets, many market makers have been replaced with automated high-frequency traders that no longer worry so much about adverse selection, because they are fast enough and informed enough not to be picked off by other market participants.

**DENNIS DICK:** To put it simply, adverse selection is the risk that your limit order gets "picked off" by a more informed trader. Market makers must balance their risk–return when deciding how tight to quote their markets, and adverse selection risk is a big part of that balancing act.

When I started with Bright Trading in 1999, I actively made markets in a number of individual securities listed on the NYSE. Executions were mostly manual and handled by the specialist on the NYSE floor. Orders typically took eight seconds to execute. That meant that if news suddenly broke on a stock or the S&P futures suddenly started ticking down, I would have ample time to cancel my limit orders and back off my quote (in order to adjust for the new market information). Today, with the evolution of electronic markets, executions are instantaneous. If information suddenly changes, your limit order can be picked off very quickly by a high-frequency trader. This means it is very difficult for a non-HFT to actively make markets, because they are not quick enough to adjust their quotes for new information. This could be a problem for the limit-order trader as well. Large institutional investors and retail traders need to be very careful with their use of limit orders, because the adverse



Sviatoslav Rosov, CFA



Dennis Dick, CFA

selection risk is much higher in an HFT world and those standing limit orders can become mispriced and potentially can be picked off very quickly.

**Are traders on lit venues at a disadvantage? What is the policy remedy?**

**ROSOV:** The problem today is that, with a lot of trading happening away from public exchanges on dark trading venues or using HFT systems on traditional venues, the incentives for human market makers or institutional investors to post limit orders on exchanges (lit markets) are reduced. The reason is that their orders are likely only to be executed when the far faster computer algorithms decide that the posted order can be executed against profitably.

The result is a hollowed-out market with a lot of liquidity of one sort (HFT) concentrated in the most liquid stocks. This is undesirable because it may reduce the resilience of markets and may cause more frequent mini flash crashes in which unjustified price swings occur simply because liquidity vanishes all at once since its provision is so homogeneous.

It is difficult to come up with a policy remedy that does not have a lot of unintended consequences. Attempts to encourage lit-venue limit orders have included special order types and maker-taker pricing, where traders are paid to

post liquidity and have to pay to take liquidity. Neither appears to have been a panacea, and the latter in particular has had some negative effects in terms of encouraging rebate optimization rather than genuine liquidity provision.

**DICK:** It appears that off-exchange market makers are potentially taking advantage of the lit quote by using price-matching techniques while leaning on the displayed quote for protection. This observation also manifests itself in data showing that off-exchange market activity increases during periods of quote stability followed by surges in lit activity during the quote rolls [i.e., when price changes occur].

For example, imagine a stock like Bank of America (BAC), which typically has a very large order queue. If the displayed quote is showing a bid of \$15.50 for 20,000 shares, any participant placing a bid of \$15.50 on that exchange would have to wait in line behind the 20,000 shares in front of them because of price-time priority. But off-exchange market makers have a distinct advantage in that they have payment-for-order-flow arrangements in which they purchase order flow directly from retail brokers. Their best execution obligations are only that they match or beat the displayed NBBO [National Best Bid and Offer] when filling customer orders.

So now assume that a retail trader sends a marketable order to sell BAC for 1,000 shares. An off-exchange market maker can execute directly against the marketable sell order and buy the stock for themselves at \$15.50, in effect jumping ahead of the displayed order queue by simply matching the price on the exchange. If a marketable buy order comes in for BAC, the off-exchange market maker can sell the stock from its own account at \$15.51, again jumping the displayed order queue. It makes it easier to capture the spread when you can jump the order queue through price matching. But not only do they have an advantage in capturing the spread, they can better manage their adverse selection risk, because they don't have to display their quotes (i.e., they don't have any limit orders they need to cancel and adjust).

Now assume the BAC quote starts to get out of balance and the bid is about

to become the offer. The off-exchange market maker can often quickly execute against the displayed bid in order to scratch the trade. So in many cases, the lit order is stepped ahead of when it is correctly priced and picked off when it is mispriced. This means the lit quote is typically transacted against *only* when it is being adversely selected against.

Policymakers need to examine the rise in off-exchange trading, and they may need to add more displayed limit order protection if off-exchange trading levels continue to grow. One possible solution would be to consider a type of trade-at rule, which would give execution priority to the displayed quote.

### **Are concerns about electronic market makers and high-frequency trading (HFT) overblown?**

**ROSOV:** To a large extent, the horse has bolted. Electronic market makers and high-frequency traders account, in many cases, for the majority of liquidity provision in modern markets. HFT is not a homogeneous activity and "HFT" as a label is not particularly useful. Some HFT strategies are beneficial for

investors, such as HFT market making, but various predatory HFT strategies play a zero-sum game with investors.

The most important thing to understand is that the issue at hand is not choosing between the current market and rolling back market structure to some imagined "better" past state. The main concern should be how to ameliorate the negative side effects of this "new normal." One of these side effects is certainly the homogeneous nature of liquidity provision, which may be a result of traditional investors being discouraged from using public markets.

**DICK:** My major concern with electronic market makers is that they are so efficient at what they do that no other type of market participant can compete with them in the market-making game. This makes the limit order book more homogeneous; there is less diversity in it. With less diversity in the limit order book, there is an increased risk that during times of stress, market liquidity can evaporate very quickly. In some extreme cases, where risk rises very quickly, we could potentially see a dramatic fall in displayed liquidity

## **The Story behind the Market Liquidity Report**

One of the most informative tools available in US equity markets is the consolidated tape, where all trades (both on- and off-exchange) are reported. This allows traders to observe patterns in the trade data and make more informed trading decisions. But the consolidated tape can help in identifying potential market structure issues as well. Dennis Dick, CFA, head of equity market structure at Bright Trading, observed a pattern in how off-exchange trades and on-exchange trades occur. There appeared to be intervals of time during which off-exchange trading dominated; at other intervals, the majority of trades occurred on-exchange. These times also appeared to coincide with periods in which the quote was stable or when it was getting ready to roll.

Dick reported these observations to fellow members of the Capital Markets Policy Council at CFA Institute, which offers input on research and advocacy positions developed in response to critical issues in the capital markets. Dick proposed a study to examine the pattern of off-exchange and on-exchange trades to better understand the dynamics of market liquidity. Sviatoslav Rosov, CFA, crunched the data and made some interesting findings consistent with the idea that market participants who have access to low-latency technology are able to divert execution of uninformed order flow during stable quote periods away from lit venues by "stepping in front of" lit limit orders via a nominal price improvement. By buying at just above the best bid and selling at just below the best offer, these players are able to, on average, capture the spread for themselves, leaving lit limit orders sitting idle. When electronic market makers predict (based on either order-book imbalances or short-term price prediction algorithms) that the quote is about to roll, they route their own orders to exchanges and trade in the direction of expected price changes (putting them on the "right" side of the trade).

(as HFT market-making firms back off their quotes to manage the adverse selection risk). This is exactly what we saw during the 6 May 2010 flash crash and most recently on 24 August 2015, when the Dow Jones fell more than 1,000 points in mere seconds. I believe homogeneous liquidity is the primary reason behind these liquidity events.

### What is the impact of HFT activity on EU vs. US equity markets?

**ROSOV:** The report looks at a specific way in which adverse selection could occur. The principle is that when prices for a given stock are stable, algorithmic traders take advantage of price improvement rules to execute trades in the dark. On average, they will buy at slightly above the best bid price and sell at slightly below the best offer price and therefore capture almost the entire spread for themselves.

However, when prices are about to change, algorithmic traders are able to predict this for the very near future (within a sub-second time horizon), typically by looking at order book imbalances. Once they think the quote is about to roll, they can go onto lit venues and execute profitably against resting limit orders that are either too passive or too slow to predict this short-term price change. This advantage is how participants on lit venues can be adversely selected against.

We observe this effect quite strongly in the US market, where the proportion of dark trading halves from approximately 40% to approximately 20% when prices are rolling. We do not observe this effect nearly as strongly in the UK or in France. We think this is likely to do with the different market structures. The UK in particular has a uniquely competitive broker/dealer market for retail order flow, which is typically the fuel for the “price improvement” strategy described above. On the contrary, in the US, payment-for-order-flow arrangements (banned in the UK) that direct uninformed retail orders to broker/dealers and a national market that is virtually unified via the consolidated tape

(nonexistent in the EU) likely make this strategy easier to implement.

Despite these findings, we do not see much evidence that liquidity on exchanges suffers from the “phantom liquidity” effect that we may have expected to see if liquidity provision was dominated by high-frequency traders posting duplicate orders. The descriptive statistics all point to very liquid and very deep markets.

**DICK:** High-frequency trading has been a major portion of US equity trading for many years now, but it is still primarily in its infancy in other markets around the world. Many of the observations, like the increase in adverse selection that was clearly visible in US markets, are not as visible in the European markets. This could be a result of HFT being more in its infancy in Europe but could also be the result of differing market structures. Data reporting from off-exchange trading activity in Europe is also not as transparent, which can make some trading activities difficult to assess.

### What can investment managers learn from this study?

**ROSOV:** Investment managers looking for best execution must certainly be aware of their local market structure, as I am sure they are already. Executing on exchange venues now typically requires algorithmic strategies to optimize the time and place for orders, as well as trying to avoid the pitfalls of competing with highly sophisticated and impossibly fast market makers and profit-taking high-frequency traders.

There are also more and more options in terms of trading products and trading venues that are designed to protect traditional investors from some

of the negative side effects of current market structure. These typically trade off higher execution costs for higher execution certainty and quality, either through special order types or trading venues with filtered, accredited counterparties.

It is clear that investment managers have to be very alert and thoughtful about execution in today’s market.

**DICK:** The major lesson that can be taken from this study is that the speed and structure of the markets have increased adverse selection risk for displayed liquidity. Therefore, traders might want to consider using more active orders as opposed to passive limit orders. That’s not to suggest that traders should be using more market orders, because market orders can be very dangerous when market pricing can move so quickly. But more marketable limit orders or liquidity-taking type orders (where the trader is lifting the offer or hitting the bid) can help to lower the adverse selection risk associated with standing limit orders.

Discretionary limit orders are a nice tool as well. For example, assume a trader wants to buy the stock at \$25.50. They could place a discretionary limit order to buy the stock at \$25.40 with \$0.10 of discretion. If the offer price falls to \$25.50, the order will automatically lift the offer. The advantage of this order is that you are placing the limit order outside of the NBBO, so it has less adverse selection risk, and it shouldn’t influence the market price as much either.

In any event, information changes very quickly in a high-frequency trading environment, and simply placing your limit order and waiting for the price to come to you could be putting you at a significant disadvantage. A common warning that we give to our traders is, “Sitting limits can make you a sitting duck.”

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