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24 August 2010

There is No Such Thing as High Frequency Trading

They are staffed by quants with PhDs, supported by the most advanced technology and have advantages that make it impossible for the rest of us to compete. They caused the May 6 flash crash and steal billions of dollars from investors' pockets. They are responsible for the most egregious forms of market manipulation. Who are these horrible folks? They are practitioners of so-called "high frequency trading" (HFT) and have been the scapegoat for many of our current market problems. When investors and traders are losing money and the HFT firms are making purported profits of $21 billion a year (now thought to be less than $8 billion), many believe the only reasonable explanation must be that they are somehow cheating everyone else. The only problem is that high frequency trading is neither the monolith nor the menace its critics make it out to be.

The press and the blogosphere regard HFT as an undifferentiated force in the markets, used by a small number of secretive firms. We are told they use very high speed, low latency infrastructure to implement their strategies by executing millions of trades in a day, accounting for an estimated 40%-70% of all U.S. equity volume. In reality, what is commonly known as HFT is a series of independent strategies and business models used by a fairly large number of market participants. Given the diversity of practices under the HFT umbrella, it makes more sense to judge each individual strategy by its own merits instead of seeing only one faceless threat.

Much is made of HFT firms' access to high speed, low latency infrastructure, which allegedly imparts insurmountable advantages to HFT firms. By relying on market data sourced directly from each marketplace to the computer running the strategy and bypassing the aggregators of data like Reuters and Bloomberg, traders (and their software) can access the data and react earlier than those participants who rely on middlemen. Some argue that this offers the opportunity to utilize information arbitrage to disadvantage those firms using the slower data sources. This is true on its face, but the direct feeds are available to anyone willing to purchase them at industry standard prices. This is really no different than the floor trader or "local" seeing market activity before the general public and is as old as markets themselves. If your business is long-term investing, sub-second price volatility should be an annoyance, not a determinant of success.

To further reduce latency delays, co-location or "co-lo" places an HFT computer physically adjacent to the marketplace's matching engine. Where strategies require that a quote be the first one in the queue, distant orders will be at a disadvantage due only to the almost unfathomably small amount of time light takes to travel from one end of a cable to another.

NASDAQ OMX claims[1] a time advantage of "up to 4.6 milliseconds" for co-lo subscribers in New York. A honey bee takes five milliseconds to flap its wings.

These speed advantages are small, but so important to some market participants that standard cable connection lengths are even used to avoid disputes over who is closest in the computer room. Again, the ability to co-locate a server is available to all at a standard fee. Some brokers and vendors have established co-lo servers at many of the largest markets and offer access to this infrastructure to clients willing to pay for it. Co-lo benefits those strategies that have an automated model reading the real time market data and sending orders from the co-lo server. A customer sending an order to market still has a delay between their computer and the exchange and co-lo would be of no benefit to such orders.

Regulation will not erase the advantages of co-lo. If banned, it will result in data centers being built across the street from markets with the revenues enriching real estate investors. The advantage of proximity to the point of execution is not new. If we go back several years to the days of trading on an exchange floor, each broker's trip from booth to specialist's post is a human-scale version of the trip buy and sell orders take through wires. If we place additional floor brokers close to each important post, buy them each a pair of running shoes to replace their heavy wingtips and perhaps use younger and faster floor brokers, we are engaging in a similar strategy. Today's electronic trading shaves thousandths or millionths of a second off latency or delay. This is conceptually no different than hiring a track star broker.

There are, however, some barriers to entry in this game of ever-speedier execution. Broker/dealers regulated by the SEC and CFTC can send their orders directly to market with their Direct Market Access (DMA) infrastructure. Their clients, however, must normally route their orders to a broker, who vets the order through its risk and regulatory systems. Brokers can offer their unique exchange identifiers, allowing clients to use their DMA, bypass risk controls and access the market without delay, in a model known as naked access. This does advantage the HFT hedge fund strategy and does add risk to the overall market. This practice may soon be banned, but may result in these firms establishing themselves as regulated broker/dealers, while continuing to use their previous broker's infrastructure. Better regulatory oversight and transparency of these traders would be a good thing.

Since there is no single high frequency trading model, which are the individual strategies we should be evaluating?

1. Algo trading and liquidity seekers. The users of algorithmic trading are buy side institutions and brokers with large blocks to buy and sell. To minimize the market impact of trading against the smaller-sized retail order flow, they slice the big block into smaller orders across multiple venues. Especially when operating with a sense of urgency, these strategies are liquidity takers and usually pay exchange trading fees. Such algo trading should not be lumped in with the feared HFT model.

2. Automated market makers. These firms risk their own money and continuously buy and sell a list of securities hoping to profit on the spread of as little as a penny per share. It is a low risk, low capital, low return business that depends on large trading volumes to be successful. Automated market making is typically a passive strategy, providing liquidity and often earning exchange rebates. Instead of using slow and expensive human traders, computer systems examine the real-time market data. Using predetermined logic, these systems publish quotes in the market. The objective is to maintain a flat book with relatively equal buy and sell volumes. Their aggressiveness in pricing determines the business they want to attract, and risk systems control the size they can hold before stopping to balance their positions. They may be registered and have quote obligations (which lead to the infamous "stub quote" of the flash crash) or they may be independent firms using a market-making strategy to earn profits. There is current discussion suggesting all market makers should register and that all quotes be within a range from the current price. In either case, they post quotes on ECNs or other quote reporting facilities like TRF or ADF. Liquidity provision has always been a paid service. In the 1990s, the spreads of a sixteenth or more made this significantly more costly to the investor than now. These firms provide cheaper, faster and deeper liquidity than a decade ago.

3. Quant trading models. These systems analyze individual and combinations of assets' historical time series data looking for trading patterns and correlations, then monitor real time data and identify opportunities to profit from temporary dislocations to expected norms. Trades range from sub-second round trips to holding periods of minutes, hours and occasionally days or weeks. For example, in pairs trades, hundreds of pairs of correlated securities may be chosen and traded, with the expectation that 55%-60% of the time the result will be a profitable change in the spread relationship. Other examples include statistical arbitrage, momentum, mean reversion and news-based strategies using publically available information. These may be implemented across asset classes such as stocks, options, futures, indexes and volatilities as well as across markets. They rely on convergence, reversion to the mean and the expectation that markets quickly correct any imbalances and irrationalities. In many ways these are the technical analysis models investors of every stripe have used for decades fitted to a high speed electronic environment. Where we once created charts with daily data, we now have real time data providing very short term tradable

signals. Remember, perfectly rational markets would never offer such opportunities and the existence of frequent profitable opportunities brings the efficient market hypothesis into some question. In fact, these strategies may help lower volatility by dampening market dislocations. For example, the authors of a 2009 Federal Reserve discussion paper on the impact of algo trading on foreign exchange markets found "no evident causal relationship" between algo trading and volatility and that "[i]f anything, the presence of more algorithmic trading is associated with lower volatility."[2]

HFT firms have been accused of market manipulation, of momentum ignition, of stuffing quotes in a marketplace to slow it down, of "pinging" a dark market for liquidity and then making trades in lit markets to move the NBBO price and other nefarious tactics. Most markets and dark pools watch carefully and try to ferret out and eliminate abusers of their systems. While these strategies are possible, there are currently no unequivocally documented examples, only conspiracy theories. Since all of these are illegal, should perpetrators be identified, they would be charged and dealt with by the appropriate regulatory authorities. Blaming HFT strategies and suggesting remedies designed to slow down trading seem to present solutions to problems we may not have.

Referring to HFT as one undifferentiated practice obscures the benefits and risks in each business model. Many press criticisms leveled at HFT are really only relevant to specific (and sometimes already illegal) strategies and only serve to confuse the public. Legislators recently made statements[3] that may result in regulatory action over a wide swath of useful techniques resulting in unintended consequences for the entire industry.

Speed isn't the issue. HFT is simply a collection of strategies that rely on quick data gathering and execution. In discussing our market structure concerns, we should be focused on the strategies and not the implementation technology.

[1]Co-Locate in the NASDAQ OMX Data Center, http://www.nasdaqtrader.com/Trader.aspx?id=colo. Viewed August 17, 2010.

[2]Rise of the Machines: Algorithmic Trading in the Foreign Exchange Market, http://www.federalreserve.gov/pubs/ifdp/2009/980/ifdp980.htm. Viewed August 17, 2010.

[3] Letter from Senator Edward Kaufman of Delaware to Mary Shapiro, Chair SEC, August 5, 2010. http://www.sec.gov/comments/s7-27-09/s72709-96.pdf. Viewed August 18, 2010.

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Comments

6 Comments to "There is No Such Thing as High Frequency Trading":

John Harris

24 August 2010

Excellent essay. I take issue only with two notions: (1) its call for "better regulatory oversight" of "naked access" and (2) its insistence that market manipulation, momentum ignition, etc. are crimes. Sponsors and venues are the appropriate parties to monitor naked access, aside from the practitioner and its interested parties. Market manipulation and so forth may be torts, but are not criminal. The only true crimes are assault, theft, fraud, and trespass.

Itabb

24 August 2010

Bernard, Excellent article. Agree with you wholeheartedly. Nothing we are seeing is new. It is just being done faster and cheaper. Even sponsored access. What is the difference between Naked Access and a DOT terminal with no risk management (which there was none when they were first deployed). Now that said, it looks like the regulators are going to raise the bar - and technologies, practices, and trading styles that were allowed before will be curtailed. And I agree there will be unintended (or maybe intended) consequences. The question will be in five or ten years will be be wondering why are we paying this much for execution, who is this increased spread going to, and why aren't our equities as liquid as they were before? Seems like the grass is always greener.

Comments (69)

Anonymous

24 August 2010

A few comments from people interviewed at random: "As a private investor I now have even less of a chance of understanding what is going on if the markets stop and start when they go up or down 10% for some stocks and not others. Geez, they have this weird auction process that I am not privy to when they restart stuff. What's that all about? Can't they just be allowed to go up and down? Damn high frequency traders have the advantage again. Maybe I should give up trying to buy stocks. FX looks good" -Murphy D. Law "I really liked the idea that I could put in some orders such as 2 dollars for major stocks and just leave them there. How cool. I could have scooped the dumber High Frequency Traders. I guess I am going to have to wait for the Fed to helicopter money to me now. " - Johnny M Keynes "As for naked access-I don't care a jot. If a broker lets someone use his badge to trade and loses his shirt, that's his own look-out. " Freddy Hayek "And the criminals who are guessing where the next buy or sell comes in, seem pretty clever. Too clever. I think that they should be locked up with the marketing people who analyze all shoppers to maximize the profits of wicked companies like JC Penny. " - Polly Pot

Anonymous

24 August 2010

Bad PR, combined with perceived arrogance is what has happened. When the leaders of huge failed institutions walk away with hundreds of millions in their pockets there is going to be finger pointing, especially from politicains looking for their next "vote for me" agenda.

louislovas

27 August 2010

Perceived arrogance, and ignorance much of which is fueled by the general media is what has created the fear and loathing of HFT. It happens in any business/industry that becomes wildly successful. Guess who is the 'bad guy' nowadays in technology? Apple Computers. Who would have predicted that 10 years ago! HFT is also the fuel that feeds the advancement in software and hardware. Newer generations of processors, networks and software platforms are a direct result of the demands from HFT firms. This fuels the machinery of technology and the worldwide economic force behind it. It is an arms race to be sure, but a good one.

kurtkujawa

27 August 2010

As someone who has been in the business for 20+ years as a sales trader, OTC market maker and currently on the buy side. I am really getting tired of being told by all of you in academia how the markets work. You may be good at trading widgets, but untill any of you have sat in my shoes, please, stay in your ivory towers and keep quiet. I've said many times before, it is not technology or speed that is the problem. It is the intent of preditory practices that is the problem. It is illegal for a brokerage to front run orders, yet that is the very model that many HFT strategies invoke. Why do you think speed is so important to them, its because if they can "see" whats coming down the pipes they can act before the original order can, to me that is front running. And please, will you stop equating liquidity with volume. The trading back and forth of 100 shares does not create liquidity, it creates volume. they are not the same. I do not think everybody needs to be on an "equal" playing field. The reason i have been siccesfull in the business for 20 years is because it isn't equal. However, I use my mind, my instincts and intuition. I do not steal other peoples work and use against them to turn a buck. Preditory strategies by some HFT's, is nothing more than stealing intellectual property. Bernard, let me ask you a question, would you think it would be ok if between when you wrote it and sent it to Tabb, someone that had colocation with Tabb's computers, saw it, intercepted it and put there name on it intead of yours? That is exactly what we are dealing with.