"An Ugly High-Frequency Mess"

DISTORTED INCENTIVES LEAD SOME HFT STRATEGIES ASTRAY

By Dennis Dick, CFA

The media debate continues to rage about whether high-frequency trading (HFT) is good for the market or bad for the market. Proponents cite increased liquidity, reduced spreads, and more efficient pricing. Opponents cite the instability of market liquidity, manipulative activities, and various market events, such as the flash crash.

So, who is right? Rather than using a broad brush that paints all HFT as either good or bad, perhaps individual strategies should be examined before drawing any conclusions.

"A lot of the media debate is oversimplified," says James Angel, CFA, associate professor of finance at Georgetown University's McDonough School of Business. "We need to be more specific. High-frequency traders employ a wide variety of strategies. Many of these strategies are beneficial to the market, such as market making, and arbitrage. But some strategies are harmful as well. Personally, I'm very concerned about the excessive quote pollution in the market."

KEY POINTS

Although high-frequency trading often adds liquidity to the market and increases pricing efficiency, some HFT strategies appear to be counterproductive and raise questions of fairness.

An order-cancellation tax has been proposed as a possible solution for mitigating dysfunctional effects of certain HFT abuses.

Some experts believe the maker–taker model is a primary structural problem and should be reformed or eliminated, but doing so without unintended negative consequences could be difficult.

Quote traffic on the exchanges has been increasing exponentially in the past few years. The daily number of quotes can now exceed 2 billion on a very active day, according to Eric Hunsader, who specializes in analysis of quote traffic and is founder of data-feed provider Nanex, LLC, in Winnetka, Illinois. That total is 459 times more quote traffic than during the internet bubble in 2000, when the number of daily quotes was only 5 million. Where do all these quotes come from?

Much of this excessive quote pollution comes from an abusive HFT strategy called quote stuffing. "Quote stuffing is when HFT firms submit huge quantities of orders with no intention of execution," says Hunsader. "They cancel these orders before they can be physically accessed."

"It's a way for algos [algorithmic traders] to game other algos," Hunsader adds. "By dumping excessive orders into the system, it slows down their competition and can be used to confuse or fool other HFT algorithms. Quote stuffing in one [stock] symbol affects the latency for all other symbols processed by that CPU or network."

It also slows down regulators, which means HFT firms engaging in shady activities have less of a chance of getting caught. "It makes the audit trail significantly more difficult to follow," says Hunsader.

Another source of quote pollution might come from a manipulative strategy called layering, in which large amounts of buy orders are placed in the order book to make the stock appear to have excessive demand. The aim is to trick another trader into paying more for the stock, and if that happens, the layering participant will sell to that trader and subsequently cancel all its own bids.

"We need to clamp down on quote polluters," says Angel. "It drives up bandwidth costs for everyone." One solution to address the quote pollution issue might be to introduce an order-cancellation tax, in which firms that cancel an excessive amount of their orders would be charged a fee. Although such a cancellation tax might reduce quote-stuffing activities, it also might negatively affect HFT participants that are beneficial to the overall market, such as arbitrageurs.

Arbitrage systems make markets around the fair value of securities. For example, if a certain stock is trading at US$36 on the Toronto Stock Exchange, and the Canadian/US$ exchange rate is 1.05, then the stock should be trading at US$34.29 in New York. HFT arbitrage systems will surround the fair value of the stock with a US$34.28 bid and US$34.30 offer. As the market price moves in Toronto, the HFT arbitrage system will adjust their New York quotes accordingly.

There is little doubt that this HFT system is adding liquidity to the market and increasing pricing efficiency as it keeps the New York price in line with the Toronto price. But it is essential that these systems be able to move their orders to adjust for the price on the other exchange. If an order-cancellation tax were implemented, systems like this might have to widen their spreads in order to absorb the extra fee.

Statistical arbitrage systems that take advantage of the relative mispricing of securities also could be affected. One benefit of statistical arbitrage is "fungible liquidity," according to quantitative trader Jaffray Woodriff, CEO of Quantitative Investment Management based in Charlottesville, Virginia.

"There is a lot of liquidity that is associated with the fungibility of highly correlated assets," he says. "Take, for example, a medium-liquidity stock that is 80% correlated to the S&P. There are systems out there that will exploit that relationship, and that stock is more liquid because of it. It spreads the liquidity around, and you can do more in that stock because of that added liquidity."

An order-cancellation tax might cause this liquidity to disappear. "The devil is in the details," says Angel. An order-cancellation tax would have to be structured to deter quote stuffers without harming legitimate users, such as market makers and arbitrage players.

Quote pollution is a problem, but Woodriff believes the maker–taker pricing model of exchanges poses a more serious threat.

The typical maker–taker pricing model pays market participants a rebate for providing liquidity and charges participants a fee for taking liquidity. Typically, the fee is slightly higher than the rebate, and the exchange keeps the difference.

Angel is also uneasy with the maker–taker model. "Effectively, when brokers are being measured against their best-execution obligations, they are not allowed to take all the fees into account," he says. "Imagine shopping on eBay and not being able to take the shipping fees into account. It distorts the incentives that market participants face."

"The notion that the exchanges need to pay rebates to providers of liquidity is ludicrous," says Woodriff, "The futures markets have plenty of liquidity without those rebates."

These rebates have created an entire class of high-frequency traders called "rebate traders" that specialize in placing limit orders on the exchange for the sole purpose of capturing these rebates. Even if such traders scratch the trade, they make money because of the rebates.

And the exchanges cater to these types of traders. "The exchanges main responsibility used to be to maintain fair and orderly markets," says Dave Lauer, market structure and HFT consultant with IEX Group. "But now they are for-profit entities, and they make money by appealing to their best customers, which are high-frequency traders."

Some exchanges have created exotic order types that are designed to profit from the maker–taker structure. Take for instance the hide-not-slide order from Direct Edge. It's an order based entirely on the maker–taker structure. For example, if stock ABC is offered at US$25.50, an HFT firm buying the offer at US$25.50 would have to pay the take fee. Alternatively, the HFT firm can place a hide-not-slide order at US$25.50, and when the quote rolls (the offer becomes the bid), the HFT firm's order is first in line at the new price. The order is held in place until the US$25.50 offer is gone, at which time the hide-not-slide order becomes the best bid at the top of the order queue at US$25.50.

"The whole maker–taker model creates a very complex battleground of HFT rebate traders," says Woodriff.

Rebate trading adds noise and complexity to the market but may not be the worst defect of the maker–taker model. The bigger problem might be that the maker–taker model can act as a deterrent for retail brokerages to route their market orders to the exchange, thus increasing the toxicity level of order flow on the exchange.

"This is the heart of the matter," says Chris Nagy, president and founder of KOR Trading in Omaha, Nebraska, and former head of order routing at TD Ameritrade. "Online brokerages do not want to send their market orders to the exchange because they would have to pay those take fees." The result appears to be an ugly high-frequency mess.

To illustrate, consider how this works in practice. A retail brokerage charges its customers US$7 per trade. If a customer placed a market order to buy 3,000 shares of a stock and the brokerage routed this order to NYSE Arca, the take fee would be $0.0030 per share for a total cost of US$9. The brokerage actually would lose money on this trade. Instead, the brokerage routes the order to an OTC market maker (in other words, an HFT internalizer) that actually pays the brokerage for the order (usually between US$0.0010 and US$0.0030 per share). This practice is called payment for order flow.

Why would an internalizer pay for an order? It gives them first chance to interact with the order, and retail orders are attractive to trade against because they are typically uninformed.

"They take the best and exhaust the rest," says Woodriff, referring to the practice whereby an internalizer picks and chooses which orders to trade against, trading against the uninformed orders and routing the more informed orders to other internalizers or to the exchanges.

The broker routes to the internalizer to avoid paying the take fee. If the internalizer doesn't want to take the other side, the broker routes it out to another internalizer or, as a last resort, sends it to the exchange. "This practice is causing the lit markets to become a dumping ground of toxic waste in the marketplace [because everybody is trying to avoid paying the take fee]," says Nagy.

"It sucks liquidity out of the market," says Lauer. As more limit orders are left unfilled when internalizers step in and trade against the market orders that otherwise would interact with those limit orders, the limit-order traders are discouraged.

"When you're displayed prominently in the marketplace, you're always going to be on the wrong side on a limit order because the only time you're going to be executed is when it blows right through you," says Nagy.

"We need internalizers to provide meaningful price improvement," says Lauer. Such price improvement would deter internalization and increase the amount of marketable order flow on the exchanges, which would encourage market participants to quote more aggressively, providing more displayed liquidity.

But retail brokers might be forced to pay more take fees if they couldn't route to internalizers, which could force the brokerage to raise commissions.

"You have to start with maker–taker," says Nagy, who believes that if maker–taker didn't exist, the whole complex system might get a lot simpler.

KEEP GOING

"Dark Pools, Internalization, and Equity Market Quality," CFA Institute report (Oct. 2012), (www.cfainstitute.org/ethics/integrity)

"Flow Toxicity and Liquidity in a High-Frequency World," summarized in *CFA Digest* (Sept. 2012), (www.cfapubs.org)

"High Frequency Trading, Algorithmic Buy-Side Execution, and Linguistic Syntax," CFA Institute webcast (Sept. 2012), (www.cfawebcasts.org)

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