Debunking the Myths of High Frequency Trading

Opinions published in response to Michael Lewis' *Flash Boys* and recent comments made by NY Attorney General Eric Schneiderman
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“A more efficient market shouldn’t be mistaken for an unfair one.”

“How HFT has changed the allocation of the pie between various market professionals is hard to say. But there has been one unambiguous winner, the retail investors who trade for themselves. Their small orders are a perfect match for today’s narrow bid-offer spread, small average-trade-size market. For the first time in history, Main Street might have it rigged against Wall Street.”

- Clifford Asness and Michael Mendelson, Wall Street Journal

“The markets are not rigged.”

“Flash Boys portrays an overly complex market hell-bent on speed and traders willing to ‘sell their grandmother for a millisecond.’ The opportunity Mr. Lewis paints comes at the expense of unwitting investors who are being taken advantage of by high-frequency traders in conjunction with colluding brokers and exchanges. He talks about latency arbitrage between consolidated data feeds and direct feeds, as well as distances between exchanges, dark pools and cable lines. While most of the physical infrastructure is adequately described, its purpose, how it is being used and its impact are dramatically misstated.”

- Larry Tabb, TABB Group

“Hardly a group of typical Wall Street old-boy, big-bank types, many HFT ventures are the consummate outsiders … who figured out a better, more efficient way to trade.”

“The idea that retail investors are losing out to sophisticated speed traders is an old claim in the debate over HFT, and it’s pretty much been discredited. Speed traders aren’t competing against the ETrade guy, they’re competing with each other to fill the ETrade guy’s order.”

- Matthew Philips, Bloomberg Businessweek
A few nights ago, CBS’s “60 Minutes” provided a forum for author Michael Lewis to announce that Wall Street is “rigged” and for the sponsors of a new trading venue called IEX to promise to unrig it. The focus of the TV segment was high-frequency trading, or HFT, an innovation now over 20 years old.

The stock market isn’t rigged and IEX hasn’t yet generated a lot of interest. In our profession, what we saw on “60 Minutes” is called “talking your book”—in Mr. Lewis’s case, literally.

The onslaught against high-frequency trading seems to have started about five years ago when a blogger made a wildly exaggerated claim about one firm’s HFT profits. Nowadays after any notable market event, and again last Sunday for no reason other than a book launch, the world gets bombarded with arcane details and hyperbolic assertions about HFT strategies. If you find the discussion overwhelming, we have some good news: The debate can be understood without knowing how equity orders are routed, matched or canceled.

Few professionals completely understand the details of market microstructure. Rather, when someone has a strong opinion about the subject, it’s likely to be what they want you to believe, not what they know.

Our firm, AQR Capital Management, is an institutional investor, primarily managing long-term investment strategies. We do not engage in high-frequency trading strategies. Here is where our interest lies: What is good for us is lower trading costs because it translates into better investment performance and happier clients, which makes our business slightly more valuable.

How do we feel about high-frequency trading? We think it helps us. It seems to have reduced our costs and may enable us to manage more investment dollars. We can’t be 100% sure. Maybe something other than HFT is responsible for the reduction in costs we’ve seen since HFT has risen to prominence, like maybe even our own efforts to improve. But we devote a lot of effort to understanding our trading costs, and our opinion, derived through quantitative and qualitative analysis, is that on the whole high-frequency traders have lowered costs.

Much of what HFTs do is "make markets”—that is, be willing to buy or sell stock anytime for the cost of a fraction of the bid-off er spread. They make money selling at the offer and buying at the bid more often than they have to do it the other way around. That is, they do it the same way that market makers have done it since they were making markets in Pompeii before Mount Vesuvius halted trading one day. High-frequency traders tend to do it best because their computers are much cheaper than expensive Wall Street traders, and competition forces them to pass most of the savings on to us investors. That also explains why many old-school Wall Street traders hate them.

One of the biggest headline-grabbing worries about HFTs is how fast the trades are conducted. The speed sounds unnecessary, dangerous and possibly nefarious— "These guys care about the speed of light!" For the most part, though, HFTs don’t need that super speed to get ahead of the little guy or even institutional traders, but to get ahead of other HFTs. Some of the loudest complaints about high-frequency trading come from the slower traders who used to win the races.
While we like HFTs on balance for reducing our clients' trading costs, some may push the envelope at times. Some of them may negotiate advantages that might be bad for markets. Worse, these arrangements tend to be little understood by the broader range of market participants. A little more transparency would be good here, and the market venues that have been offering these deals have been moving in that direction. They should move faster.

But these concerns are occupying too much attention. The biggest concern we have with modern markets is their complexity and the associated operational risks. The market structure that enables the HFTs and provides us with their benefits may also be one that risks technological calamity.

The good news has been that regulators began to focus on this potential problem last year. Unfortunately, the recent fusillade of hyperbole about HFT practices threatens to derail this effort and refocus attention where the problem isn’t. Real work is necessary to improve and safeguard a complex and still reasonably new system. We shouldn’t get ourselves dragged into a hyped-up war over a matter that doesn’t affect investors very much—and where, to the degree that it does, we’d argue that the effect is easily a net positive.

So why are so many people so loudly certain about the problems of high-frequency trading? Again, look to interests. Making mountains out of molehills sells more books than a study of molehills. But some traditional asset managers are also HFT critics. These managers are institutional investors like us but with different investment strategies and trading methods.

Rather than embracing electronic markets, these managers have stuck with their old methods. They think HFT costs them money. Often when they try to trade large orders quickly, they find the trades more difficult to execute in a market that has gravitated toward more frequent trades in smaller sizes, and that the price moves away from them faster now.

We doubt that these old-school managers were truly better off in the pre-HFT world, but it’s hard to prove either way. And if they’re right, it may be only because HFTs have made the markets more efficient, eliminating some of the managers' edge.

Well, sorry, but prices responding quickly—and traders not being able to buy or sell a ton without the market moving—is what is supposed to happen in a well-functioning market. It happens to us too. It may be that in the old days these managers were able to take advantage of whomever was on the other side of their trade, and that nowadays they find it far more difficult to gain that advantage. A more efficient market shouldn’t be mistaken for an unfair one.

These big, traditional investment managers represent a business opportunity to anyone who can offer them new market venues, like IEX, that might conceivably avoid the perceived ill effects of high-frequency trading. We wish them well in that effort, and if they succeed these new exchanges and their clients will benefit. But let’s allow the issue to be decided by open competition, not by politics, demagoguery and rules born of crony capitalism.

Our bet is that high-frequency trading comes out on top as it offers more investors better execution. But we have zero problem being proven wrong by the marketplace.

How HFT has changed the allocation of the pie between various market professionals is hard to say. But there has been one unambiguous winner, the retail investors who trade for themselves. Their small orders are a perfect match for today’s narrow bid-offer spread, small average-trade-size market. For the first time in history, Main Street might have it rigged against Wall Street.

Mr. Asness is managing and founding principal of AQR Capital Management, where Mr. Mendelson is a principal and portfolio manager. Aaron Brown, chief risk officer at the firm, also contributed to this op-ed.
I’m halfway through the new Michael Lewis book – the one that has been turned into not only a breathless 60 Minutes segment but also a long excerpt in the New York Times Magazine. Like all Michael Lewis books, it’s written with great clarity and fluency: you’re not going to have any trouble turning the pages. And, like all Michael Lewis books, it’s at heart a narrative about a person — in this case, Brad Katsuyama, the founder of a small new stock exchange called IEX.

The narrative is interesting enough — but so far I haven’t seen anything that would qualify as the “lighting in a bottle” he promised Boris Kachka. We were promised scoops, but so far it’s hard to see what the scoops are supposed to be. The most interesting thing I’ve discovered so far is the existence of something called “latency tables” — a way for HFT shops to work out exactly which brokers were responsible for which orders. The trick is to realize that because every brokerage is in a slightly different physical location, each house’s trades will hit the various different stock exchanges in a slightly different order. And so by looking at the time difference between a given trade showing up on different exchanges, you can (or could, at one point) in theory identify the bank behind it.

This vagueness about time is one of the weaknesses of the book: it’s hard to keep track of time, and a lot of it seems to be an exposé not of high-frequency trading as it exists today, but rather of high-frequency trading as it existed during its brief heyday circa 2008. Lewis takes pains to tell us what happened to the number of trades per day between 2006 and 2009, for instance, but doesn’t feel the need to mention what has happened since then. (It is falling, quite dramatically.) The scale of the HFT problem — and the amount of money being made by the HFT industry — is in sharp decline: there was big money to be made once upon a time, but nowadays it’s not really there anymore. Because that fact doesn’t fit Lewis’s narrative, however, I doubt I’m going to find it anywhere in his book.

Similarly, Lewis goes to great lengths to elide the distinction between small investors and big investors. As a rule, small investors are helped by HFT: they get filled immediately, at NBBO. (NBBO is National Best Bid/Offer: basically, the very best price in the market.) It’s big investors who get hurt by HFT: because they need more stock than is immediately available, the algobots can try to front-run their trades. But Lewis plays the “all investors are small investors” card: if a hedge fund is running money on behalf of a pension fund, and the pension fund is looking after the money of middle-class individuals, then, mutatis mutandis, the hedge fund is basically just the little guy. Which is how David Einhorn ended up appearing on 60 Minutes playing the part of the put-upon small investor. Ha!

Lewis is also cavalier in his declaration that intermediation has never been as profitable as it is today, in the hands of HFT shops. He does say that the entire history of Wall Street is one of scandals, “linked together trunk to tail like circus elephants”, and nearly always involving front-running of some description. And he also mentions that while you used to be able to drive a truck through the bid-offer prices on stocks, pre-decimalization, nowadays prices are much, much tighter — with the result that trading is much, much less expensive than it used to be. Given all that, it stands to reason that even if the HFT shops are making good money, they’re still making less than the big broker-dealers used to make back in the day. But that’s not a calculation Lewis seems to have any interest in.

In his introduction to the book, Lewis writes this:
The average investor has no hope of knowing, of course, even the little he needs to know. He logs onto his TD Ameritrade or E*Trade or Schwab account, enters a ticker symbol of some stock, and clicks an icon that says “Buy”: Then what? He may think he knows what happens after he presses the key on his computer keyboard, but, trust me, he does not. If he did, he’d think twice before he pressed it.

This is silly. I’ll tell you what happens when the little guy presses that key: his order doesn’t go anywhere near any stock exchange, and no HFT shop is going to front-run it. Instead, he will receive exactly the number of shares he ordered, at exactly the best price in the market at the second he pressed the button, and he will do so in less time than it takes his web browser to refresh. Buying a small number of shares through an online brokerage account is the best guarantee of not getting front-run by HFT types. And there’s no reason whatsoever for the little guy to think twice before pressing the button.

HFT is dangerous, I’d like to see less of it, and I hope that Michael Lewis will help to bring it to wider attention. But my tentative verdict on Flash Boys (I’ll write something longer once I’ve finished the book) is that it actually misses the big problem with HFT, in the service of pushing a false narrative that it’s bad for the little guy.
No, Michael Lewis, the US Equities Market Is Not Rigged
Larry Tabb, Tabb Forum
March 31, 2014

http://tabbforum.com/opinions/no-michael-lewis-the-us-equities-market-is-not-rigged

While Michael Lewis’s new book, “Flash Boys,” is an amusing read and does talk about the very complex execution framework of the US equities market, he has not portrayed the full story of the US equities market, leaving much on the cutting-room floor.

Flash Boys portrays an overly complex market hell-bent on speed and traders willing to ‘sell their grandmother for a millisecond.’ The opportunity Mr. Lewis paints comes at the expense of unwitting investors who are being taken advantage of by high-frequency traders in conjunction with colluding brokers and exchanges. He talks about latency arbitrage between consolidated data fees and direct feeds, as well as distances between exchanges, dark pools and cable lines. While most of the physical infrastructure is adequately described, its purpose, how it is being used and its impact are dramatically misstated.

Market Fragmentation

While our markets are fragmented, there is significant benefit to having a fragmented market: competition. While economic theory represents that the most efficient market is one where all orders interact and compete in a central limit order book, this theory falls down when it runs headlong into a market devoid of competition. This was shown when market makers were caught colluding in 1998 on NASDAQ and on the NYSE in 2003. In both of these instances, market makers and specialists were taken away in handcuffs.

Out of both of these scandals came SEC rules to facilitate competition – not just between orders, but between markets. The SEC enabled the development of three major non-exchange-type matching mechanisms: internalization – where brokers could internally match buyers and sellers; ECNs’ (electronic communications networks’) alternative central limit order books (less-regulated, quasi-exchanges); and dark pools, opaque broker-owned matching venues that work like exchanges but do not display limit orders (hence, “dark”). During this time the SEC developed the Order Handling Rules, Regulation ATS, and Regulation NMS, which codified how orders needed to be treated in this fragmented market structure.

Today, while fragmented, equity execution is much less expensive, faster (generally sub-millisecond compared to more than 10 seconds in 2005), and more open. Retail brokerage fees are generally under $10 a trade, and institutions can pay under 1 penny a share (closer to .8 cents per share) for electronic execution. In addition, average effective spreads are down, and investors are much more in control of their executions than ever before.

The development of multiple execution venues has changed the economics of trading. If we look back on equity trading even as recent as a decade ago, the brokers and exchanges were standalone profitable powerhouses. Today, equity exchanges are not in the same financial shape. Derivative exchanges are driving exchange growth, and equity exchanges need to be lean and mean to survive. Brokers are not prospering either, as traders and experienced sales people are being swapped for machines and less experienced sales support. ETFs, self-empowering technology and investor pressure have reduced the cost of execution and have caused brokers to reduce their staffs.
So where is all of this value going? To high-frequency traders? We don’t see them doing much better than the exchanges or brokers. The pressure to invest in expensive technology and infrastructure, colocation and connections to many more markets, as well as improvements in vendor-based solutions, have caused a hit to their revenues. TABB Group estimates that US equity HFT revenues have declined from approximately $7.2 billion in 2009 to about $1.3 billion in 2014. Looking at recent public data, the profitability of HFT firms in the US equities market has declined, just as the number of players has decreased.

If the exchanges, brokers and HFTs are not reaping the rewards, then where is this leakage going? This money is going back to investors in the form of better and cheaper executions, as few if any institutional investors we have interviewed – and we have interviewed thousands – have ever expressed that their equity implementation costs have increased, meaning … trading just becomes cheaper and cheaper. That cost comes from somewhere: market makers, speculators, brokers and exchanges.

Risk and Reward

Everyone hates speculators. That is a given. They are viewed as parasites sucking the alpha out of investors’ brilliant ideas. While intermediaries do step in the middle of investors’ trading strategies, speculators/intermediaries do serve a true purpose: They facilitate price discovery – meaning they provide quotes. That is a very important (if not the most important) function of a market: determining the price. A market without price discovery becomes an expensive and illiquid market. While most major investors know the intrinsic value of an asset they are willing to trade, the quoting process not only crystalizes the price for all to see, it provides tradable quotes for even the largest investors.

To fully understand this, think of a store. A store that doesn’t display or advertise its prices doesn’t get much business. Think of walking into a store filled with merchandise with nary a price to be seen. For each product, you need to ask a salesperson, who may or may not give you an accurate price. While a store can advertise that it will beat all competitors’ prices, if it doesn’t display a price, it puts the onus on buyers to find the best price, bring proof into the store and haggle with the storekeeper to book a deal.

The same is true with displayed markets. A market without a pricing mechanism isn’t much of a market.

The people who provide these prices are market makers, speculators, or what most people call HFT. These actors quote product bids and offers across a wide spectrum of markets (exchanges, ECNs, and dark pools). Collectively, it is their business model to try to provide the most aggressive price they can provide to buy or sell a stock. These firms also generate their revenues from two sources: the spread between which they can buy and sell stock, and any incentives that exchanges, ECNs, or dark pools may give them to quote in their markets.

While trading venues may provide incentives to quote (generally up to $.00029 per share), venues do not share in liquidity providers’ trading profits or losses. This means that any trading house that improperly gauges supply and demand has to bear the entire cost of any losses itself.

Let me rephrase this: To have tight markets, many firms (mostly HFT) need to compete to set the best market price. These firms are competing to capture the spread (for liquid stocks, this is 1 cent per share) plus any incentive, minus any trading cost. If these firms miscalculate supply and demand, as Knight did one fateful morning, they will not only have a bad trading day, they could go bust.

So how do these firms manage risk?

Quotes equate to risk. Any time a trader (asset manager, retail investor, market maker or HFT) puts a quote into the market, it is an option for the market to trade. The quoting provides the option – I would like to buy 100 shares of IBM at $190 a share. Just because a buyer wants to acquire IBM at $190 doesn’t mean that someone is out there willing to sell IBM at $190; however, if someone is, unless the
The problem with quoting – especially for market makers, speculators, and/or HFTs – is that the quoter cannot easily gauge the quantity the longer-term buyer/seller wants to trade. If the quantity is small, the problem is slight; if the quantity is large, then the investor’s order could significantly alter supply, demand and price, forcing the short-term trader to lose money. And remember, the quoting party is committed, while the aggressing party is not. The aggressor may want to buy 100 shares, or it could be looking for a million.

So how does the quoter manage risk?

There are different ways for market makers to manage risk. First, they need to be quick. If market makers are slow to react, they will be taken advantage of. If the price of IBM should really be $191 instead of $190, then either the market maker’s order won’t trade (if it is out of the money), or worse, it will trade disadvantageously and the liquidity provider will take a loss. And if that quote is for 10,000 shares, the loss could be significant.

Second, they need to be connected. Market makers need to be connected to markets where liquidity either resides or will reside. If speculators are not connected to markets, it becomes harder to trade. They may be able to go through a third party to get to an unconnected market; however, if time is important, connecting via a third party will be latency-prone.

Third, they need to be connected to proxy products. Proxy products are products that may trade somewhat like the product that you are trading. These products could be futures, ETFs, FX, bonds, news or other indicative entities that may hint that the market is about to move. Traditionally, futures move before cash. If the S&P 500 future starts moving, it will indicate that the cash equities may soon follow.

Last, they must fully understand all of the nuances of each market they trade. This means: how to connect, their protocols, pricing, order types, market data structures, and all of the information surrounding how that market operates. Without this information, the speculator may find that its connection time lags, its order type usage isn’t appropriate, or it is just being outsmarted by someone more versed in market microstructure.

Why do quotes fade when a larger order enters the market?

We hear frequently that on an aggregate basis there is significant displayed volume, but when approached, it disappears. The reason why this occurs is twofold: first, since there are 13 exchanges and more than 40 dark pools, liquidity providers and investor algorithms spread orders across exchanges and often oversize them, to ensure that no matter which venue you arrive at there is the ability to get executed. So that large aggregated volume really doesn’t exist. It is being represented multiple times. Second, if a large order does arrive in the market and outstrips supply, then the price should adjust given the increase in demand.
While no one really likes it, today’s yield pricing models do the same thing. When buying a ticket on a flight or booking a hotel room, the price displayed today is never the price displayed tomorrow. And given cookie technology, travel sites and, increasingly, other Internet pricing engines are determining your location, previous transactions, and obtaining information from other sites to do their best to extract every marginal dollar from your wallet that you are willing to pay. That said, if you don’t want to go, don’t by the ticket.

If you talk with the airlines and hotels, they say that “on balance” these pricing engines benefit both travelers and the airlines/hotels by enabling patient buyers to pay less and more urgent buyers to pay more. Liquidity providers in markets are using the exact same strategies to do the exact same function – gauge supply and demand and determine the value of their risk capital.

But how does this happen?

HFT exists because our markets are systematic. There are ways to connect, ways orders are executed, and ways data can be modeled. Our 53 or so lit and dark markets operate in specific and consistent ways. They are in different places, connected via jitter-free dark fiber connections where latency can be measured by the nanosecond. And orders move through this infrastructure in certain ways.

Orders move from investors to brokers, to broker algorithms, to dark pools, to exchanges. Placing limit orders across these markets gives liquidity providers (not necessarily HFTs) the ability to create a Tsunami early warning system.

If a trader places limit orders in all 53 or so markets, as one order is hit and then another, the trader could begin to develop a pattern of where liquidity was coming from, where it was going to, how much was being taken, and how aggressive the market was being pushed. Given this information, a market marker/liquidity provider would begin to develop a sense of how aggressive and price sensitive the trader was. The market maker can then raise or lower the price, depending upon demand. This, however, is easier said than done.

Can the market be manipulated?

Markets can be pushed, but not for long. With so many algorithms in the market calculating fair market value, machines can determine, by the microsecond, the price of almost every financial asset. That said, the more liquid the product, the harder it is to manipulate. Highly liquid products are much harder to push than less liquid products, just because they are highly liquid. The more people trading an asset and the more divergent the view, the more traders there are pushing that asset into an equilibrium price. Conversely, the less liquid the product, the easier it is to move the price, especially if the bid and offer are thin. However, the less liquid a product, the less supply and demand, so determining an accurate clearing price is also harder. So whether you call that price discovery or manipulation is hard to say with authority.

While markets can be pushed, does it mean they are rigged?

No. Not at all. Liquidity has a price. Having a firm commit capital to buy and sell at a moment’s notice costs money. That money comes from the bid-offer spread and any rebate a market venue decides to pay. While there is an intermediary, the intermediary doesn’t decide the price. A market maker holding a product for seconds or minutes can only have a limited impact on price. When firms are buying in second one (pushing the price a touch higher), and subsequently selling a few seconds or minutes later, the act of selling will generally bring the price back to around its original value. Only investors with longer holding periods and greater amounts of capital can influence a market for a sustained period. Speculators and HFTs tend to have limited capital and turn it over frequently. It is larger investors and hedge funds that buy and do not sell that can push the price for any significant period. However, this type of trading is aligned with real ownership, and hence should have a longer-term influence on price.
While larger investors’ trading influences longer-term price swings, it is the buy-side trader that is responsible for managing the impact of the investors’ executions. Institutional investors typically employ buy-side traders to manage their trading. It is up to the buy-side trader to determine the trading strategy that aligns with the portfolio manager’s investment thesis. Buy-side traders are professionals who have a fiduciary obligation to trade their clients’ assets with care.

When traders engage with the market, they are focused on execution quality and worry about interacting with bad actors. Institutional investors understand how much they are willing to pay and how active they want to be in the market. If speculators wanted to intercede and significantly market up liquidity, investors would vanish and the price would settle back down, until patient investors would reenter the market.

That is what a market does. It ascertains supply and demand and forces participants to pay the most they are willing to pay. When you run out of patience (if you and not others were pushing the market), reversion takes place, prices back down and investors can come back into the market again.

This is the cost of liquidity – the cost of trading.


So what if the market makers/speculators and liquidity providers all go bust?

While many would like to see speculators go bust, market makers, speculators and HFTs do provide a service. They price product. Since market markers quote and quotes are commitments to trade, without market makers there would be fewer quotes, less competition to be at the top of the book, and a less aggressive pricing mechanism for investors. While investors may fund the profits of speculators, without vigorous competition to be top of the book, spreads would widen, and investors would actually pay more.

That said, speculators can’t be allowed to capture all of the alpha either. While speculators need to make enough to survive, they shouldn’t strip all of the profitability out of investors’ ideas either.

The job of protecting investors’ alpha many times rests with the buy-side trader and the broker. The broker’s job (be it human or electronic) is to shop an order as efficiently as possible and capture as much of the economic interest of the trade for the investor as possible. If an investor felt that IBM was going to move from $190 to $200, the investor wouldn’t be happy if the broker, instead of obtaining the market price of $190, paid up $10 and bought the stock for $200. If that occurred, all of the alpha on that trading idea would be lost. If this occurred frequently, investors would get frustrated and eventually leave the market.

Protecting Client Orders

It is the broker’s job to protect the client order. The way brokers protect client orders in a fragmented market is through smart trading. Now, there isn’t one way to execute an order; some orders need to be traded aggressively, some passively, some in blocks, and some with capital. While strategies change with each trade and each name, there are certain tactics brokers have developed to help investors get their best price. While orders a decade ago were mostly traded by hand, in today’s market, most orders are traded by algorithm.

Algorithms are developed to model the different ways that investors want their orders executed, such as at the current price (implementation shortfall), averaged VWAP or TWAP (volume- or time-weighted average price), when liquidity arrives, or in stealth mode. Algorithms generally have two major parts: the
scheduler, and the order router. The scheduler will take a larger order (parent) and determine the most appropriate way to segment the order (break it into smaller pieces, or child orders) and when to send it to market. The router then takes the child orders and routes them to the appropriate trading venue. This could be a dark pool, an ECN, or an exchange. Each of these venues has a probability of execution associated with it, and each has a series of costs.

Execution Cost

Execution costs are not just spreads and execution fees. Some of the least-impactful trading costs are explicit costs such as spreads and execution fees. Other execution costs include market impact (what influence did your order have on the market?), adverse selection (was your limit order placed correctly?), and opportunity cost (was your order placed at the wrong venue?).

How parent orders are segmented and where child orders are routed have everything to do with how effective your trading strategy is.

Once the child order is created, getting that order to market becomes critical. Should it be a market or a limit order, or some special order type? Should it be exposed or dark? How many dark pools should be checked before the order is routed to a lit venue? Should it be sent to a ping network (an electronic capital commitment facility)? Which exchange should it be routed to? Should the exchange route the order to another market, if there is a better price elsewhere?

This process can change depending upon the stock, time of day, supply and demand, and a host of other issues. This is not an easy problem to solve.

Measurement

Just because this problem isn’t easy, however, doesn’t mean it should not be solved. The brokers that develop buy-side trading algorithms take this job seriously. There isn’t one firm that has ever told me that it goes out of its way to give its clients a poor execution. Most brokers have a vast array of folks that analyze execution costs or provide Transaction Cost Analysis (TCA) services. This service tries to analyze the implicit cost of trading by analyzing each execution.

Besides broker TCA services, most buy-side firms analyze their own trading performance, and there are a number of firms that provide TCA services across brokers such as Markit, Bloomberg, ITG, Abel Noser, Elkins McSherry, SG Levinson and others. Are these firms perfect? Probably not. But the investors spend heavily to analyze their trading, their brokers, their algorithms, and their impact on the market.

Takeaways

Now, is there a single best way to execute an order? Are brokers perfect? Are there conflicts in the pricing structure of trades that may push brokers to trade off-exchange in their own dark pool versus at a lit exchange? Absolutely. That said, investors, brokers, and third-party measurement firms are trying to help better analyze the problems, help investors shift flow toward better performing brokers and algorithms, and help traders better understand where there is leakage.

We have not yet reached execution nirvana.

Toward a Better Solution

Brokers’ algos are not perfect. No trading machine, be it silicon or human, is perfect. The idea, however, is to create a more perfect and more efficient market. That is what competition and freedom are about. If
IEX has a better idea, great – put up capital, create a new market, and see if it works. If it does, it will gain share; if not, it will go bust.

Should the SEC restrict markets? I had said “yes.” I had felt that there were too many exchanges, too many dark pools, and too many internalizes. However, if the SEC would have placed a limit on matching venues, would new markets such as IEX or Tripleshot have been developed? Would they have had enough funding to buy an ATS license? Who knows? But one thing is for certain: The ability to bring new ideas to market is a hallmark of our markets. If the SEC limited licenses, then new platforms would have a harder time coming to fruition.

The most important aspect of our markets is our transparency. Each order is tracked, each order is archived, and each trade is printed. The key to making our markets better is being able to analyze that information – to make information-based judgments that accurately represent the truth for each investor, each broker and each market. Once this information is in the hands of investors, they can value it as they like. If they care about execution quality, then obtain, analyze and measure broker and venue execution quality and shift your trading flow accordingly. If leakage is less important than other services your broker provides – whether online access, custodial services, research, or corporate access – then understand the true cost of those services and make a value judgment accordingly.

The markets are not rigged. They are just intermediated and possibly not effectively brokered. Information, analysis and choice are our most powerful weapons. Analyze your trading data. If your managers, brokers, and/or trading venues are not doing their jobs, leverage your choice, send them a message, and fire them!

Let's use the power of choice appropriately.
Michael Lewis’s new book on HFT, Flash Boys, has been released, and has unleashed a huge controversy. Or put more accurately, it has added fuel to a controversy that has been burning for some time.

I have bought the book, but haven’t had time to read it. But I read a variety of accounts of what is in the book, so I can make a few comments based on that.

First, as many have pointed out, although this has been framed as evil computer geniuses taking money from small investors, this isn’t at all the case. If anyone benefits from the tightening of spreads, especially for small trade sizes, it is small investors. Many of them (most, in fact) trade at the bid-ask midpoint via internalization programs with their brokers or through payment-for-order-flow arrangements. (Those raise other issues for another day, but have been around for years and don’t relate directly to HFT.)

Instead, the battle is mainly part of the struggle between large institutional investors and HFT. Large traders want to conceal their trading intentions to avoid price impact. Other traders from time immemorial have attempted to determine those trading intentions, and profit by trading before and against the institutional traders. Nowadays, some HFT traders attempt to sniff out institutional orders, and profit from that information. Information about order flow is the lifeblood of those who make markets.

This relates to the second issue. This has been characterized as “front running.” This terminology is problematic in this context. Front running is usually used to describe a broker in an agency relationship with a customer trading in advance of the customer’s order, or disclosing the order to another trader who then trades on that information. This is a violation of the agency relationship between the client and the broker.

In contrast, HFT firms use a variety of means—pinging dark pools, accessing trading and quoting information that is more extensive and obtained more quickly than via the public data feeds—to detect the presence of institutional orders. They are not in an agency relationship with the institution, and have no legal obligation to it.

And this is nothing new. Traders on the floor were always trying to figure out when big orders were coming, and who was submitting them. Sometimes they obtained this information when they shouldn’t have, because a broker violated his obligation. But usually it was from watching what brokers were trading, knowing what brokers served what customers, looking at how anxious the broker appeared, etc. To throw the floor of the track, big traders would use many brokers. Indeed, one argument for dual trading was that it made it harder for the floor to know the origin of an order if the executing broker dual traded, and might be active because he was trading on his own account rather than for a customer.

This relates too to the third issue: reports that the FBI is investigating for possible criminal violations. Seriously? I remember how the FBI covered itself in glory during the sting on the floors in Chicago in ’89. Not really. The press reports say that the the FBI is investigating whether HFT trades on “non-public information.” Well, “non-public information” is not necessarily “inside information” which is illegal to trade on: inside information typically relates to that obtained from someone with a fiduciary duty to shareholders. Indeed, ferreting out non-public information contributes to price discovery: raising the risk of prosecution for trading on information obtained through research or other means, but which is not
obtained from someone with a fiduciary relationship to a company, is a dangerous slippery slope that could severely interfere with the operation of the market.

Moreover, it’s not so clear that order flow information is “non-public”. No, not everyone has it: HFT has to expend resources to get it, but anybody could in theory do that. Anybody can make the investment necessary to ping a dark pool. Anybody can pay to get a faster data feed that allows them to get information that everyone has access to more quickly. Anybody can pay to get quicker access to the data, either through co-location, or the purchase of a private data feed. There is no theft or misappropriation involved. If firms trade on the basis of such information that can be obtained for a price that not everyone is willing to pay, and that is deemed illegal, how would trading on the basis of what’s on a Bloomberg terminal be any different?

Fourth, one reason for the development of dark pools, and the rules that dark pools establish, are to protect order flow information, or to make it less profitable to trade on that information. The heroes of Lewis’s book, the IEX team, specifically designed their system (which is now a dark pool, but which will transition to an ECN and then an exchange in the future) to protect institutional traders against opportunistic HFT. (Note: not all HFT is opportunistic, even if some is.)

That’s great. An example of how technological and institutional innovation can address an economic problem. I would emphasize again that this is not a new issue: just a new institutional response. Once upon a time institutional investors relied on block trading in the upstairs market to prevent information leakage and mitigate price impact. Now they use dark pools. And dark pools are competing to find technologies and rules and protocols that help institutional investors do the same thing.

I also find it very, very ironic that a dark pool is now the big hero in a trading morality tale. Just weeks ago, dark pools were criticized heavily in a Congressional hearing. They are routinely demonized, especially by the exchanges. The Europeans have slapped very restrictive rules on them in an attempt to constrain the share of trading done in the dark. Which almost certainly will increase institutional trading costs: if institutions could trade more cheaply in the light, they would do so. It will also almost certainly make them more vulnerable to predatory HFT because they will be deprived of the (imperfect) protections that dark pools provide.

Fifth, and perhaps most importantly from a policy perspective, as I’ve written often, much of the problem with HFT in equities is directly the result of the fragmented market structure, which in turn is directly the result of RegNMS. For instance, latency arbitrage based on the slowness of the SIP results from the fact that there is a SIP, and there is a SIP because it is necessary to connect the multiple execution venues. The ability to use trades or quotes on one market to make inferences about institutional trades that might be directed to other markets is also a consequence of fragmentation. As I’ve discussed before, much of the proliferation of order types that Lewis (and others) argue advantage HFT is directly attributable to fragmentation, and rules relating to locked and crossed markets that are also a consequence of RegNMS-driven fragmentation.

Though HFT has spurred some controversy in futures markets, these controversies are quite different, and much less intense. This is due to the fact that many of the problematic features of HFT in equities are the direct consequence of RegNMS and the SEC’s decision (and Congress’s before that) to encourage competition between multiple execution venues.

And as I’ve also said repeatedly, these problems inhere in the nature of financial trading. You have to pick your poison. The old way of doing business, in which order flow was not socialized as in the aftermath of RegNMS, resulted in the domination of a single major execution venue (e.g., the NYSE). And for those with a limited historical memory, please know that these execution venues were owned by their members who adopted rules-rigged the game if you will—that benefited them. They profited accordingly.
Other news from today brings this point home. Goldman is about to sell its NYSE specialist unit, the former Spear, Leeds, which it bought for $6.5 billion (with a B) only 14 years ago. It is selling it for $30 million (with an M). That's a 99.5 decline in market value, folks. Why was the price so high back in 2000? Because under the rules of the time, a monopoly specialist franchise on a near monopoly exchange generated substantial economic rents. Rents that came out of the pockets of investors, including small investors. Electronic trading, and the socialization of order flow and the resultant competition between execution venues, ruthlessly destroyed those rents.

So it's not like the markets have moved from a pre-electronic golden age into a technological dystopia where investors are the prey of computerized super-raptors. And although sorting out cause and effect is complicated, the decline in trading costs strongly suggests that the new system, for all its flaws, has been a boon for investors. Until regulators or legislators find the Goldilocks “just right” set of regulations that facilitates competition without the pernicious effects of fragmentation (and in many ways, “fragmentation” is just a synonym for “competition”), we have to choose one or the other. My view is that messy competition is usually preferable to tidy monopoly.

The catch phrase from Lewis's book is that the markets are rigged. As I tweeted after the 60 Minutes segment on the book, by his definition of rigging, all markets have always been rigged. A group of specialized intermediaries has always exercised substantial influence over the rules and practices of the markets, and has earned rents at the expense of investors. And I daresay it would be foolish to believe this will ever change. My view is that the competition that prevails in current markets has dissipated a lot of those rents (although some of that dissipation has been inefficient, due to arms race effects).

In sum, there doesn’t appear to be a lot new in Lewis’s book. Moreover, the morality tale doesn’t capture the true complexity of the markets generally, or HFT specifically. It has certainly resulted in the release of a lot of heat, but I don’t see a lot of light. Which is kind of fitting for a book in which a dark pool is the hero.
What Michael Lewis Gets Wrong About High-Frequency Trading
Matthew Philips, Bloomberg
April 1, 2014


Michael Lewis spent the first half of Tuesday promoting his book about high-frequency trading on NBC. In the morning, he went on NBC’s Today show. By midday he was on CNBC, taking part in a battle royal over the merits of HFT. Lewis’s TV publicity tour started on Sunday night with an appearance on 60 Minutes.

Lewis’s book, Flash Boys, is driving a huge amount of attention toward the topic of high frequency trading, and it has rekindled some of basic arguments over its impact on markets and investors. The new book is typical Lewis. It’s a page-turner that reads like a novel and succeeds in making complex topics accessible to non-experts. By taking seemingly disparate developments—the secretive race to build underground, super-fast fiber optic cables, the 2009 arrest of a Goldman Sachs computer programmer—Lewis stitches together a compelling, character-driven narrative to walk readers through the immense changes the financial markets have undergone over the past decade.

Still, the book fails in some big ways, mostly due to Lewis’s zeal to simplify complex subjects into catchy bites and to consign players to clearly heroic or villainous roles. Here are three things Lewis gets wrong:

1. HFT doesn’t prey on small mom-and-pop investors. In his first two TV appearances, Lewis stuck to a simple pitch: Speed traders have rigged the stock market, and the biggest losers are average, middle-class retail investors—exactly the kind of people who watch 60 Minutes and the Today show. It’s “the guy sitting at his ETrade (ETFC) account,” Lewis told Matt Lauer. The way Lewis sees it, speed traders prey on retail investors by “trading against people who don’t know the market.”

The idea that retail investors are losing out to sophisticated speed traders is an old claim in the debate over HFT, and it’s pretty much been discredited. Speed traders aren’t competing against the ETrade guy, they’re competing with each other to fill the ETrade guy’s order. While Lewis does an admirable job in the book of burrowing into the ridiculously complicated system of how orders get routed, he misses badly by making this assumption.

The majority of retail orders never see the light of a public exchange. Instead, they’re mostly filled internally by large wholesalers; among the biggest are UBS (UBS), Citadel, KCG (KCG) (formerly Knight Capital Group), and Citigroup (C). These firms’ algorithms compete with each other to capture those orders and match them internally. That way, they don’t have to pay fees for sending them to one of the public exchanges, which in turn saves money for the retail investor. For a detailed map of the market’s plumbing and how orders get filled, check out this Bloomberg Businessweek graphic from 2012.

Many retail investors enter the market through buy-side institutional investment firms such as pension and mutual funds. Lewis contends that these big, slow traders are also getting screwed by HFT. While that certainly might have been the case a decade ago, they caught up years ago. Talk to most chief investment officers at these big firms today and you’re more likely to hear how efficient trading is today, compared to 20 years ago—back in the era when orders got routed through human market-makers standing on the floors of exchanges.
Last year, I spoke with Gus Sauter, the former chief investment officer at Vanguard, one of the biggest buy-side investment firms in the U.S. By the time he retired in 2012, he had about $1.75 trillion under his watch. Rather than decrying speed traders, Sauter praised the benefits it had brought to him and his clients. By his estimate, speed traders helped him save him more than a $1 billion a year.

2. Speed trading isn’t hugely profitable. Lewis gives the impression that high-frequency trading firms are rolling in dough. The reality, however, is that HFT’s best days are behind it, and many firms are barely keeping their heads above water. Getco, which merged with Knight and was once a titan of HFT, experienced a profit drop of 90 percent in 2012. That year, according to estimates from Rosenblatt Securities, the entire speed-trading industry made about $1 billion, down from its peak of around $5 billion in 2009. That’s nothing to sneeze at, but it isn’t impressive once you put it into context: JPMorgan Chase (JPM) made more than $5 billion in profit in just the last quarter.

Halfway through Flash Boys, Lewis writes that “financial intermediaries” made $10 billion to $22 billion a year. While he doesn’t define the term, he gives the impression that he’s talking about HFT firms serving as electronic market-makers, matching up buyers and sellers and profiting off the spread, which is rarely more than a penny per share these days. Pre-HFT, it used to be around 12¢.

Lewis doesn’t say where he got those estimates. To the firms that track HFT profits, the figures seem wildly inflated. Tabb Group also estimates HFT profits, and its latest figures show that industrywide profits are about $1.3 billion, down from a peak of about $7.9 billion in 2009.

3. High frequency traders aren’t Wall Street Insiders. One of the staples of a Michael Lewis book is a narrative of outsiders disrupting an entrenched system and knocking down established ways of doing business. Moneyball features Oakland A’s general manager Bill Bean. The Big Short focuses on investor Michael Burry. In Flash Boys it’s a group of former traders at Royal Bank of Canada (RY:CN) who go on to form their own exchange.

By focusing on this story, Lewis misses the much bigger tale of disruption that speed-trading firms themselves brought about over the past 15 years. Hardly a group of typical Wall Street old-boy, big-bank types, many HFT ventures are the consummate outsiders. Such firms as Tower, Hudson River Trading, and ATD were started by tech geeks who figured out a better, more efficient way to trade. Their first victims weren’t mom-and-pop traders but big, established, market-making firms that made up the clubby insiders’ group of floor specialists.

This is not to say that Lewis’s book has no merit, or that the market isn’t messed up right now. Lewis puts his finger on a lot of what’s wrong: The competition regulators hoped to induce through new rules over the past decade has led to a fragmented market rife with perverse incentives and far too much complexity. Speed traders have certainly benefited from the new ecosystem, and there are undoubtedly bad actors among them. But it’s too much to say that as a whole, they’ve rigged the market. Vilifying them misses the bigger picture.
I suppose one way to evaluate your life is to ask yourself, would I be the hero of a Michael Lewis book, or the villain? Am I a clever young outsider applying rigorous quantitative thinking to revolutionize a stodgy stupid business that is bad for its customers, or am I, you know, the stodgy stupid one?

Brad Katsuyama is the latest Michael Lewis hero, which is nice for him. I haven’t read Lewis’s new book yet, but “60 Minutes” had a segment on it last night, and here is an excerpt. Katsuyama was an equities trader at Royal Bank of Canada who discovered one day that the equity markets were rigged. Big mutual funds that wanted to buy a lot of shares found that it was hard to do so at displayed prices: As soon as they started buying shares, the price started to go up.

Being a nice young Canadian -- "60 Minutes" called him "a conformist even by Canadian standards" -- Katsuyama decided to unrig the markets, offering fair trades at a fair price to everyone. So he left RBC and started a IEX, a dark pool1 with unusual transparency and rules intended to protect orders from being picked off. The idea is that if you’re a big mutual fund and you submit an order on IEX, that order will not provide any information to high-frequency traders for almost a whole millisecond. (A shoebox full of wires is involved, which everyone else seems to find more interesting than I do.) The result is that HFTs won’t be able to react to your order by moving up prices on other exchanges, and you’ll be able to execute more shares at the displayed price.

Katsuyama was received as a hero by institutional investors, Goldman Sachs and Michael Lewis. The investors you can understand; their favorite pastime seems to be buying a lot of shares at displayed prices. Goldman is a little weirder -- IEX competes with Goldman’s own dark pool -- but Goldman is into market-structure fairness these days. Michael Lewis -- I mean, this excerpt has some hurtful things to say about dark pools, so it’s odd that his hero is a dark pool operator,2 but the story is actually pretty compelling. Young nice whippersnapper takes on the establishment and makes life better for everyone, etc. I just ordered the book.

While I wait for it to arrive, though, let me spin for you an alternative Michael Lewis story. This one starts with a bunch of stodgy old banks filled with the sorts of equity traders whom you might recognize from "Liar’s Poker." "Liar’s Poker" has nothing nice to say about equity traders at big banks. In this story equities, in Dallas or otherwise, is not an intellectual power center.

But it’s a simple operation. A trader quotes a stock, Microsoft say, bidding to buy it for $39.95 and offering to sell it at $40.00.3 If a big seller hits the bid, the trader owns a bunch of Microsoft stock at $39.95, and then tries to resell it at a profit.4 He does this using his gut instinct: If there’s a big seller, that means the price should move down, so the trader might lower his quote to $39.93 bid, $39.98 offered, hoping to sell at $39.98 and make some profit. If the seller is really big and really informed, the trader might move his quote down faster, because you don’t want to be on the other side of the market from a big informed seller. On the other hand, if the seller is a small retail order, the trader might not move his quote at all: Uninformed small orders are basically random, so for every one of those who sells to you at $39.95, another will buy from you for $40.00, making you a big profit.5
If the trader’s instinct is good, he’ll make his spread trading with a lot of uninformed orders. If he’s less good, or unlucky, he’ll get picked off: He’ll buy from big smart institutions for $39.95 when the “right” price is $39.90, and he’ll end up with a big loss. Overall, though, it’s a lucrative business, because the spread is wide enough to make up for the times that the trader loses.

Then along come some smart young whippersnappers who replace gut instinct with statistical analysis. Instead of relying on some equity trader’s ample gut to guess what orders are likely to move the market, you can use a computer to figure it out, and then automate how you trade. If you build your computer right, you won’t be blindsided by informed orders that go against you, like a lot of mortgage-backed securities traders were.6

And this means that you can quote a much tighter spread: By being smarter than the competition, you can also be leaner and more efficient. You might quote Microsoft at $39.97 bid and $39.98 offered on every exchange, knowing that as soon as someone hits your bid on one exchange, you can instantly move your market down to $39.96/$39.97 everywhere else. This reduces your risk of being picked off by trading with informed traders, which lets you make a profit even on much narrower spreads. You can charge less to trade by being more informed.

There are two ways of characterizing high frequency trading. In one, HFTs are front-running big investors, rigging the game against them and making the stock market illusory. In the other, HFTs are reacting instantly to demand, avoiding being picked off by informed investors and making the stock market more efficient.7

In my alternative Michael Lewis story, the smart young whippersnappers build high-frequency trading firms that undercut big banks’ gut-instinct-driven market making with tighter spreads and cheaper trading costs. Big HFTs like Knight/Getco and Virtu trade vast volumes of stock while still taking in much less money than the traditional market makers: $688 million and $623 million in 2013 market-making revenue, respectively, for Knight and Virtu, versus $2.6 billion in equities revenue for Goldman Sachs and $4.8 billion for J.P. Morgan. Even RBC made 594 million Canadian dollars trading equities last year. The high-frequency traders make money more consistently than the old-school traders, but they also make less of it.

You don’t have to be absolutist about this either way. Whether or not HFTs’ behavior of quickly adjusting quotes to market conditions is “predatory” in some moral sense -- and whether or not it ultimately makes markets more or less efficient on balance -- it is clearly annoying to a lot of institutional investors. So those investors like having the option of trading on IEX. And there’s no obvious reason to think that the current market structures and rules are the “right” rules, or that high-frequency traders aren’t sometimes gaming those rules in not-so-socially-optimal ways.

Still, I don’t know, I feel a little sorry for the HFTs. They check a lot of the right boxes to be the heroes of their own Michael Lewis stories. It’s sad for them that they instead turned out to be the villains of someone else’s.

1 Is this a little mean? From the website: “At launch IEX began operations as a non-displayed ATS but, at a date to be announced, IEX plans to convert from an ATS to an ECN and publish a displayed quotation." Bloomberg News called it "a dark pool that plans to convert into a U.S. stock exchange."

2 Again, a little unfair. See footnote 1 above, and also, the hurtful things are about nontransparent dark pools operated by brokers. IEX has transparent rules and isn't owned by a broker; it just happens not to display quotes.

3 Here’s a 2001 paper finding 3.5 cent to 7 cent spreads depending on how you count.
4 Lewis on Katsuyama:

His main role as a trader was to play the middleman between investors who wanted to buy and sell big amounts of stock and the public markets, where the volumes were smaller. Say some investor wanted to sell a block of three million Intel shares, but the markets showed demand for only one million shares: Katsuyama would buy the entire block from the investor, sell off a million shares instantly and then work artfully over the next few hours to unload the other two million.

5 If you’re going to Amazon anyway, this is where I learned most of my market microstructure.

6 See what I did there? Some of those were a stretch, though I insist on the Moneyball one.

7 In the New York Times excerpt, Lewis describes three types of predatory HFT behavior:

   The third, and probably by far the most widespread, they called slow-market arbitrage. This occurred when a high-frequency trader was able to see the price of a stock change on one exchange and pick off orders sitting on other exchanges before those exchanges were able to react.

   But his “pick off” is the HFT’s “avoid being picked off.” If a big informed investor buys Microsoft for $40.00 on one exchange, that should move the price up. An HFT who leaves a $39.99/$40.00 quote on other exchanges is now offering to trade at the wrong price. Trading at the wrong price is bad for business.
I find myself unable to get all that mad at New York Attorney General Eric Schneiderman’s weird quest to ban high-frequency trading. It has a lot of things I dislike -- overheated rhetoric, efforts to criminalize things that everyone including regulators thought were fine when they were done, vague unfulfillable promises of level playing fields -- but there’s a good point at the core of it. The modern structure of U.S. equity markets is to some extent an accretion of accidental consequences of regulatory and exchange decisions made in simpler times, without complete foresight into how they would play out in today’s faster world. No one is really all that stoked about building lasers to beam index-futures prices between New York and Chicago, not even the guys building the lasers.

Trading on Speed

Someone probably should think about whether the structure we have is the structure we want, and ... I mean, Schneiderman may not be at the top of your list of who should do it, but who is at the top of your list? The Securities and Exchange Commission has had a while, and anyway is largely responsible for the current system. The exchanges have their own conflicts. Schneiderman is not ideal, but at least he’s, like, energetic.

But, ugh, I’m really not a fan of Schneiderman’s tag of "Insider Trading 2.0," or his focus on doing stuff to "eliminate the unfair advantages enjoyed by high-frequency traders." As we’ve discussed before, the thing about high-speed traders is that their core advantage is high speed, and you can’t eliminate that advantage with tinkering. They trade faster than other traders because their business is to trade faster than other traders, and because they invest time and money and labor and expertise in that business. If you cut down on their unfair advantages they will be left with their fair advantages.

Here is Schneiderman’s list of unfair advantages provided to HFTs by exchanges:

Those services, which in the hands of predatory high-frequency traders distort our markets, include, for example: allowing traders to locate their computer servers within trading venues themselves; providing extra network bandwidth to high-frequency traders; and attaching ultra-fast connection cables and special high-speed switches to their servers.

So, if you ban co-location, high-frequency traders will move their servers out of the exchange and into the building across the street, where they will still be closer than your servers, assuming you even have servers. If you stop providing extra bandwidth and fast cables to high-frequency traders inside exchanges,¹ they’ll still have fast internet connections and fast cables outside the exchanges. More fundamentally, they will have fast computers, and those fast computers will run fast algorithms, and those algorithms will make trades faster than a human can. Co-location and cables and whatever save HFT firms maybe half a second per trade. Trading algorithmically, instead of relying on humans to make decisions and communicate those decisions with keyboards and telephones, saves them ... minutes? Hours?
The things that Schneiderman objects to are ways for stock exchanges to make money off of high-frequency traders who want to one-up each other. Not letting stock exchanges make money off those services will shift the ways in which high-frequency traders one-up each other, though it's hard to see how it would end them. But that has nothing to do with fairness or level playing fields or non-HFT investors getting fleeced. At most, it has to do with the barriers to entry to the algorithmic trading industry. Algorithms running on fast computers will always trade faster than humans. Unless you plan to ban algorithmic trading, that's going to continue.²

Nor are Schneiderman's reasons for wanting to ban these advantages all that impressive. First:

For instance, high-frequency traders look for arbitrage opportunities between and among the various exchanges, moving on price and order information before the rest of the market is even able to digest it - - all in order to capture momentary differences in stock prices.

And this is bad because ... ? Here is why it is good. Generally, people think that it is good for prices to reflect all available information; there is even a word for it, and the word is "efficiency." I don't actually think anyone thinks it's bad? People dislike the arms-race aspect of it, the socially wasteful investment in doing the arbitrage slightly faster than other HFT firms.³ But Schneiderman seems to be saying that the law of one price is illegal, which is a fairly radical proposition.

But more substantively:⁴

Co-location arrangements also help high-frequency firms to continuously monitor all the exchanges for large incoming orders. If a firm can detect a large order from an institutional investor - like a pension fund - it can instantaneously position itself on the other side of the trade, driving up the prices artificially. You will find high-frequency trading firms who dispute this characterization and say that they are just providing market-making services more efficiently than the old guard of broker-dealer market makers. You will find people who think that, when a large buy order comes in, that doesn't drive up prices "artificially," that drives up prices naturally. Prices balance supply and demand; when more demand comes in, the price goes up to maintain the balance. HFT is just an efficient, and privately profitable, mechanism for performing that balancing.

On the other hand, you will find people who agree with Schneiderman's characterization. In particular, Schneiderman's contention that HFT "has forced large, institutional investors to develop complicated and expensive defensive strategies in order to conceal their legitimate orders from parasitic traders" is not entirely wrong, suggesting that it's not just nosy regulators who think there's room for improvement.

Schneiderman's suggestion that co-location is what enables this problem -- that HFTs would be unable to front-run "legitimate orders" if they just had to move their servers across the street -- is of course very silly, but to be fair he knows that. His actual idea for reducing the speed arms race, and the potential for front-running, is more radical:

Attorney General Schneiderman today called on the exchanges and other regulators to review the feasibility of certain market structure reforms that could help eliminate some of the fundamental unfairness in our markets. Currently, securities are traded continuously, so that orders are accepted and matched by price, with ties broken by which order arrives first. This system emphasizes speed over price, rewarding high-frequency traders for flooding the market with orders. One detailed proposal would seek to correct this imbalance by processing orders in batches in frequent intervals, to ensure that price – not speed – is the deciding factor in who obtains a trade.

Frequent batch auctions are totally a thing; here is what seems to be the leading proposal. The attraction of the proposal is primarily that it attacks the arms race of high frequency trading: The time horizon for everyone becomes the batch interval -- call it one second -- and so making a decision in less than a second is less valuable.⁵ So co-location, cross-country lasers, etc., become less of an advantage, as
does (probabilistically) 100-millisecond early access to data feeds. And there's less order flow information available, meaning that it's harder to make money picking off real-money orders.

On the other hand, it is a little odd that Schneiderman's most substantive proposal is to reduce market transparency, by limiting the amount of order information that is available to traders.\(^6\) Maybe that will improve market function, but it's not obvious a priori. Maybe it'll just increase trading costs, as liquidity providers have to charge more to make up for the less transparent risks they face.\(^7\) In any case, reducing market transparency is sort of a weird fit with the rest of Schneiderman's Insider Trading 2.0 program.

And that weird fit worries me. Yes, equity market structure is the result of many individual decisions, each aimed at solving a different problem, that don't all work perfectly together. And it might make sense for someone to reconsider it. But Schneiderman's reconsideration is just as confused: His proposals don't really relate to his goals, and his main goal -- equal speed for everyone -- is obviously unachievable and also extremely weird. Whatever Schneiderman does, high-speed traders will have a speed advantage. The hard question is whether that advantage compensates them for providing efficient markets, or is just used to rip other people off. Schneiderman doesn't seem all that interested in figuring out the answer.

\(\text{1 Possibly unnecessary if you've banned co-location, but whatever.}\)

\(\text{2 Also, the things that Schneiderman has already cracked down on are mostly pretty silly.}\)

\(\text{3 I mean, that assumes that it's socially wasteful. A lot of it involves building faster computers and better communications infrastructure, which maybe isn't that socially wasteful? You can probably use those lasers to communicate things other than stock prices. There's a decent argument that HFT drives non-financial innovation.}\)

\(\text{4 The other substantive problem that people associate with high-frequency trading is that it encourages market instability, with computers occasionally forgetting how to trade and causing flash crashes. Schneiderman is less focused on this, and you can see why: It's not the sort of fraud-esque issue that he has jurisdiction over. It's a pure market structure issue that seems like the SEC's problem -- and one that is in part the SEC's fault.}\)

\(\text{5 In the Budish/Cramton/Shim proposal, "Orders are not visible to other market participants during the batch interval, i.e., the auction is 'sealed bid.' " Otherwise speed would still be rewarded, as the ability to change your order 1 microsecond before the auction closes would be profitable. One objection to this is that sealed-bid auctions would increase volatility, but really only on an intra-second horizon, and who cares about that but high-frequency traders?}\)

Another suggested solution to the speed arms race is to eliminate the sub-penny pricing rule and allow everyone to compete on price rather than speed. This has its own problems, and in fact regulators seem to be moving in the other direction.

\(\text{Still another proposal is to have pro-rata matching, which exists and doesn't seem super popular.}\)

\(\text{6 I guess it is also arguably a little odd that, if batch auctions are in fact better for equity markets, no trading venue really offers them as a way to gain market share.}\)

\(\text{7 One simple way to think about HFT is:}\)

\(\text{In the olden days, if you wanted to sell a million shares of stock, you'd go to Goldman and ask for a bid, and they'd bid you down 3 percent to compensate for the risk they're taking buying that stock.}\)
In modern times, if you want to sell a million shares of stock, you post some orders in a bunch of places, and HFTs figure out that you’re a big and probably informed seller, and they move their prices down to compensate for the risk they’re taking buying that stock.

The modern version is faster and more iterative and more "transparent" in one sense -- it's all based on public orders -- though less transparent in another sense, since the old-time market maker would charge you that risk price up front. If you take away HFTs' ability to understand the order book, though, they will need to build in some more of that up-front risk pricing.

As a matter of theory you'd think that risk pricing in non-transparent markets would be wider than pricing in perfectly transparent markets, though that is not necessarily true either.
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The FIA Principal Traders Group is composed of firms that trade their own capital on the global exchange-traded markets. FIA PTG members engage in manual, automated, and hybrid methods of trading and are active in a variety of asset classes such as equities, foreign exchange, commodities, and fixed income. FIA PTG member firms serve as a critical source of liquidity, allowing those who use the markets to invest their capital and manage their risks effectively by entering and exiting markets efficiently. For further information please visit http://www.fia.org/ptg/ or contact us at press@fia-ptg.org or (202) 391-0226.

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