High-frequency stock trading of little value to investors, general public

January 10 2013

High-frequency stock trading leads to an increase in order cancelation but little else of value to investors and the general public, says research co-written by University of Illinois business professor Mao Ye, left, and graduate students Chen Yao, center, and Jiading Gai. Credit: L. Brian Stauffer

The increase in the speed of stock trading from microseconds to nanoseconds leads to an increase in order cancellation, but little else of value to investors and the general public, says research by a University of Illinois business professor.

According to a forthcoming study by Mao Ye, a professor of finance at Illinois, the arms race in speed at the sub-millisecond level of stock trading is a "purely positional game" in which a trader's payoff depends on transaction speed relative to other traders.

"There are lots of extreme views about high-frequency trading, but if you look at high-frequency trading scientifically, you would see that's it's neither good nor evil," Ye said. "Although some people think it's good, and others, necessarily, think that it's really bad, our paper shows that neither extreme view is correct. So stock exchanges are investing heavily in order to play what's really a zero-sum game."

According to the research, co-written with Jiading Gai and Chen Yao, both graduate students at Illinois, since the current exchange fee structure only charges for executed trades, and not order cancellations, legitimate traders and investors essentially subsidize high-frequency traders who purposefully cancel orders, reflecting a wealth transfer from low-frequency traders to high-frequency traders.

"If you increase the speed of trading from micro- to nanoseconds, which is a 1,000 percent increase in speed, there's really no social value to that," Ye said. "There is, however, a lot of private value in that for traders."

The research shows an increase in the cancellation-execution ratio of orders, as well as a corresponding increase in short-term volatility and a decrease of market depth.

"We found that an increase in the speed of trading does increase the liquidity of the market, but it also doesn't decrease market liquidity," Ye said. "But considering the huge investment these exchanges have made in speed, you really have to question the social benefit to doing that."

The research also finds evidence consistent with "quote stuffing," a practice that involves submitting an extraordinarily large number of orders followed by immediate cancellation for the sole purpose of creating congestion in the market.

"Quote stuffing is certainly an externality-generating activity – the equivalent of noise or pollution in financial markets," Ye said. "We've found evidence that's consistent with quote-stuffing, and the economic incentive for that is pretty straightforward. If only relative speed matters, then people invest heavily to increase their speed. But firms have invested a sufficiently large amount of money simply to max out their speed, which in essence has created a positional arms race in the markets."

The researchers say the study is one of the largest computing efforts ever conducted in academic finance.

"From a computational standpoint, this paper involved calculations that were both data-intensive and computing-intensive, which represented a special challenge," Gai said.

"One year of trading data is equivalent to if you were to digitize all of the books in the Library of Congress – and the majority of that data is cancellations," Ye said. "On an average trading day, a stock like Microsoft has over a million messages – and the majority are cancellations. Cancelling trades is taking over the system and monopolizing resources."

So how do you create "speed bumps" in the market speed so that trade cancellations don't overtake the system? There needs to be a level-playing field so that no one can game the system, Ye says.

"Mary Shapiro, the chairman of the Securities and Exchange Commission, wants to impose a minimum quote life," Ye said. "But let's ask an extremely simple question: What's the distribution of a quote life now? Well, no one really knows, because to draw a summary statistic from that data takes lots of computing power. Without a scientific approach, the debate has become based on ideology, on whether you

think high-frequency trading is inherently good or bad."

As a result, a restriction on trading speed should only be imposed unilaterally by an outside authority, which means slowing down everyone by the same amount, Ye says.

"What that means is that you can't push the order and then cancel it within 50 milliseconds," he said. "What do orders less that 50 milliseconds contribute to liquidity? I don't think anyone has looked at that. Considering the investment that was made, that wasn't really the best allocation of resources. There's a lot of debate over that, and we have some concerns about that. If you continuously increase the speed, our results indicate that the benefits do not justify the costs, because it only slightly increases volatility."

But it's probably not a good idea to remove high-frequency traders' profits in the current market just yet.

"Let it continue to grow because they're eventually going to hit a speed wall, and at a certain point there will be no value to it," he said.

More information: "The Externality of High-Frequency Trading," papers.ssrn.com/sol3/papers.cf … ?abstract_id=2066839

Provided by University of Illinois at Urbana-Champaign