Jefferies

Jefferies LLC

520 Madison Avenue
New York, NY 10022
tel 212.284.2300
Jefferies.com

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Mr. Brent J. Fields
Secretary
Securities and Exchange Commission
100 F Street, N.E.
Washington, DC 20549-1090

Dear Mr. Fields:

Jefferies appreciates the opportunity to comment on the Investor's Exchange LLC ("IEX") Form 1 application. Jefferies is a global investment bank with active participation in equity trading markets primarily on behalf of our institutional client base. In this comment letter, we will make an attempt to analyze the relative merits of the proposed IEX exchange from the perspective of an institutional execution algorithm. We also will note that Jefferies has an employee who was recently selected by other members of the industry to participate as an unpaid member representative on the Board of the IEX (if and when approved).

Based on independent research, we estimate that approximately 40% of institutional trading is in the form of orders directed to broker dealer algorithms. Institutional trading desks utilize the algorithms to manage their order flow, selecting specific strategies like VWAP, POV, IS etc. to achieve their trading goals. The execution algorithms access liquidity on exchanges and off-exchange destinations in multiple ways. The order types utilized by an algorithm can be categorized into three broad categories:

- Liquidity Providing Orders
    - The objective of these orders is primarily to capture the bid-ask spread and act as liquidity providers in the marketplace
- Midpoint (Hidden) Pegged Orders
    - These orders are generally larger and hidden (non-displayed) in the order book. Their objective is to minimize information leakage and match with other orders at the prevailing midpoint.
- Liquidity Removing Orders
    - These are aggressive orders, usually generated by a smart router with the objective of removing the displayed liquidity on the book.

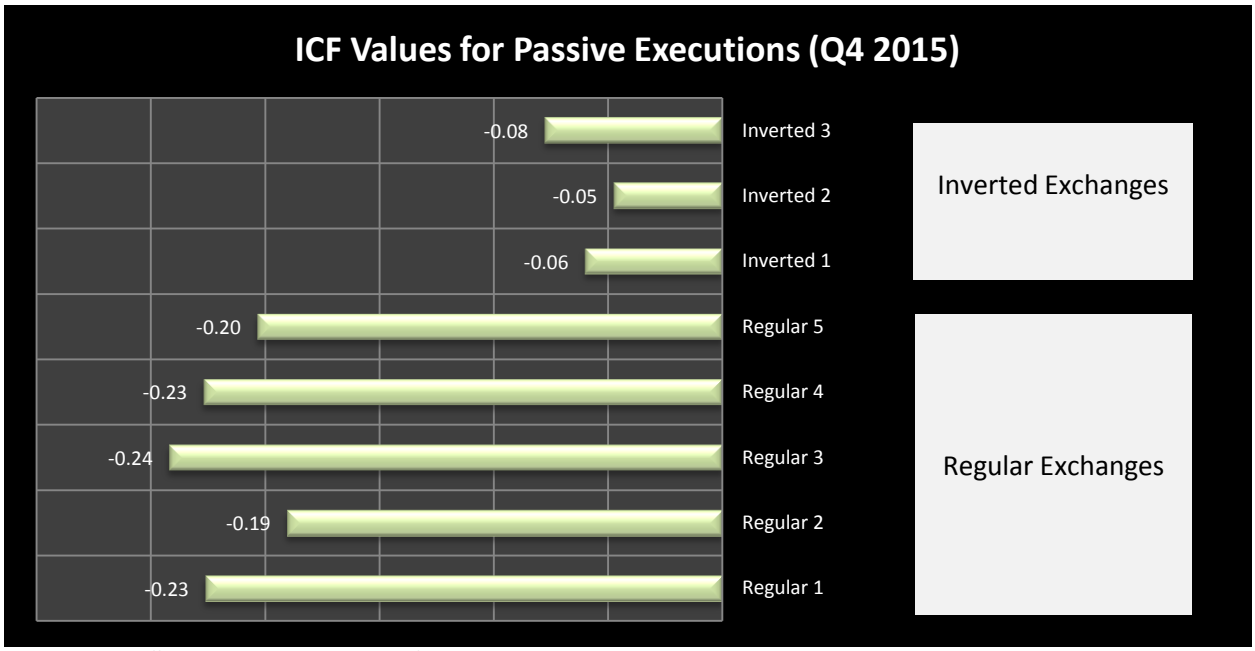
Outlined in more detail below, we try to estimate the impact an exchange structure like the one proposed by IEX would have on the above three aspects of an execution algorithm. In addition, we will also comment on whether this proposed design gives IEX's own router an advantage over other smart routers.

Liquidity Providing Orders

One point to consider in the context of existing protected markets is whether the proposed IEX Exchange model provides a more attractive alternative for posting orders passively (i.e., liquidity providing orders). Exchanges which charge a low fee (or provide rebate to) liquidity removing orders find themselves at a higher priority in a

Smart Order Router's choice of destinations. These exchanges are generally referred to as 'inverted exchanges'. IEX proposes to have a similar cost structure wherein the fee to remove liquidity will be much less than that of the large rebate oriented exchanges, making it as attractive to the cost sensitive smart order routers as the inverted exchanges.

The improved execution quality on account of such a structure can be viewed in the chart below which utilizes passive execution data in Jefferies algorithms in order to compare the Information Content Factor (ICF)[1] of regular and inverted exchanges.



(Data source: Jefferies Algorithmic Executions from Oct to Dec 2015)

ICF values for passive order executions were higher (better) on inverted exchanges than those on regular rebate oriented exchanges. Assuming that IEX will charge a low fee for liquidity removing orders, we anticipate that its execution quality for passive orders will be comparable to that of the existing inverted exchanges.

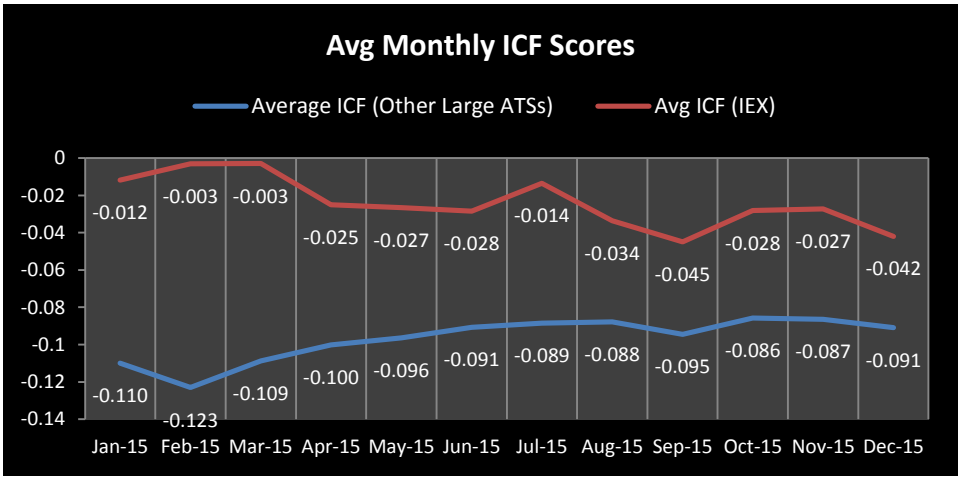
We also believe that IEX has another advantage that could make it the preferred choice for smart order routers. This advantage is attributed to the fact that trade reports to its proprietary data feed are going to be delayed by 350 microseconds. We explain the impact of this feature in detail in the 'liquidity removing' segment.

A combination of the above factors (rebate and delayed prints) make the proposed IEX Exchange model a favorable destination for passively posted orders.

[1] ICF stands for Information Content Factor. The calculation is based upon the execution price in relation to the stock price two seconds following the fill. Zero or positive values indicate a higher quality of execution; i.e., the destination has a good mix of less informed flow, better spread capture and favorable price improvement logic against marketable flow. The ICF calculation methodology is set forth in more detail within attached Appendix A.

Midpoint Pegged Orders

The IEX ATS offers a midpoint pegged order type, which is designed to seek hidden liquidity. Our analytics have consistently demonstrated that the order flow we interact with in IEX has some of the lowest short term information content. This can be viewed in the chart below, which compares ICF values on midpoint pegged orders in IEX to some of the other large pools accessed by our algorithms. We believe that the latency created by the 350 microsecond trade report delay ("speed bump") and the price improvement logic built into the D-Pegged[2] order types act in concert to provide these orders with superior execution quality.



(Data source: Jefferies Algorithmic Executions from Jan to Dec 2015)

Liquidity Removing Orders

One of the biggest concerns of smart order routers in the current (fragmented) environment is their inability to capture 100% of the displayed liquidity on the various exchanges. The root cause of this is the 'quote fading' phenomenon, which occurs when market makers withdraw their quotes from an exchange based on executions on other exchanges. The more dispersed the liquidity, the more the likelihood of quotes fading away before they can be accessed.

The IEX proposal of delaying a trade report to its own proprietary feed makes it harder for market makers to be able to 'respond' (cancel their existing quotes on other exchanges) to these prints. Because of the 350 microsecond time gap between the actual trade event and the information being available on the IEX proprietary data feed, trades on the IEX exchange are less likely to be the cause of quote fades at other venues. This is very positive for the execution of institutional orders which are more liquidity removing than liquidity providing. An exchange whose own trades do not generate immediate signals that can be exploited by other participants to fade their quotes on other exchanges brings 'incremental' liquidity to the market.

[2] D-Peg is a non-displayed order type that is priced at either the NBB for buys or NBO for sells. D-Peg orders passively rest on the book while seeking to access liquidity at a more aggressive price up to Midpoint of the NBBO, except when IEX determines that the quote is transitioning to less aggressive prices.

Does the IEX Router have an unfair advantage?

Many comments have been focused around the point that the IEX Router does not have to go through the 350 microsecond delay to access the IEX book. This sounds like a clear advantage for the IEX Router when compared to a non-IEX router.

In order to compare the relative advantages of the IEX router and a proprietary smart router, we consider the following situations:

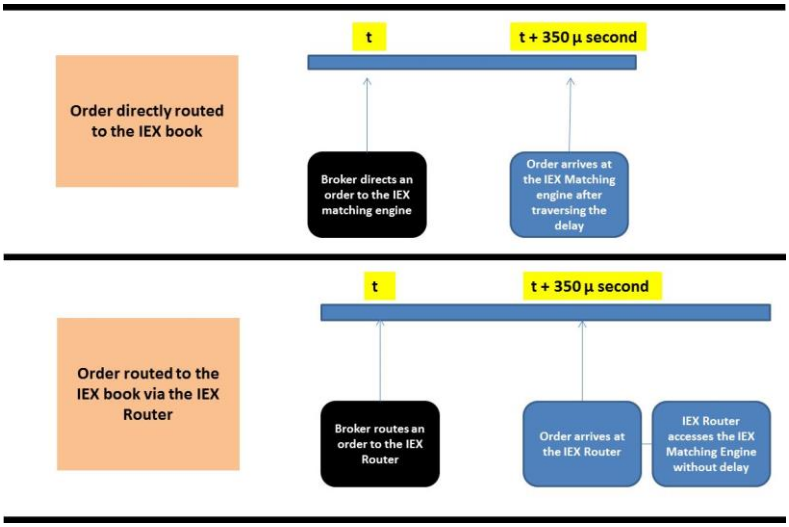
1. Accessing the IEX quote only
2. Accessing the IEX quote as part of a Smart Routing sequence (single price level)
3. Accessing the IEX quotes as part of a Smart Routing sequence (multiple price levels)

When accessing the IEX order book only

Proprietary Smart Order Router ("PSOR"): The order directed to the IEX book will have to go through the 350 microsecond delay in order to access the quote and another 350 microsecond delay before receiving the report.

IEX: The same order when routed using the IEX router will also have to go through the 350 microsecond delay before it reached the IEX router.

Therefore, utilizing the IEX router (in order to just access a quote on the IEX book) has no specific latency based advantage over a proprietary router.



Accessing the IEX quote as part of a Smart Routing sequence (single price level)

In this scenario, we classify the PSORs into two types:

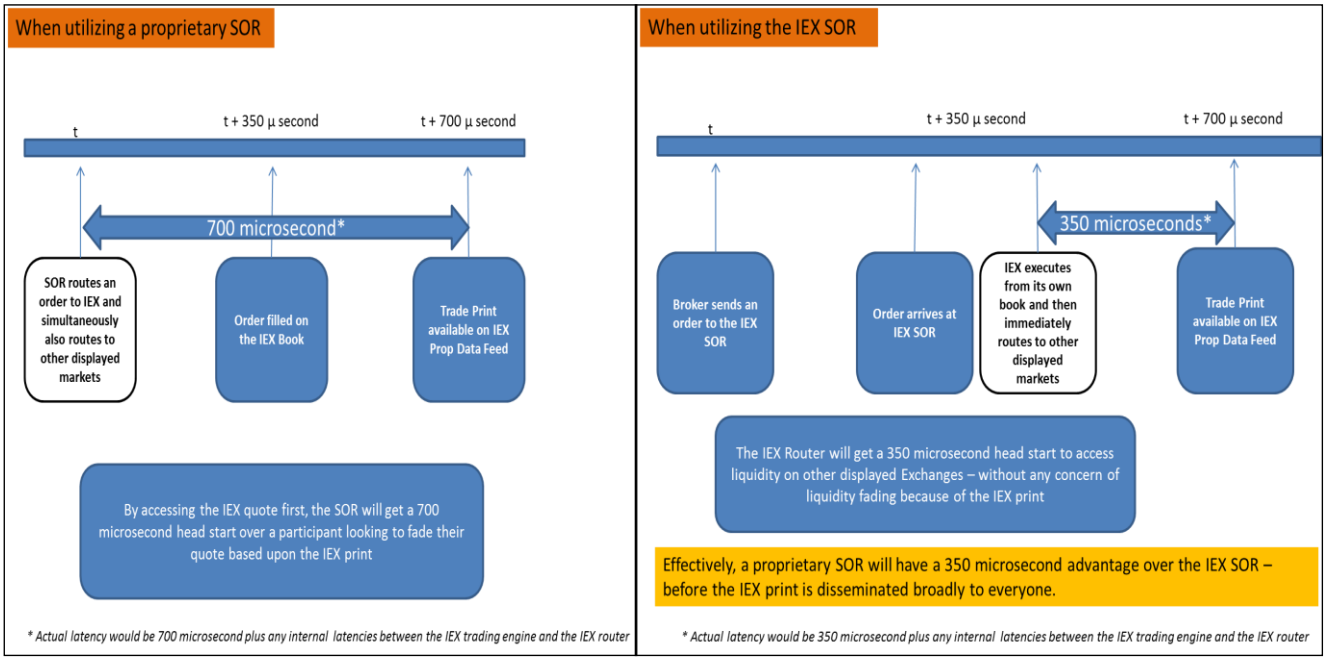
a. PSORs which access the displayed quotes sequentially (i.e. wait for a fill from a destination before routing the residual to the next destination)

b. PSORs which access the displayed quotes in a parallel (or latency adjusted) manner.

A **sequential PSOR would be at a disadvantage when compared to the IEX router** – because of the additional 350 microseconds it has to wait for its execution report to come back. This delay could result in missing some liquidity on account of quote fading on the exchanges which are to be accessed later in the sequence. The IEX router on the other hand, will bypass this 'delay' and can therefore route to other destinations quicker.

However, **a smarter PSOR which is able to route to multiple destinations simultaneously (parallel routing) has an advantage over the IEX router**. The diagrams below explains how a proprietary router accessing the IEX book first is able to create for itself a (minimum) 700 microsecond cushion between the time it routed an order to the book and the time the other participants will be aware of the fill. This time cushion can be utilized to access the liquidity on other displayed markets.

For this reason, the displayed liquidity on the IEX book could be considered as incremental to the overall market.



Accessing the IEX quotes as part of a Smart Routing sequence (multiple price levels)

In this scenario a router is trying to access liquidity at multiple price levels and at multiple destinations. For the purpose of simplicity, we can classify the routing logic into two broad categories:

PSOR1 – Accesses all destinations at a single price level in a parallel fashion. Once liquidity at that level has been exhausted, the same logic is utilized to access liquidity at the next price level.

PSOR2 – Routes multiple (ISO) orders in parallel and directed to the displayed quotes of various Exchanges at various price levels – based on the distribution of liquidity in the order book.

Example: The below table shows the status of various SELL orders in an order book

Offer Prices	IEX	Exch 1	Exch 2	Exch 3
33.05	500		800	
33.06	300	800	200	
33.07		100	500	700

PSOR1:

Step 1: (orders priced at 33.05) Route 500 shares to IEX and 800 shares to Exch2
Step 2: (orders priced at 33.06) Route 300 shares to IEX, 800 shares to Exch1 and 200 shares to Exch2
Step 3: (orders priced at 33.07) Route 100 shares to Exch1, 500 shares to Exch2 and 700 shares to Exch3

PSOR2:

Parallel routing of the following orders (using ISO order types as necessary)
IEX: 800 shares priced at 33.06
Exch1: 900 shares priced at 33.07
Exch2: 1500 shares priced at 33.07
Exch3: 700 shares priced at 33.07

At this time, we are not aware of the routing logic utilized by the IEX router when accessing multiple levels. Therefore, for comparison purposes we will assume that the IEX router utilizes the same routing sequence as the router it is being compared with (PSOR1 or PSOR2).

We believe that the IEX router will have an advantage over PSOR1 (accessing each price level, one at a time) in situations when the IEX book has liquidity at multiple price levels. This is because the IEX router will bypass the 350 microseconds delay when accessing its own book at every price level. PSOR1 however, will undergo

the delay every time it comes back to access the IEX quote at each progressive price level. The more price levels at which the IEX quote exists, the more 'latency' advantage the IEX router will have.

However, we do not see the IEX router having an advantage over PSOR2 because in this scenario (parallel and directed orders routed to various order books) the total delay to all orders routed to IEX will just be 350 microseconds – which is the same delay the order routed to the IEX router would have.

How would the IEX router fare against the routers offered by competing exchanges?

Exchange routers prioritize access to their own book (and sometimes the book of others in the exchange's member family) before routing to other competing exchanges. This behavior results in a higher probability of "quote fading", since the routing is somewhat sequential (routing exchange and their family exchanges followed by other exchanges). The IEX Router has the ability to take advantage of a 350 microsecond time difference between executing the order from the IEX book and the market participants being aware of the trade. This feature might make it more potent than routers offered by competing exchanges. Similar objectives (reducing signaling on account of their own trade print) have been met by some other exchanges by utilizing different mechanisms.

We don't think that the IEX router holds an unfair advantage over other exchange routers. By mitigating signaling on account of its own trade, the router is trying to maximize access to displayed liquidity on other exchanges even though this effectively helps the market share of a competing exchange (fewer quotes will fade on competing exchanges).

Based on the above, we believe that, when determining whether the IEX router has an unfair advantage over other proprietary routers, the answer is very dependent on the routing logic being deployed by the router which the IEX router is being compared against. Trading firms which utilize sophisticated and dynamic routing logic (based on order book status etc) will be able to outperform the IEX router and can actually use the 'delay' to their advantage, hence, improving their overall fill rates.

Conclusion

The proposed structure of the IEX exchange is truly unique and addresses some of the biggest issues faced by execution algorithms. The many benefits provided by the proposed IEX exchange structure can be summed up as:

- Increase in accessible liquidity on the book (reduced quote fading)
- Lower trading costs (no market data fee, low cost of connectivity and low access fee)
- Better fill quality on passive and midpoint orders (lack of latency arb, no rebates)
- Fair playing field (no one has faster access to the matching engine).

We believe that the 'out of the box' measures proposed by the IEX exchange provide a very healthy environment for execution algorithms which ultimately benefits the institutional community. We are strong supporters of IEX's application and hope that this paves the path for a more simplistic and fair market structure.

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Over the years, algorithms and smart routers have found ways to adapt to varying latencies in a fragmented market. If anything, the concerns have been more about uncertainty in accurately predicting latency of a destination and the ability of certain participants to take advantage of lower latencies to create risk-free arbitrage opportunities for themselves. The proposed IEX Exchange model provides certainty of a fixed latency value and also ensures that no other participant can purchase faster access to the matching engine or data feeds in order to take advantage of other (slower) participants.

Also, we believe that reducing the frequency of quote-fading will help lower execution costs for institutional algorithms and also let the order book reflect an accurate picture of the stock's liquidity.

Sincerely,

Jefferies LLC

Appendix A

Information Content Factor (ICF)

ICF (Information Content Factor) is a spread normalized measure of the price differential between the execution price and the midpoint of the NBBO two seconds post-execution.

Calculation

The equation used to calculate ICF can be written as

$$\text{ICF (Buy Execution)} = \frac{(\text{X1} - \text{Exec Price})}{\text{Bid Ask Spread}}$$

Where

X1 = NBBO Midpoint 2 seconds after execution

Exec Price = Fill price on the child order

In order to determine the ICF for a particular destination, the above values are then aggregated across all qualifying executions. The overall number for any pool (or category) is the value weighted average for all fills from that pool.
Examples
Scenario:
NBBO = 10.15-10.20
Passively Posted (midpoint pegged) buy order gets filled at 10.175.

Case 1 (no short term information content, no price improvement)
NBBO (2-seconds later) = 10.15-10.20 (unchanged)
Midpoint (2-second later) = 10.1750

$\text{ICF}\left(2\ \text{Seconds}\right) = \frac{10.1750-10.1750}{0.05}$ = 0.0 Spreads

Case 2 (short term information content, no price improvement)
NBBO (2-seconds later) = 10.10-10.15 (lower)
Midpoint (2-second later) = 10.1250

$\text{ICF}\left(2\ \text{Seconds}\right) = \frac{10.1250-10.175}{0.05}$ = -1.0 Spreads

Case 3 (short term information content, with price improvement)
NBBO (2-seconds later) = 10.15-10.20 (unchanged)
Midpoint (2-second later) = 10.1750
Execution Price = 10.1600 (price improved)

$\text{ICF}\left(2\ \text{Seconds}\right) = \frac{10.1750-10.1600}{0.05}$ = +0.3 Spreads

The execution quality in Case 2 was worse as the stock price immediately moved lower following our execution, thereby creating a 'penalty' for posting the order. When interacting with 'informed' flow, one can expect multiple occurrences of such executions.

In Case 3, the order obtained a price improvement which resulted in a positive ICF value for this particular execution.

The analysis in this paper utilizes two-second ICF data.
Zero & Positive ICF values are good for a destination to have, while negative ICF values are undesirable.