February 19, 2016

Brent J. Fields
Secretary
Securities and Exchange Commission
100 F Street, NE
Washington DC

Re: Investors' Exchange LLC Form 1 Application (Release No. 34-75925; File No. 10-222)

Dear Mr. Fields:

It's been a delight to read the hundreds of comment letters in support of IEX's Form 1, letters representing perhaps 50 million people and their trillions of assets under management. It's also been a delight to read the handful of protest letters sputtering against IEX's exchange application. I can't remember the last time high frequency trading firms hollered and flapped around like this. You'd think they all swallowed a bumblebee.[1] Their latest complaint is about the supposed unfairness of the IEX router. Since the IEX outbound router doesn't go through the IEX hardware speed bump ("speed bump"), IEX critics say it will disadvantage firms overall and hold an unfair advantage over every other router in particular. Price discovery will be weakened, market stability threatened, and angels will lose their wings. I was so surprised by one businesslike comment letter from a high frequency trading firm I thought it had to be a parody, or perhaps even a confession. It wasn't either, as it turned out, at least not on purpose.

There's nothing new or calamitous about IEX's router and speed bumps. Claims they are unprecedented and unfair are at best uninformed. As for the IEX router, exchange-affiliated routers have had well understood speed and information privileges over other broker dealer routers since exchanges introduced them 15 years ago.[2] They still do. As for the speed bump, markets have introduced deliberate delays by rule, or in software or hardware, for decades, both well before and long after Reg NMS.[3] The SEC has obvious precedents to permit a speed bump in hardware, or, if the SEC denies IEX that simple, transparent, and useful device, IEX can patch together a complicated set of rules to do much the same, and little in Reg NMS, the Exchange Act, or any other federal regulation will oppose it. Which do we want?

The complaints depend on a self-serving read of Reg NMS, leaving out its history, its original meaning, and its subsequent interpretation. Critics say IEX's speed bump defies Reg NMS because protected quotes have to be "immediately and automatically" executed, and to them that phrase should be understood in a bubble, meaning only what they want it to mean right now. But the Reg NMS adopting release[4] ("Adopting Release") discusses all this at some length. It defines "automatically" as an execution without human intervention and it defines "immediately" to preclude "any coding of automated systems or other type of intentional device that would delay the action taken with respect to a quotation," which it then spends quite a bit of time explaining. As is clear the larger plan was to encourage automated markets and prevent

[1] Except for Virtu, which has given IEX its full support.
[2] Securities and Exchange Commission, "Order Approving Proposed Rule Change by the Pacific Exchange, Inc., as Amended, and Notice of Filing and Order Granting Accelerated Approval to Amendment Nos. 4 and 5 Concerning the Establishment of the Archipelago Exchange as the Equities Trading Facility of PCX Equities, Inc.," Release No. 34-44983; File No. SR-PCX-00-25, October 25, 2001.
[3] For example, halts for news pending are trading delays intended to let information disseminate, just as the speed bump is a delay intended to let information disseminate. The NYSE used to prohibit more than one auto ex order from the same person every 30 seconds. Nasdaq used to deliberately delay some messages to correct for the geographic dispersion of its market makers. Every major exchange group today uses "delay coils" to equalize access in their data centers, as IEX has pointed out. Every major exchange group today sells several tiers of access, all providing different market access latency, and those latencies easily vary by as much or more than IEX's proposed speed bump. And so on.
[4] Exchange Act Release No. 34-51808, June 9, 2005.

exchanges from favoring their own *manual markets*, so the SEC protected an exchange's lit, automated quotes and banned any programmed tricks or devices an exchange might use to give human traders a chance to intervene or any kind of an edge over automated quotes. "Immediately and automatically" means without human intervention and with no chance of human intervention. It does not mean as fast as an exchange, or any exchange, can go.

In 2003, when Reg NMS was percolating at the SEC, electronic exchanges in the listed market were struggling to compete against legacy trading floors. At the time exchanges used the Intermarket Trading System ("ITS"), the 1970s-era network connecting the markets, to route orders to better priced quotations at away exchanges. ITS allowed the human traders at away exchanges up to 30 seconds to respond, and frequently enough the response from floor-dominated markets was to reject incoming orders, which was one way floor markets protected themselves against their electronic competition. The electronic exchanges were hamstrung by it, waiting up to 30 seconds to process an order was an eternity to them. To pave the way for the future, the SEC proposed Reg NMS and scrapped ITS, and in Reg NMS the SEC created a new kind of market quotation that had to be honored "immediately and automatically." The standard by which to measure Reg NMS's new protected quotes was never that they must go as fast as any exchange can go. The standard by which to measure automated and protected quotes was ITS, or, more precisely, human intervention, because it was human intervention the SEC wanted to firewall.[5]

Cash Register

That's not what IEX critics want us to believe. They want a revisionist account of Reg NMS, without even a nod to its original meaning, but their version of Reg NMS was buried under a cash register years ago. The Adopting Release precludes "any coding of automated systems or other type of intentional device that would delay the action taken with respect to a quotation," but exchanges have all kinds of intentional devices that speed up some firms and slow down other firms, from co-location facilities to faster and slower networks and network facilities. Unless a member pays for the quickest and most expensive facilities an exchange sells, no matter the price,[6] that member is delayed by a slew of intentional devices.

If we take the Adopting Release out of context like this, should the SEC stop exchanges from selling co-location, tiered network facilities, and all the other products and services that turbocharge one firm over another?[7] With the SEC's blessings, exchanges have sold billions of dollars of turbochargers over the years, products and services giving some firms material speed advantages over other firms, even when the slower firm's computers sit side-by-side with the faster. A firm can spend millions every year for preferred speeds at any of the large exchange groups. How does an exchange sell a speed advantage without purposely disadvantaging anyone who can't or won't buy it? How can that square with Reg NMS if Reg NMS prohibits "any coding of automated systems or other type of intentional device that would delay the action taken with respect to a quotation"?

It squares with Reg NMS only if Reg NMS precludes an exchange from "any coding of automated systems or other type of intentional device that would delay the action taken with respect to a quotation [*allowing human intervention*]." For example, the Adopting Release says:

> [T]he adopted Order Protection Rule protects only quotations that are *immediately accessible through automatic execution*. It thereby addresses a serious weakness in the ITS provisions, which were drafted for a world of floor-based markets and fail to reflect the disparate speed of response between manual and automated quotations. By requiring order routers to wait for a response from a manual market, the ITS trade-through provisions can cause an order to miss both the best price of a manual quotation and slightly inferior prices

[5] Adopting Release, pages 22-23.
[6] See "Stock Exchanges Are Eating Your Returns" by Larry Tabb, Bloomberg View, January 22, 2016, at http://www.bloombergview.com/articles/2016-01-22/stock-exchanges-data-fees-harm-investors.
[7] Well, yes, the SEC should. But it hasn't, and it won't.

> at automated markets that would have been immediately accessible. The Order Protection Rule eliminates this potential inefficiency by protecting only automated quotations. It also promotes equal regulation and fair competition among markets by eliminating any potential advantage that the ITS trade-through provisions may have given manual markets over automated markets. [Emphasis added.]
>
> *and*
>
> The Commission therefore is adopting, as reproposed, *an approach that excludes manual quotations from trade-through protection*. Under the Order Protection Rule as adopted, investors will have the choice of whether to access a manual quotation and wait for a response or to access an automated quotation with an inferior price and obtain an immediate response. [Emphasis added.]
>
> *and*
>
> First and most importantly, Rule 611 protects only *immediately accessible quotations that are available through automatic execution*. It does not require investors submitting marketable orders to access "maybe" quotations that, after arrival of the order, *are subject to human intervention* and thereby create the potential for other market participants to determine whether to honor the quotation. [Emphasis added.]

As it is today, not only is every exchange but the quickest slowing its members down with intentional devices like slower networks, hardware, software, and even geography,[8] any exchange with more than one speed service class is intentionally slowing some of its members down. A co-located firm on a 40gb connection is many microseconds faster than a firm right next to it slogging along on a 1gb connection, particularly under load, and the SEC has no problem with any of it. By any context-free reading of the Adopting Release, there is no question a firm using a 1gb connection is delayed by intentional devices, but the SEC does not read Reg NMS context-free. No one does.

That "immediately" simply prohibits discrimination favoring manual markets is all the more obvious in the Adopting Release's discussion of self-help. The SEC had every opportunity to define "immediately" in absolute terms and declined to do it. The SEC only went as far as suggesting one second was a reasonable upper bound for declaring self-help and left it up to the marketplace to reward fast markets or punish slow markets. The SEC didn't hesitate to indulge in ratemaking to settle access fees in Reg NMS, and it had many chances to indulge in latency-making to settle "immediately and automatically." It turned all those chances down, except to repeatedly point out "immediately and automatically" meant without human intervention. Other than that one second threshold, the SEC could have dictated lots of factors that might define an "immediate" response. It could have dictated inter- and intra-exchange response time consistency, exchange geography, response time averages and percentiles, and matching engine and network technologies and architectures. Instead, the same exchange on the same day in the same stock can respond to an order in 100 microseconds at 11AM in the morning and in 990,000 microseconds at 3:59PM in the afternoon and both are immediate responses under Reg NMS so long as a human being can't jump in. The same exchange on the same day *at the same time* can respond to an order in IBM in 100 microseconds and to an order in AAPL in 990,000 microseconds and both are immediate so long as there is no chance for human intervention. Someone might argue these variances are from load changes or hardware limitations and aren't deliberate, but technology underinvestment and poor capacity planning are as deliberate as any speed bump. Immediate does not mean instantaneous, and it certainly doesn't mean an exchange has to help spoofers and snipers scalp a buck, as we'll see.

[8] In its November 23, 2015 comment letter, IEX points out that exchange latencies (ex-CHX) vary by a factor of eight from the fastest to the slowest. Including CHX, exchange latencies vary by a factor of almost 100. Are the slower exchanges violating Reg NMS because they're so much slower than the fastest exchange? Suboptimal exchange hardware, software, and geography are surely as "intentional" as optimal hardware, software, and geography.

By offering only one kind of automated access in a single service class, IEX lives up to the letter and spirit of the Exchange Act and Reg NMS. Not only is every IEX quote immediately accessible through automatic execution, with no chance of human intervention, no one can buy preferred status on IEX. There aren't any turbochargers for sale. There isn't any floor and there aren't any appliances preferencing one kind of quotation, automated or manual, over another, or one kind of member, rich or poor, over another.

Exchange Routers

As for its router, as IEX itself pointed out in its November 13, 2015 response to critics, exchange facilities like the IEX router have been well-settled rulemaking for years. It's ironic Nasdaq too has complained about IEX because Nasdaq set one precedent in 2012 with a set of routing instructions that further elevated its own router above others. From the SEC's approval order ("Nasdaq Approval Order"):

> NASDAQ has proposed to amend Rule 4758(a)(1)(A) to reflect a change in NASDAQ's order routing functionality, which will allow routable orders to simultaneously execute against NASDAQ available shares and route to other markets for execution of the remainder of the order. Currently, when a routable order is entered into the NASDAQ system, the NASDAQ book is first checked for available shares. If such an order is not filled or filled only partially, then the order is routed to away markets with the best bid or best offer pursuant to NASDAQ's System routing table.
>
> NASDAQ stated that it has observed that upon partial execution of a routable order at NASDAQ market participants often react to the order by cancelling their orders on other markets and entering new orders at inferior prices. This occurs because the current process directs the order to NASDAQ before attempting to access available liquidity at other markets and thereby allows market participants to react to the execution (an effect known as "market impact" or "information leakage"). As a consequence, the available shares at the away market are no longer available, resulting in a lower likelihood of successfully accessing liquidity on away markets (i.e., the "fill rate") and an increased likelihood of ultimately receiving an execution at an inferior price. As such, NASDAQ has proposed to address this by changing how the routing process will operate.[9]

Let's walk through all this in some detail. As I understand Nasdaq's stable of routing instructions and how its matching engines might work, Nasdaq offered routing instructions that would cause Nasdaq to, on receiving a marketable and routable order, (1) check the Nasdaq book for available shares (displayed and hidden), (2) execute trades against its own book, (3) calculate any residual to the order, (4) route any residual out and (5) send trade confirmations back to the parties to the trade. Certainly all this happens before the SIP receives and disseminates Nasdaq's new BBO and before the SIP calculates and disseminates any new NBBO. Nasdaq changed its router to behave this way because Nasdaq (or perhaps Nasdaq's institutional customers) noticed what Brad Katsuyama of IEX noticed, "Why was was there a difference between the stock market displayed on his trading screens and the actual market? Why, when he went to buy 20,000 shares of IBM offered on his trading screens, did the market only sell him 2,000?"[10] Or, as the SEC cited Nasdaq, "upon partial execution of a routable order at NASDAQ market participants often react to the order by cancelling their orders on other markets and entering new orders at inferior prices."

If we take a moment to consider advantages to Nasdaq and its router here, we see they include (1) the ability to check Nasdaq's displayed and non-displayed liquidity before (2) calculating any residual and (3) routing the residual to other market centers before, or concurrent with, (4) notifying anyone of a trade. Its other advantages include (5) knowing its own BBO - and often enough (6) the NBBO too - well before anyone else knows it. In 2012 the difference was certainly large enough to make a material difference to its

[9] Exchange Act Release No. 34-67639; File No. SR-NASDAQ-2012-071 (August 10, 2012)
[10] *Flash Boys,* Michael Lewis (2014).

router or Nasdaq wouldn't have proposed the rule change. (50 microseconds? 100? Only Nasdaq knows.) Nasdaq's advantage knowing its own and possibly even the national top of book meant Nasdaq was likely 100 times faster, or more, than anyone depending on the Nasdaq-run SIP. Here too, only Nasdaq knows.[11]

Checking the book for displayed and non-displayed liquidity is *sui generis*, just one of the unique and irreproducible advantages of exchange-affiliated routers - *including speed* - the SEC has been comfortable with since Arca introduced the concept of exchange-affiliated routing brokers well over a decade ago.[12] Knowing its own BBO, or even the NBBO, before anyone else knows it is also unique to market centers in our fragmented marketplace.

In the Nasdaq Approval Order, the SEC found that Nasdaq's new routing instructions promoted "*efficiency* in the market, and should, as represented by NASDAQ, increase the likelihood that a routable order will receive *faster and better executions*." [Emphasis added.] The SEC also found the change "could improve NASDAQ's ability to effectively process routable orders" and that Nasdaq's changes were consistent with the Exchange Act. If Nasdaq's advantages have subsequently hurt price discovery or market efficiency, or contributed to market instability, hurt competition, or exacerbated market complexity, as some claim for IEX's similar advantages[13], let's see the evidence. (While we're at it, why haven't all the exchanges described precisely the sequence of events and associated latencies when they route out? Those details now seem every bit as important as knowing what data feeds exchanges use and for what purposes.)

In approving Nasdaq's routing behavior, the SEC stood on an implied principle that exchanges can use their advantages over other kinds of market centers, and certainly over ordinary broker dealers, to deter latency arbitrage or gaming. Whatever you might call it when high speed firms react to an order "by cancelling their orders on other markets and entering new orders at inferior prices" - whether you call it an example of latency arbitrage, quote fading, phantom liquidity, ghost liquidity, adverse selection avoidance, backing away, or, as I've argued, spoofing[14] - the SEC was quite clear that exchanges could use *time* strategically to help marketable and routable orders access liquidity at away markets before that liquidity vanished. The SEC was also quite clear exchanges could use the unique and irreproducible advantages of exchange-affiliated routers to outpace other routers. Perhaps that's because helping investors quickly access all displayed liquidity at order submission time across our many distributed markets has been an explicit Congressional and SEC goal since the 1970s, when serious proposals for an automated national central limit order book ("CLOB") first surfaced.[15] Reformers, academics, and advisory committees have proposed real or virtual CLOBs ever since.[16]

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[11] In a comment letter on IEX's application to become an exchange (Letter to Brent J. Fields, Secretary, SEC from Joan C. Conley, Senior Vice President and Corporate Secretary, Nasdaq, January 29, 2016, "Nasdaq Letter"), Nasdaq disputes that it gave its router any advantage in that 2012 rule change, maintaining that the rule change merely "rectified [an] inequity" because before the change Nasdaq was "*treating its own routing broker worse than other routing brokers."* [Emphasis in original.] So far as I know, the Nasdaq Letter is the first time Nasdaq has offered that explanation for its rule change. In 2012, Nasdaq said "NASDAQ believes that this *simultaneous execution against NASDAQ available shares and routing to other venues' shares* will avoid the deleterious effect of market impact discussed above and result in overall faster and better executions of its members' routable orders." [Emphasis added.] Of course, if after the change the Nasdaq router stood on the same ground as other routers, no better or worse situated, how could it then "avoid the deleterious effect of market impact"? And isn't simultaneous execution and routing a unique and irreproducible advantage of exchanges and their routers?

[12] See note 2 above.

[13] Letter to Brent J. Fields, Secretary, SEC, from Adam Nunes, Head of Business Development, Hudson River Trading, December 4, 2015; Letter to Brent J. Fields, Secretary, SEC, from John C. Nagel, Managing Director and Senior Deputy General Counsel, Citadel LLC, November 30, 2015.

[14] http://www.sec.gov/comments/sr-bats-2015-101/bats2015101-1.pdf

[15] See Exchange Act Release No. 34-11942, December 19, 1975, and Release No. 34-12159, Mar. 2, 1976, and Release 34-14416, January 26, 1978, and so on.

[16] For example, in 2011 the Joint CFTC-SEC Advisory Committee on Emerging Regulatory Issues suggested intermarket depth-of-book protection (a virtual CLOB) as one of its "recommendations targeted at the most important and pervasive issues affecting investors and the markets."

A National Market

Professor Rajiv Sethi's brilliant IEX comment letter[17] tells us why IEX's speed bump and router are consistent with Congressional directives and with the SEC's policy initiatives:

> Given the large number of trading venues now in operation and the speeds at which communication occurs....If a marketable order arrives at an exchange, is partially filled, and then routed to another exchange, there will be a small gap in time before the second exchange receives what is left of the order. It is technologically possible for a third party to observe the first trade (either because they are a counterparty to it or have access to the data generated by it) and to act upon this information by sending orders to other exchanges. These may be orders to trade or to cancel, and may arrive at other exchanges before the first order has been fully processed.
>
> Should these new orders, placed after Order A has made first contact with the market, be given priority over Order A in interacting with resting orders at other exchanges? It seems to me that the plain meaning of Congress' directive [the 1975 amendments] and the order protection rule says that they should not.
>
> IEX's proposed design prevents this kind of event from taking place by delaying the dissemination of information generated by Order A's first contact with the market until enough time has elapsed for the order to be fully processed. This brings the market closer to the national system envisaged by Congress, and indeed by the SEC itself....
>
> The design proposed by IEX, by preventing orders from trading out of sequence (measured with respect to first contact with the market) would bring the system closer to that envisaged by Congress. In a true national market system with multiple exchanges, each order would receive a timestamp marking its first contact with the market, and no order would begin to be executed until all orders with earlier timestamps had been fully processed. In making a determination on the IEX application, I would urge the commission to consider whether approval would bring the system closer to this ideal.

Businesslike

Which takes us to that businesslike comment letter and why furies over IEX's router and speed bump can't be taken seriously. Hudson River Trading's[18] ("HRT" or "Hudson") December 4, 2015 comment letter[19] ("HRT Letter") includes four examples where it believes IEX's speed bump is unfair or irrelevant.

In its first example, HRT says all the speed bump does is slow everyone down by 350 microseconds and is otherwise inconsequential. Stipulated.[20] We'll skip a closer look.

Hudson's second example is more interesting:

> Example 2: Non-Displayed Pegged Order – IEX bypasses the POP allowing it to beat a member by updating the pegged order price

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[17] http://www.sec.gov/comments/10-222/10222-285.pdf

[18] Hudson River Trading has described itself as "a quantitative trading firm that develops automated trading strategies that provide liquidity and facilitate price discovery on exchanges and Alternative Trading Systems." The firm is a founding member of the Modern Markets Initiative, a high frequency trading industry trade group. In 2014 the Wall Street Journal wrote the firm accounted for "more than 5% of U.S. stock transactions on most days."

[19] See note 13 above.

[20] Except insofar as the speed bump gives IEX systems time to ensure they always have the freshest prices.

- Member B and IEX see a quote update on another exchange in which the best offer goes from 20.00 to 20.01 that would lead them each to take action.
- **Member A has a non-displayed primary peg order** that is available to sell at 20.00 on IEX, where IEX manages the price of pegged orders on behalf of members (primary peg sell orders peg to the best offer).
- Member B responds to the price change in 100 microseconds by sending a marketable IOC buy limit order at 20.00 to IEX **to trade with Member A**.
- Only Member B will go through the POP, adding 350 microseconds to its order. The result is that Member B's order message reaches the IEX matching engine in 450 microseconds.
- IEX does not go through the POP and therefore it is able to update the price of the pegged order to 20.01 before Member B reaches the matching engine. As such, no trade occurs.

[Emphasis added.]

About all this Hudson coughs on a bumblebee, saying "the pegged order on IEX was repriced while Member B was attempting to trade with it." Among other questions we can ask about this example, we might ask why Member B was frantically attempting to trade with an order it can't see and doesn't know exists.[21] It's also worth pointing out that undisplayed interest isn't protected by Reg NMS and, if it wished, an exchange could propose rules to delay an order before it trades with undisplayed interest, or to delay principal orders before they trade with undisplayed interest, or to delay IOCs before they trade with undisplayed interest.

But what is Member B up to? One answer might be that Member B was sniping, hoping to pick off any undisplayed interest at what Member B now believes is a stale price. Many consider that a canonical example of latency arbitrage and predatory trading.[22] Ironically, the industry can deny it does anything like it.[23] We shouldn't have any sympathy for the professional scalpers at Member B, and if Member B is unhappy IEX won't let it pick off investors whose only fault is that IEX is microseconds slower than Member B, Member B doesn't have to go sniping at IEX.

Hudson's third example is interesting too:

> Example 3: IEX BD Router – IEX bypasses the POP allowing it beat a member to another exchange
>
> - Member C has an order to buy at 10.00 resting on IEX.
> - IEX has a routable sell order that fully executes Member C's buy interest on IEX.
> - **When executed, Member C decides to update its buy order prices on another exchange from 10.00 to 9.99.**
> - The POP would delay Member C's execution information by 350 microseconds. As a result, although Member C's buy order on IEX has been executed, it does not know this for at least 350 microseconds.
> - Before Member C is informed of its buy order execution, the IEX BD Router sends an order to the other exchange to execute against Member C's buy order at 10.00 on the other exchange.

[21] It's an undisplayed order type. The example even says so.
[22] Arnuk and Saluzzi, Themis Trading, "Latency Arbitrage: The Real Power Behind Predatory High Frequency Trading," December 4, 2009; Letter to Brent J. Fields, Secretary, SEC, from Clive Williams, Andrew M. Brooks, and Christopher P. Hayes, T. Rowe Price Associates, Inc., December 24, 2015.
[23] On October 15, 2014, the Wall Street Journal quoted Adam Nunes, the author of Hudson's comment letter, as saying "We [also] don't try to race ahead of an institution's order or sniff out whether someone is trying to place an order here or there."

- Since Member C was not informed of its execution on IEX, its order at 10.00 on the other exchange is executed by the IEX BD Router before Member C can update the price to 9.99.

[Emphasis added.]

It seems Member C in this example has at least two buy orders in the market, one on IEX and one on another exchange. If its order on IEX is executed Member C wants to immediately cancel its order on the other exchange, and Hudson is upset it might not be able to do it because of how IEX will work.

But first, if this is Member C's business model, in what sense does Member C have any intent at all to trade both orders at a price of 10.00 when it submits them - how are both orders *bona fide* orders Member C fully intends to trade? If Member C intends to execute only one of these orders when it submits them, as Hudson's example makes very plain, and Member C has programmed its systems to let only one execute if it can, and Member C pays millions every year for the high speed data feeds, data links, and co-location facilities to help guarantee it will execute only one of these orders, how can these orders possibly represent actual supply and demand?[24] (What kind of firm do we think Member C is?)

Isn't this exactly the scenario that Nasdaq was trying to defeat with its 2012 rule change, which the SEC praised as improving "efficiency in the market, and should ... increase the likelihood that a routable order will receive faster and better executions"? (It's also worth pointing out that, despite Hudson's outrage over this example, IEX doesn't have any obligation to send Member C a trade report on any particular timeframe: resting orders in an exchange book aren't entitled to immediate confirms under Reg NMS or any other SEC regulation.) We shouldn't have any sympathy for the spoofers at Member C, and if Member C is unhappy IEX throws a speed bump at its spoofing, Member C doesn't have to rest orders on IEX.

Lastly, Hudson's fourth and final example includes the same paradox as its second example - why is the firm trying to trade with an order it can't see and doesn't know exists?

Taking all these examples together, Hudson's worry seems to be IEX members won't be able to game our fragmented markets and pick off investors or pull quotes. Stipulated. This is exactly IEX's point. Not only have we perhaps gained some insights into what Hudson thinks about trading, we've learned how, by trying to make sure the exchange has the most current market information - away market information arriving from a fragmented and geographically dispersed marketplace - IEX could force high frequency trading firms to find some other way to make a living. That sounds like responsible public policy that could quickly improve market quality and lower investor costs.[25]

Advantages

For the last 15 years, the SEC has let exchanges offer products and services to help high frequency trading firms dominate the market. From co-location to proprietary data feeds to high speed networks, exchanges turned once simple membership and fee models into billion dollar technology businesses. About ten years

[24] I argue this is spoofing at http://www.sec.gov/comments/sr-bats-2015-101/bats2015101-1.pdf.

[25] Data-driven research papers showing how high frequency trading firm tactics like these harm market quality and long-term investors include: Boni, Brown, and Leach, "Dark Pool Exclusivity Matters" (2013); Breckenfelder, "Competition between High-Frequency Traders, and Market Quality" (2013); Ding, Hanna, and Hendershott, "How Slow is the NBBO? A Comparison with Direct Exchange Feeds" (2014); Hirschey, "Do High-Frequency Traders Anticipate Buying and Selling Pressure" (2013); Kwan and Philip, "High Frequency Trading and Execution Costs" (2015); Malinova and Park, "Liquidity Provision and Market Making by HFTs" (2015); McInish and Upton, "Strategic Liquidity Supply in a Market with Fast and Slow Traders" (2012); Nanex, "Perfect Pilfering" (2014); Menkveld and Zoican, "Need for Speed? Exchange Latency and Liquidity" (2015); Partington, Philip, and Kwan, "Is High Frequency Trading Beneficial to Market Quality?" (2015); Tong, "A Blessing or a Curse? The Impact of High-Frequency Trading on Institutional Investors" (2015); Toulson, "Do HFTs Really 'Game' Buy-Side Orders' (2013); Wah, "How Prevalent and Profitable are Latency Arbitrage Opportunities on U.S. Stock Exchanges?" (2016).

ago an entrepreneur could lease a seat on the NYSE for around $60,000 a year. Today that entrepreneur needs millions for rack space, 40gb connects, and data feeds to get started at any of the larger exchanges. Exchanges discovered how to monetize price/time priority and encouraged intermediation as a way to pay for speed. The technology mostly benefited market participants who all deployed the same kind of business plan, the high turnover and low inventory trading firm: high frequency trading firms. But it was more than technology on offer. Implicitly or explicitly exchanges sold structural and informational advantages to these firms as they monetized time advantages.

Here are two reasons why firms might want those advantages[26]:

It was this kind of behavior Nasdaq observed and deployed its router's advantages to counter in 2012, and the same is true now for IEX and its speed bump and router.

IEX knows firms have profound incentives to be fast and that they have lots of capital to buy speed. The HRT Letter and those two tweets show us what firms can use their speed to do. To protect investors from getting picked off at stale prices, and to help investors trade with all displayed liquidity when they submit an order, IEX can either try to forever win the speed arms race or it can try to put a cap on it. Wisely, IEX uses hardware to put a 350 microsecond cap on it, just enough to (usually) guarantee IEX is on an equal footing with even its fastest members. The cap is dictated by the geography of the largest data centers in the National Market System, but still small enough IEX is as fast or faster than other exchanges,[27] well within the only absolute standards the Adopting Release discussed for automated quotes,[28] and completely uniform within its one service class.

Simple and Fair

It's worth exploring some alternatives for IEX. These alternatives might reach some of the same laudable goals IEX achieves with a speed bump but only by introducing quite a bit more cost, opacity, and complexity.

In the first place, IEX could propose a rule forcing its members to hold any order add, update, or cancel for 350 microseconds before sending it to the exchange. No federal regulation would forbid it. The purpose of that rule would be to ensure that, given the dispersion of markets in the National Market System and the speed arms race, the exchange had the most recent market information on hand so it could shield resting orders entrusted to it from the kinds of tactics outlined in the HRT Letter. (A recent study looking into just one kind of latency arbitrage, and just in the lit markets, estimates it could cost investors up to $3 billion every year.[29]) And then, if approved, IEX could enforce the rule through time-consuming, intrusive, and expensive examinations.

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[26] At the time of these tweets Remco Lenterman was a senior executive of IMC and the chairman of the FIA European Principal Traders Association, a lobby group for high frequency traders. IMC describes itself as "a leading market maker, active on over 100 exchanges, platforms and pools of liquidity around the world" and "a leading Designated Market Maker (DMM) on the New York Stock Exchange (NYSE) providing liquidity in over 600 NYSE listed securities."

[27] Letter to Brent J. Fields, Secretary, SEC, from Sophia Lee, General Counsel, IEX Group, November 23, 2015.

[28] See the discussion of self-help in the Adopting Release.

[29] Wah, "How Prevalent and Profitable are Latency Arbitrage Opportunities on U.S. Stock Exchanges?" (2016)

If the SEC turns the IEX universal speed bump down, IEX could also apply selective delays or other restrictions. "Immediately and automatically" applies only to incoming IOC orders against displayed quotes, so if the SEC turned the speed bump down for IOCs, IEX could apply it to every other order type, which at least counters the spoofer example in the HRT Letter. IEX could also delay orders before trading with - or for some order types, prohibit them from trading with - any undisplayed interest in its book without worry, which at least puts paid to some kinds of predators.

Doing it all in hardware is simpler, impossible to game, impossible to misinterpret, doesn't require lengthy and intrusive examinations to enforce, treats everyone equally, lowers investor costs, is completely consistent with Reg NMS, and, most important, it is a real chance to deter many species of predatory and manipulative behavior in the National Market System.

Sincerely,

R. T. Leuchtkafer