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Issue 93, September 2013



Like coastal storms, powerful technological innovations come in cycles, dramatically changing the landscape of the financial industry. It can be hard to predict which innovations will build the landscape, which will reshape it, and which might cause tremendous destruction. High Frequency Trading, or HFT, is a prime example of a powerful technological innovation bringing rapid and sweeping changes to capital markets' structure and operations.

In HFT, computers connected to capital market exchange servers run software that scans and extracts trade and other information. Based on the extracted information, sophisticated algorithms in the software execute trades--automatically, extremely quickly, and in huge volumes. But HFT has confused definitions for financial industry ethical practices, such as the CFA Code of Ethics, and its rapid expansion has outpaced the ability of regulators to keep up. Now, regulators and other bodies are beginning to recognize the real dangers HFT poses, and they are taking action.

The Rise of HFT

Exponential growth in computational power, communication speed, and data digitization have fueled the rapid expansion of HFT in the equity market. Currently, about two dozen large firms offer HFT services. Dominant players include Chicago Trading, Virtu Financial, Timber Hill, ATD, GETCO, and Citadel. In the capital markets, competition among HFT service providers has become fierce, spawning a war of algorithms, speed, and scale. The intense competition has shrunk profit margins considerably, driving some firms out of business. Other providers, hobbled by significant operating and other losses, regulatory sanctions, or technical glitches costly to their reputation and to investors, have been acquired by healthier firms. Although HFT recently accounted for about 70% of trading volume for equities in the US, that volume is now probably below 50% because of competition, the cost of the technology, lower trading volume overall, and the dilution of competitive advantage as the technology spreads to traditional investors. But the technology of direct, computer-generated trading is still driving enormous activity and change in the markets. And as more markets become digitized and automated, HFT and related technologies are spreading into other asset classes such as fixed income, foreign currency, and commodities.

Pros and Cons of HFT

Market participants are engaged in spirited debate about its pros and cons. Proponents claim that HFT contributes dramatically to lower trading costs, greater market liquidity, and accelerated price discovery--contributing to a more efficient, and in some cases less volatile capital market. These positive impacts are reasonably well documented, and

some believe that HFT has contributed significantly to the democratizing of the capital markets, making them fairer and more open to all participants.

Critics say that HFT adds no real economic value. Charlie Munger, Vice Chairman of Berkshire Hathaway, has said HFT has "all the social utility of a bunch of rats admitted to the granary."

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The critics cite a long list of disadvantages for long-term individual and institutional investors, including traffic jams as trading algorithm wars tie up markets. Critics also believe that HFT causes market liquidity to disappear faster in times of stress. And they say that HFT can increase volatility because the impacts of software glitches and mistakes are magnified by other automated processes, costing investors money and tarnishing the reputation of the markets. The "flash crash" of 2010 has been blamed in part on HFT, and one government report criticized HFT algorithms for having poor risk controls and for lacking processes for development, testing, deployment, and control.

Ethics Becoming Harder to Define

Adherence to codes such as the CFA Code of Ethics, one of the oldest individual participant creeds in the industry, is critical to maintaining the public's trust in the fairness of markets, and trust is critical to the strength and vibrancy of economies. The CFA Code of Ethics is intended to help protect the integrity of the capital markets by defining standard ethical practices, such as not trading on inside information, and not manipulating markets.

Some critics feel that HFT is a way to legally manipulate markets and front run orders, but it's hard to say for certain, even for organizations such as the CFA Institute. It all depends on how you define or interpret specific financial industry ethical practices, in the new context created by HFT. For example, spoofing is the practice of placing high volumes of bids and offers and then cancelling them, with the intention of falsely signaling high volume to the market. Because HFT practices enable large volumes of cancellations, it is now more difficult to discern what is normal volume and what constitutes spoofing. Discerning the difference can come down to subjective judgment.

A Tough Call

Other practices that might at first seem obvious examples of insider trading actually turn out to be tough calls. Some investment firms were reportedly paying Thomson Reuters significant sums to get consumer sentiment data a mere two seconds before other subscribers. Although the data provider didn't advertise this arrangement to regular investors, neither did they keep it secret from them. So although Thomson Reuters has temporarily agreed to stop, the practice might still be perfectly legal and ethical, according to current laws and ethical standards.

HFT algorithms read news, assess keywords, and initiate trades based on that data before the news is widely disseminated, using servers physically close to exchange computers for microsecond speed advantages. Is this practice simply the result of healthy competition or does it constitute "insider trading?" To keep pace with the rapidly changing context introduced by technologies such as HFT, definitions of ethical practices need to be refined and updated carefully and quickly, but doing so is proving to be complex and difficult.

Attempts to Ban, Tax, and Control HFT

Beyond ethical standards, there are now many efforts to legally control HFT. In Europe, both Germany and Brussels are trying to ban HFT or at least control its growth through regulations. In the UK and US, some are trying to tax it. Even China has had operating problems with HFT technology. In the US, the SEC and other regulators have significantly strengthened their technological capabilities to monitor HFT, and they are hiring new staff with strong backgrounds in mathematics, physics, computer science, and trading. They are becoming more capable now of reviewing the practices of investment firms using HFT for signs that might indicate insider trading or market manipulation.

In 2012, the US Commodity Futures Trading Commission (CFTC) announced it would create an advisory panel on HFT issues, and CFTC Chairman Gary Gensler said the agency will increase its HFT monitoring. Recently the CFTC has deployed its own high-tech surveillance system, capable of viewing market activity in hundredths of a second, and tracing trades back to the firms that executed them. CFTC Commissioner Bart Chilton has said, "...regulators around the world are starting to catch up with the [HFT] traders and we are shutting them down when they violate the law."

The Dodd-Frank law defines manipulative practices such as spoofing to be violations, by adding "Disruptive Practices" to the section on "Prohibited Transactions." A new section of the Commodities Exchange Act makes it unlawful for any

person to engage with any registered entity that violates bids or offers, demonstrates intentional or reckless disregard for the orderly execution of transactions, or uses spoofing.

In July of this year, in the CFTC's first case using new enforcement powers granted under the Dodd-Frank financial law, New Jersey HFT provider Panther Energy Trading LLC was fined for manipulating the commodities market for two months during 2011.

Panther Energy was the first to be charged with "spoofing," a practice first banned by the 2010 Dodd-Frank financial regulation law as a "disruptive market practice." The firm, which made USD 1.4 million using the strategy, agreed to a USD 2.8 million fine and one-year trading ban. One year might sound like a short ban, but it is an indelible black mark on the shop and could prove to be an immense hurdle for acquiring future investments. CFTC enforcement Chief David Meister said the regulator plans to use the Dodd-Frank disruptive practices provision "against schemes like this one to protect market participants and promote market integrity, particularly in the growing world of electronic trading."

"The use of quantitative techniques and computer-driven algorithms has changed the market structure and financial world drastically in the past decade. It provides a lot of challenges to regulators and companies. If you look at many of these companies, I don't see them as solely finance companies; I also see them as engineering companies driven by algorithms... In my opinion, traditional compliance needs to become Quantitative Compliance: Financial Engineering requires Compliance Engineering."

Erozan Kurtas, Director of the SEC's Quantitative Analytics Unit

The SEC is investigating whether firms using HFT have unfair advantages similar to insider trading over regular investors on stock exchanges. FINRA last month sent letters to about 10 high-frequency traders seeking information about risk controls for the computer programs they use to trade. Regulators are also considering a wide range of proposals, and the regulatory landscape is still in flux. Proposals include:

- "Speed bumps," to slow down the rapid pace of automated trading when it goes awry
- "Kill switches" to halt a broker dealer's ability to trade if blatant errors or technological glitches are detected
- Fees on cancelled orders
- Requiring HFT providers to register with regulators
- Forcing HFT providers to continue trading during turbulent periods

Innovation Continues to Shape the Landscape

The regulators seem to understand what appears to be the potentially harmful and unethical aspects of High Frequency Trading. They are implementing platforms and regulations to monitor and enforce the ethic and reduce what they consider market-damaging actions by participants. They may never get it exactly right, but this unfolding story will affect everyone in the financial services industry for some time. It is one of the more fascinating areas of the broad topography where technology "innovates" in finance, for good and bad. HFT is a very important and evolving example of the waves of innovation molding the structure of the future of the capital markets. Cutter will periodically update you on developments in HFT and on other issues concerning finance, ethics, and technology, such as High Frequency Trading, and market fragmentation, that complicate ethics and regulations. Follow the story and be involved if you can. Regardless of what you call it, technological advances in network, database, and computational speed and accuracy will continue to dramatically alter the landscape of capital markets.

Learn more about us at www.cutterassociates.com

James E. Hollis, CFA, has been a Board member and President of the Investment Advisers Association, Chair of the GIPS Council, and a member of the CFA Board of Governors. He was also a partner at Standish Ayer & Wood for 15 years with responsibility for Technology and Operations for 10 years. He was recently named Chair of the CFA Standards of Practice Council, where he helps develop and maintain the Code of Ethics and Standards of Professional Conduct. At Cutter Associates in Rockland, Massachusetts, Hollis is a managing director and focuses on systems for manufacturing and managing portfolios, on outsourcing and managed accounts, and on technology for managing wealth and relationships.