Making Markets: A Conversation with Five High-Frequency Trading Firms

By Will Acworth

Over the last six months or so, financial market regulators in Washington have begun taking an in-depth look at high-frequency trading, a term that describes a type of trading that turns over positions very rapidly.

The regulators are responding to a flurry of complaints and allegations targeting high-frequency trading. Some members of Congress have asserted that high-frequency traders are manipulating prices and "front-running" customer orders. Others have complained that high-frequency traders have special access to the markets and have better access to market data than traditional investors.

Some critics also have raised concerns about the risks of high-frequency trading. They warn that a computer glitch at a high-frequency trading firm could flood the market with thousands of erroneous order messages, causing a major jolt to price levels or even a system crash at one of the exchanges.

These complaints are putting pressure on the regulators—primarily the Securities and Exchange Commission and the Commodity Futures Trading Commission—to step up their oversight of this type of activity. The regulators also are recognizing that high-frequency trading accounts for a large and increasing amount of the total trading volume.

Rosenblatt Securities, an agency broker known for its market structure analysis, published some estimates in September for the share of high-frequency trading across several asset classes. Rosenblatt estimated that high-frequency traders account for more than half of the trading volume in the U.S. equity markets, more than 35% of the volume in the U.S. futures markets, and more than 10% of the volume in the U.S. equity options markets. The firm cautioned, however, that these estimates were only "highly educated guesses" given the lack of hard data and the uncertainty about how high-frequency trading is defined.

High-frequency traders in general rely on extremely fast connections to process market data as quickly as possible and to transmit their order messages with the least amount of delay. Some firms can transmit more than a thousand order messages in a single second, then cancel and replace the bulk of these orders a fraction of a second later as their models adjust to incoming market data.

In many cases, the firms are looking to profit from the spread between the best available bid and the best available offer. In other cases, the firms are looking to take advantage of tiny discrepancies between prices of two or more closely related products, such as equity index futures and exchange-traded funds.

Regulatory Review

This past fall, the SEC said it plans to undertake a broad review of equity market structure early in 2010 in order to consider the effects of high-frequency trading and other types of trading activities that have drawn criticism. Though SEC officials have said that high-frequency trading can provide some benefits to the markets, they also have raised concerns about the potential for market abuse.

"We will continue to use all tools at our disposal to aggressively pursue illegal market manipulation by high-frequency traders and others," SEC Chairman Mary Schapiro said in a Dec. 3 letter to Senator Ted Kaufman (D-Del.), one of the leading critics of high-frequency trading in Congress.

One topic that has come under particular scrutiny is co-location, the practice of placing computer servers adjacent to exchange matching engines in order to reduce the time delay in transmitting order messages to exchanges. This has become a common practice at virtually all the major cash equity and derivatives exchanges in the U.S. and Europe.

For high-frequency traders, co-location is essential. They need the freshest market data so that they can get a better read on where prices are likely to move in the next fraction of a second. And under the price-time priority rules that prevail at many exchanges, they need to post their quotes faster than all the other firms in order to maximize their chances of a successful trade.

In August, the CFTC sent a list of questions to U.S. futures exchanges asking for detailed information about their co-location services. Among other things, the agency asked for the number of participants using these services, the percentage of trading volume that they generate, the eligibility requirements, and the fees charged by the exchange. The CFTC has not yet disclosed the results of its survey.

Old Wine in New Bottles

Behind much of the criticism of high-frequency trading is the perception that this is a new phenomenon. But firms that engage in high-frequency trading disagree. They say they are carrying out the same function in the marketplace as the specialists and market-makers that used to populate the floors of the exchanges. They say they fulfill the same basic role—providing liquidity—except that now it is completely electronic, highly automated, much faster and far more efficient.

In the following roundtable discussion, representatives from five high-frequency trading firms—Allston Trading, DRW, Infinium, QuantLab and RGM—describe their business and discuss the public concerns about their impact on the exchange-traded markets. They point out that high-frequency traders continued to provide liquidity to these markets during the fall of 2008, when many other types of market participants were pulling back. They also talk about the benefits of technology in making the provision of liquidity far more efficient than ever before.

To the concern that they are "front-running" customer orders, they argue that in fact they are reacting to the same information that is available to everyone else. Granted, they have the capacity to do this at vastly faster speeds than most other market participants. But they insist that it is far better to have the tools of the trade available to everyone who is willing to pay for it than to go back to the market-maker arrangements that existed in the past, when the bid-ask spreads were far wider and the cost of trade execution was much higher.


Liam Connell | Allston


Richard Gorelick | RGM

FI: Let's start with a description of your firms and what types of markets you trade.

GORELICK: I am the chief executive officer of RGM Advisors, an Austin, Texas-based proprietary trading firm that I co-founded with two partners in 2001. We use fully automated, quantitative strategies to trade our firm capital in a variety of markets, including equities and futures in the U.S. and Europe, cash foreign exchange and cash U.S. Treasuries. We're just over 100 people today, with most of the team in Austin and a smaller London office.

SMITH: I am executive vice president and general counsel at QuantLab. We are in Houston, Texas and we're closing in on 100 employees now. We've been in the high frequency area since 2002 and we currently are trading in multiple asset classes all around the world. QuantLab actually started out in the late 1990's as a hedge fund pursuing an inter-day strategy. The guys running the fund were troubled by the slippage in their execution quality and they decided to take that in-house. Over time they realized that there was more opportunity in the intra-day strategies and they decided to focus entirely on that.

CONNELL: My name is Liam Connell. I'm the chief executive officer of Allston Trading. We're based in Chicago and we have about 140 people. Allston was founded in 2003 by several very experienced and established floor traders from Chicago Mercantile Exchange. We do not manage outside money and we don't see ourselves as a money management firm or investment firm. We trade in as many markets as we can, which means that we trade all U.S. futures, many non-U.S. futures, as well as U.S. equities, U.S. and non-U.S. options, foreign exchange and commodities markets.

LEBOVITZ: I'm a partner in Infinium Capital Management, in charge of our Algorithmic trading unit. Our firm was founded in 2001 by a couple of floor traders and an information technology specialist. We are a global liquidity provider in every asset class, primarily in options and futures. We have a hybrid business model in that some of the liquidity we access is on the floor, some is on the phone, and some is electronic. We have about 240 people, mostly in Chicago but with a presence in New York and London.

WILSON: I'm the founder and chief executive officer of DRW. I started DRW in 1992. At the time, I was standing in the Eurodollar options pit on the Chicago Mercantile Exchange. Today we employ just under 500 people. Our main office is here in Chicago and we have offices in New York and London. We trade only the firm's capital and we have no outside investors. Similar to Infinium, we are active across the spectrum. We still have people on the floors, we provide liquidity over the phone, and we also engage in latency sensitive trading strategies. As far as asset classes go, we're more focused on futures than equities. We trade fixed income futures, commodity futures, most options markets, cash Treasuries and FX.

Defining HFT

FI: As all of you know, there's been a lot of talk lately about high-frequency trading in the media, but it's often lumped together with other market structure issues and trading practices. From your perspective as proprietary trading groups that engage in high-frequency trading, how would you define the term?

CONNELL: There's a tendency to talk about high-frequency trading as if there were a distinct set of firms doing something differently than the rest of the market. I don't think that's really correct. Any modern trading firm has to use technology to its utmost to remain competitive, and it's inevitable that over time all trading firms are going to be highly automated. I think part of what is happening, and part of the reason for the sudden interest in high-frequency trading, is that not everyone is adapting to the changes in technology at the same rate. Over the last 10 years, proprietary trading firms and exchanges have evolved together to replace the traditional providers of liquidity. That has created a lot of benefits for the markets in terms of tightening the spreads and lowering execution costs. But it also has discomforted a number of people, partly because some people who haven't been able to keep up with the rapid change tend to see that change in a negative light.

SMITH: I agree with Liam. In every market where you have natural buyers and sellers—investors if you will—there are also participants that provide liquidity because there simply isn't enough liquidity between investors. Historically these liquidity providers were called specialists or market makers, and the exchanges gave them privileged positions relative to other market participants with respect to information. Now that we have completely electronic markets, the informational advantages that the specialists and market makers enjoyed have just about vanished. Everyone has to compete fairly out in the open market, and liquidity providers now have to employ technology in order to do that in a more efficient fashion.

It's ironic that high frequency trading has a negative connotation. I look at it instead as a symbol of the vitality and the health of our market. Instead of a market where trading is done over the phone and certain people have informational advantages, we have a multi-

tude of market participants in the marketplace aggressively competing with each other to make the best prices.

GORELICK: High frequency traders come from every kind of firm. Banks, investment funds, commodity trading advisors and proprietary trading firms all use computers to execute strategies that turn positions over frequently. So it's a very widely accepted style of trading.

In terms of the range of markets, I think we've all seen estimates that high frequency trading accounts for about 60% of the shares traded in the U.S. equities markets. If you take a broad definition of high frequency trading, that strikes me as reasonable. That is probably the market that is furthest along in the transition to electronic trading. But high frequency traders also play important roles in other markets, like futures globally and increasingly European equities and foreign exchange.

It's important to put this in perspective, however. The story of high frequency trading is often portrayed as if an entirely new kind of trading has come out of nowhere to suddenly account for a large amount of trading in the markets. In reality, there's always been a large class of professional market intermediaries playing critical roles in all the markets. In recent years, technological and regulatory developments have opened up this function to competition from diverse participants using computers.

Think about what that means for users of these markets. Because of the vigorous competition and the efficiencies brought about by technology, investors have a much better market than ever before. Investors have benefitted from lower transaction costs and much tighter, more liquid, transparent, and fair markets. And the markets are more resilient to market shocks, much more so than in any market structure we've had in the past.

WILSON: It is ironic that the media vilifies high-frequency trading. The benefits that it brings to the market were really highlighted last fall. The stock market declined precipitously but anybody who wanted to buy or sell a stock was able to do that the whole time with still relatively tight bid-ask spreads. Compare that to what happened during the market crash of 1987, when people were trying to call Nasdaq market makers who weren't answering their phone. I think it's pretty clear that current system is more effective and provides the end users with a much better service than what we had before.

FI: One thing that we saw last fall in the fixed income futures markets was a large reduction in the volume and liquidity of the markets. Many people said that one important reason was the deleveraging among the banks and hedge funds. Do firms like yours borrow money to engage in your trading strategies? And were you also deleveraging at that time?

WILSON: Well, speaking just for DRW, we were very, very active liquidity providers in the marketplace during that period. If anything, we stepped up our activities. We don't need to borrow money to do what we do. We don't rely on leverage, other than the natural leverage that's imbedded in future contracts.

LEBOVITZ: That's a big difference between our business model and the larger financial institutions. Firms like ours do not have a lot of outside capital. We manage our capital very carefully and typically we do not use leverage other than, as Don said, the natural leverage within the contracts.

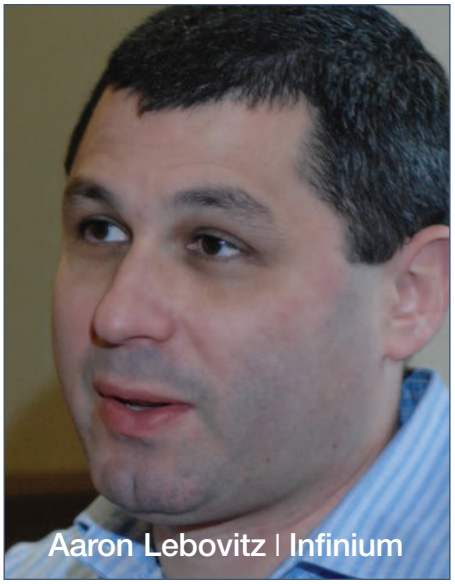
The reason we use technology so extensively is to produce liquidity very efficiently. We're doing what every other industry is doing, in that we're using automation to reduce our production costs and provide our services at a much lower cost.

Another aspect to this is that there's a feedback cycle. As the bid-offer spread tightens and there's more depth available, the markets attract more participants, which then further reduces our costs and increases our economies of scale. Conversely, anything that would greatly raise costs of providing liquidity has the potential to create a negative feedback loop, with lower liquidity leading to fewer market participants leading to deteriorating economies of scale for market makers, and further reductions of liquidity.

Scrutiny from Washington

FI: The market regulators in Washington are taking a closer look at high-frequency trading and considering whether they need more information and possibly more regulation. What's your reaction to this interest?

SMITH: I think the question is not whether they have the information, but whether they are using it effectively. At


Aaron Lebovitz | Infinium

QuantLab, all of our equities trading goes through either our own broker or a third-party broker so the regulators can see all of our activity. The same is true with our futures trading, which comes into the market through a futures commission merchant regulated by the CFTC.

I think the larger question is whether the regulators can put together the whole picture. Historically each marketplace and its regulatory arms have tended to look at their own market in isolation. Given all the connections and linkages among markets nowadays, regulators really need to take in all the data across all the markets. There's a bit of inter-market surveillance between equity markets and between options and equities, but I'm not sure how sophisticated it is and whether it has kept pace with the changes in the market. That's where I think a big improvement could be made, and where firms like ours could constructively contribute to some sort of initiative to review and enhance the current regulatory oversight practices.

WILSON: The fact that a vast majority of the markets are now electronic makes the audit trail much more precise than it ever has been. This creates unprecedented transparency not only for market participants, but also for regulators. As responsible market participants, it's important for all of us to propose changes that are beneficial to the markets and for us to engage with regulators and other policy makers about the appropriate structure and rules surrounding our markets.


Cameron Smith | QuantLab

Front-Running

FI: It's been alleged that high-frequency trading is a form of front-running, in that people are using technology to detect what other people are doing and get in front of their orders. How do you respond to that criticism?

WILSON: First of all, we need to make sure that we all understand what front running is. My understanding is that it is acting on non-public information and, more specifically, on customer orders that have not yet been made public to the marketplace. Since a majority of high frequency trading firms do not have customer orders, there's no possible way that they could be engaged in front running. Beyond that, the audit trail in this environment is so good, because everything is electronic and everything is time stamped, that if there were front running going on with firms that do have customer orders, that would be very easy for a regulator to find.

So beyond the legal definition, I'm going to assume that what people mean when they say front running is that high frequency traders have a tendency to jump in front of large orders. This is not a new concern. It's important to take a step back and remember what's happening in these markets. Obviously these markets provide immediate price information so that resources across the economy can be efficiently allocated. If the markets are trading at equilibrium, then essentially all available information in the marketplace is taken into account. High frequency traders help in that process. For instance, arbitrage strategies work as a mechanism for transmitting information about a large bid in an ETF to the corresponding futures contract and vice versa. So effectively what happens is that a firm like ours perceives an imbalance in the order flow and bids up the price of that asset to reflect the fact that there seems to be, at that moment in time, more buyers than sellers.

CONNELL: Allston does not handle any customer orders. We don't have any prior knowledge of any counterparty's trading intentions. We don't have access to it and we wouldn't be interested in it. That isn't our trading style. I agree with Don that the issue is more related to the fact that high-frequency trading firms are reacting to changes in the order book more quickly than some traditional investors.

I think the nub of the problem is the natural tension between the firms that want to put a large order into the market without impacting the market and firms like ours that don't want to get run over when a large order floods the market. This has been around for as long as I've been in the market. So to address this, the buy side firms have tried a number of different mechanisms. They have buy side to buy side venues. They have dark pools. They have algorithms that attempt to mask their intentions. Those are all valid ways for them to minimize the market impact of large orders. And what we do to avoid getting run over is we scan the publicly available market data to try to see if the market actually is in imbalance or signaling that it will be in imbalance. We've invested very heavily in doing that as efficiently and as quickly as possible. And in my opinion that's perfectly appropriate.

It is worth pointing out that it is only in the last 10 years that buy side firms have had so many mechanisms to minimize the impact of their large orders on the marketplace. Before that, buy side firms had to shop around their large orders to Wall Street block desks. They had to pay a hefty fee, and often they had to show their order to several desks before getting an acceptable offer. Obviously that created a real potential for front-running.

Co-Location

FI: One of the specific concerns raised by policy-makers in Washington is about co-location, and in particular whether it is fair that some market participants have faster access to market data and the matching engine. All of your firms use co-location. How do you respond to this concern?

CONNELL: Co-location, if it's done properly, if it's transparent and fair, with consistent pricing and access, is a very good way of solving physical latency issues for the subset of people for whom it makes a difference. For the business that we're in, it's important that we are as quick as we can be. If everybody else for whom that's important has the equal chance to do that, I think that's a very fair way of doing it. Conversely, if you get rid of collocation, what you get is virtual collocation, which is going to be very inefficient and not transparent at all.

LEBOVITZ: Exchanges have co-location policies and facilities that are open to anybody, provided they can afford it. Generally speaking, that's good for consumers of liquidity because they know what their options are. Our interests are aligned with other market participants—we all want healthy, vigorous, transparent markets. So Infinium has a very clear stance on co-location, which is that it makes markets more transparent and therefore more fair, as compared to the alternative.

WILSON: Let's just imagine what would happen if we banned co-location. Everybody in the industry who is concerned about latency will try to guess where the matching engine is, will try to make friends with the local telecommunications worker, and will try to buy the shed across the street from the matching engine and gain some kind of competitive advantage by doing that. Obviously some people will be more effective at doing that than other people, and the process will completely lack transparency. I think co-location is an important part of opening up the markets to more competition from diverse market participants and making the markets more fair, transparent, and competitive.

Risk Management

FI: People who are suspicious of high frequency trading often cite the potential for chaos in the marketplace as a potential problem. They worry that an algorithm might run amuck and overwhelm the markets with a flood of erroneous orders, and maybe even crash the system. How do you respond to that concern?

GORELICK: It's important to remember that most proprietary trading firms are very aware of the risk to their own firm because it's their own capital that is at risk. Certainly

at RGM we think about this constantly, and we have put in place a number of safeguards, both technological and process-based, at various points in our system and organization to address the operational risks from runaway algorithms.

CONNELL: As Richard said, we're all very highly motivated to insure that damage is not done through mistakes. I'm sure we all have built in trip wires in redundant parts of the trade flow. We have an operations desk that's bigger than any of our trade desks. We all have a lot at stake in making sure this isn't a problem.

LEBOVITZ: I think one of the things that's interesting here is the evolution of the position of risk manager. I traded at a couple of large banks back in the 1990's, and our risk managers ran correlation matrices and value-at-risk calculations and limited our positions based on that. Our risk manager at Infinium, in addition to monitoring market risk with those sorts of tools, also checks our technology safeguards. Our risk management team is involved in our quality assurance of our software, testing the software before we put it into production. And they're engaged in setting whatever risk parameters we use as circuit breakers on our trading system.

Beyond that, there are many safeguards at the exchange level, also the clearinghouse level, to avoid these situations becoming catastrophic risk. And when you have things that are unusual or unintended, there are effective and proven ways of dealing with those that have developed over the course of years.

WILSON: This issue of risk in electronic trading is not a new one. When there were only trading floors, you were reliant on the individuals working for you to do the right thing. You really had no immediate control over them. The great thing about the electronic environment is that you can put lots of risk controls in place. So, in a sense, the system now is less risky than it used to be. But obviously, because it's automated, you do have a different element of risk. A computer programmer could make a mistake and you might not catch it in your testing, and you could send an order in to the marketplace that you didn't intend to send.

I know some people in Washington have started asking questions about this in the last month or so. But, interestingly, we've been working on this with the exchanges for years. One of the results is that we have come up with error trade policies that provide a framework for dealing with trades that were made mistakenly. The CME, for example, has done a good job of evolving the policies that they have. Somebody who makes a mistake will have to bear a cost, but it won't put them out of business and it certainly won't create systemic risk.

In addition, many of the exchanges have implemented safeties that can be used to catch erroneous orders before they are even routed to the matching engine.

Look Ahead

FI: What new growth opportunities do you see ahead for high-frequency trading?

WILSON: As foreign markets become more open and create more level playing fields, that will definitely create opportunities to apply similar strategies in additional markets. So that's certainly something that we look at as a possible growth area.

GORELICK: I also think if the regulators are serious about systemic risk issues, they are going to put pressure on some of the less transparent over-the-counter markets, which did not function well during the recent market shock, to become more transparent and more competitive, and more hospitable to our types of trading strategies. That has the potential of making those markets a lot safer, a lot more transparent, and a lot more effective.

LEBOVITZ: I agree. One of the biggest elements of transparency is central clearing. Looking back at what happened last fall, it was the bilateral credit risk that caused such fear and uncertainty. If you centralize that risk at a clearinghouse, you add transparency in a very direct and clear way.

FI: Will cost be a barrier to entry going forward?

GORELICK: The firms that are here today are larger firms that trade in many markets and many instruments. I'm guessing that we all spend millions of dollars a year on technology. But smaller firms with good ideas and more targeted strategies can probably enter the market spending as little as tens of thousands of dollars.

SMITH: I'd like to think that one of the main barriers to entry is intelligence or, in other words, the ability to know when to trade. There's a mistaken belief that this business is all about having the fastest servers or telecommunications network. These are important ingredients but they're not decisive. The key barrier to entry is developing a strategy that can predict, at least more accurately than the market overall, the likely direction of the market.


Don Wilson | DRW

LEBOVITZ: I think the most significant barrier to entry is having the necessary expertise in intellectual property. If someone has a really good idea, it's not tremendously expensive to set up the hardware and connectivity. The challenge is in knowing how to put all the pieces together and make them work effectively. That includes the hardware, the software, the connectivity, and the business logic that determines when and how you provide liquidity. Knowing how all your technology affects how you are able to trade, and how efficiently you produce that liquidity, is not trivial. That kind of IT knowledge is hard-won and very difficult to replicate.

CONNELL: The good news about the changes that we've seen in the last 10 years or so is that the market structure has opened up. We've seen that smart people can enter the market and improve it. I hope that continues because I think that's pretty healthy.

Will Acworth is editor of *Futures Industry*.