

September 24, 2026

Jennifer Piorko Mitchell
Office of the Corporate Secretary
Financial Industry Regulatory Authority
1700 K Street N.W.
Washington, DC 20006

Re: Regulatory Notice 26-15 — FINRA Requests Comment on Modernizing FINRA's Best Execution Guidance

Dear Ms. Mitchell:

Our names are Xing Huang and Christopher Schwarz.¹ As background, we run randomized control trial (RCT) trading experiments by placing the same trade across multiple brokers, randomizing all aspects including broker order, at the same time using our own personal money to perform research on current market structures.

To date, over the last five years, we have placed more than 200,000 regular market hours equity trades, 40,000 extended and overnight trades, and 25,000 options trades at more than 10 brokers. By doing so, we know who the broker is, which venue handled our trade, and how our trade was handled and executed (on- or off-exchange, through auctions (for option trades), and so forth). We then use these data to perform research into the economics of the current market structure. Thus, while we are professionally academics, we are also customers of many brokers, wholesalers, and exchanges.²

In summary, several aspects of the current regulatory framework for “Best Execution” are particularly difficult to reconcile with our findings across multiple markets. In our opinion, FINRA should *either* strengthen and clarify the best-execution rules so that broker-dealers deliver execution quality the rules appear to promise *or* make clear to retail investors that they bear the responsibility of comparing execution quality across brokers themselves.³

¹ Xing Huang is an Associate Professor of Finance at Washington University in St. Louis. Christopher Schwarz is a Professor of Finance at the University of California, Irvine.

² Our related academic papers are “The ‘Actual Retail Price’ of Equity Trades” (available at <https://onlinelibrary.wiley.com/doi/full/10.1111/jofi.13467>), “Some Anonymous Trades Are More Equal than Others” (available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4951825), “Many Facets of Best Execution: Order Routing and Competition in Retail Trading” (available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4609895), and “Trading-through Extended and Overnight Hours” (available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=7301379).

³ Many of the points in this comment concerning best-execution duties are also articulated in our comments submitted for the SEC’s April 2026 Options Roundtable (see <https://www.sec.gov/comments/4-887/4887-753447-2321514.pdf>) and The Trade-Through Rule and Locked and Crossed Markets Provisions of Regulation NMS

In this comment, we first describe a potentially widespread misconception about best execution. We then compare our trading experiences to the current best execution rules, explain why rigorous rules matter even more if the Order Protection Rule (611) is rescinded, and offer some general recommendations. At the end of the comment letter, we provide responses to the specific questions asked in the Notice.

I. A Potential Misconception about Best Execution Duties

There is likely a disconnect between what many retail investors believe “best execution” duties guarantee and how brokers and regulators actually implement them. The plain language of the current rule may invite retail investors to read it like a promise of the best available price, or a similar price no matter which broker you use. We shared this reading ourselves, until we found the systematic price execution differences for equity trades by accident (in our paper “The ‘Actual Retail Price’ of Equity Trades”) while testing an algorithm to identify retail trades.

When we first discovered the differences across brokers, the first question we asked a FINRA employee was, “How can six brokers give six different prices and that be consistent with best execution?” The person’s response was that the rule was “broad” and that every broker could “build their own mousetrap” to evaluate execution. Sometimes other characteristics, such as fill speed and so forth, are mentioned. However, we were told by brokers, when selecting wholesalers, those characteristics are “table stakes.” More generally, almost all retail brokers use the same wholesalers for execution; thus, these characteristics should be homogenous across brokers.

It was clear that we were not the only ones with a misunderstanding that best execution should lead to similar pricing across brokers. When the paper was first made public, many parties, including one broker we traded and several employees of financial regulators, initially argued our differences were due to latency and not systematic pricing differences across brokers. They were not.⁴ The paper received widespread financial media attention (e.g., Wall Street Journal, CNBC, etc.) because many in finance were surprised by our findings.

Many retail investors likely still read “best execution” the way we once did: as a promise that they will receive similar price execution on their trades regardless of where they trade.

proposal, Release No. 34-105655 (see <https://www.sec.gov/comments/S7-2026-20/s7202620-1005639-3202229.pdf>).

⁴ “The ‘Actual Retail Price’ of Equity Trades” is cited in the Disclosure of Order Execution Information (34-99679), available at <https://www.federalregister.gov/documents/2024/04/15/2024-05556/disclosure-of-order-execution-information>.

II. A Plain Reading of the Rules Cannot Explain Our Trading Evidence

In this section, we will discuss relevant results to our comments later in the letter. We will split our discussion based on two different market experiences: one in options markets, and one in extended and overnight equity trading.

A. *Options Markets*

The assumption about brokers' execution quality being homogenous is likely even more acute in the options markets, since option trades are required to be executed on exchanges where trades are anonymized before execution. In fact, our prior was that forcing options trades to exchanges would prevent price differentiation across brokers.

In our paper "Some Anonymous Trades Are More Equal than Others," we performed our RCT experiment on options markets. The original paper and our analysis within this comment are based on approximately 7,000 market and marketable limit orders of various trade sizes across approximately two dozen symbols at six different retail brokers from March to June 2024.⁵

However, we find that price execution across our six brokers varies by almost the entire quoted spread—a difference of 0.89 effective-to-quoted spread (E/Q).⁶

	% Trades (PI>0)	Mean PI (% NBBO)	E/Q	PFOF (cents/contr.)
All Brokers	44.6	26.8	0.46	
Broker #1	71.7	51.5	-0.03	0.0
Broker #2	65.1	40.5	0.19	10.1
Broker #3	60.8	33.2	0.34	45.7
Broker #4	35.2	19.0	0.62	39.3
Broker #5	34.4	18.8	0.62	38.9
Broker #6	13.9	7.2	0.86	65.8
Corr. with PFOF	-0.84	-0.91	0.91	

Wholesalers can create differential pricing because, although they remove customer information prior to handing the trade off to their affiliated market maker, they provide trade instructions. Specifically, they specify whether a trade is routed to a price improvement (PIM) auction or

⁵ We have continued to trade, expanding our sample to more than 25,000 trades across now 10 brokers. While we have not finished our full analyses of these additional trades, we have used them to evaluate specific issues such as the unbundling of multi-contract trades (see our comment letter on SR-NASDAQ-2025-103, available at <https://www.sec.gov/comments/sr-nasdaq-2025-103/srnasdaq2025103-717467-2246454.pdf>).

⁶ Broker #6, using their entire order flow, reports their price improvement is 9.3% on an equally weighted basis for the symbols we traded and 12.5% for their entire order flow. However, even using their preferred measure, the rank order of our brokers would not change. See https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5399225.

filled by auto-execution as well as the starting price of those auctions. These two instructions create 90% of the differential pricing we observe.⁷ In addition, these differences are strongly related to payment for order flow (PFOF): brokers that receive more PFOF deliver worse price execution.

Two aspects of the current regulatory framework for “Best Execution” are particularly difficult to reconcile with these findings. The first is in FINRA Rule 5310(a)(1), which states the following (with our emphasis):

In any transaction for or with a customer or a customer of another broker-dealer, a member and persons associated with a member shall use reasonable diligence to ascertain the best market for the subject security and buy or sell in such market so that the resultant price to the customer is as favorable as possible under prevailing market conditions.

The rule says find the best market and trade there. These brokers use the same wholesalers (or a subset of) who execute on the same exchanges. By any plain reading, the brokers are in the same market. Yet prices vary by nearly the full quoted spread.⁸ Either "best market" means something different from what it appears to mean, or compliance is purely formal.

Second, FINRA Regulatory Notice 21-23 (June 2021) states (with our emphasis):

In other words, order routing firms and firms receiving customer orders from other firms for handling and execution must regularly evaluate whether reliable, superior prices are readily accessible for the customer orders they handle, and these firms may not negotiate the terms of order routing arrangements for those customer orders in a manner that reduces the price improvement opportunities that otherwise would be available to those customer orders absent payment for order flow.

Based on a straightforward interpretation of this notice, investors do not need to evaluate differences in PFOF as brokers are not allowed to negotiate PFOF rates that would impact price

⁷ In our approximately 7,000 trades, 10% of differential pricing across brokers was through pricing differences within auto-execution trades. Price improvement was obtained by wholesalers posting our trades via limit orders at prices within the current NBBO spread. These trades were interacted with and executed at the limit price resulting in price improvement.

⁸ Related, we find that for two-contract orders, wholesalers appear to unbundle our orders in an attempt to execute the trades against their own order book while providing minimal price improvement. See the related comment letter on unbundling: <https://www.sec.gov/comments/sr-nasdaq-2025-103/srnasdaq2025103-717467-2246454.pdf>.

execution relative to firms that charge no PFOF.⁹ Yet the relationship between PFOF and price execution we document as mentioned above is precisely the one this notice says should not exist.

Finally, we find that our multiple option orders are being unbundled, i.e. a two contract order is split into two individual trades. Below are the price improvement and handling statistics for bundled versus unbundled orders.

	Trade Count	Avg. PI	Auction (%)	Auto-Execution PI	Auction PI
Unbundled	25	4.3%	36.0%	0.0%	12.0%
Bundled	226	33.8%	66.7%	7.2%	46.7%
Diff		-29.5%	-30.7%	-7.2%	-34.7%
t-value		-11.8**	-4.21**	-2.63*	-5.53**

While we cannot observe the counterfactual, it is clear that our trades are not being unbundled to provide better price improvement. In fact, our average price improvement is 30% (E/Q 0.6) worse for our unbundled trades. In all cases where unbundled trades were executed via auto-execution, there is sufficient liquidity to execute our order at one exchange. One of the most likely explanations for unbundling, based on our trades, is the ability to internalize.¹⁰

FINRA Rule 5290 states (with our emphasis):

No member or associated person shall engage in conduct that has the intent or effect of splitting any order into multiple smaller orders for execution or any execution into multiple smaller executions for transaction reporting for the primary purpose of maximizing a monetary or in-kind amount to be received by the member or associated person as a result of the execution of such orders or the transaction reporting of such executions. For purposes of this Rule, “monetary or in-kind amount” shall be defined to include, but not be limited to, any credits, commissions, gratuities, payments for or rebates of fees, or any other payments of value to the member or associated person.

⁹ Based on statements in brokers’ Rule 606(a) filings, there are various ways brokers attempt to comply or dismiss this notice. Some brokers appear to believe the negotiated tradeoff between PFOF and price execution has to be explicit. For example, one broker states “<Broker> does not negotiate ... nor does <Broker> negotiate a tradeoff between payment and price improvement/execution quality.” Other brokers simply state they believe there is not a tradeoff between PFOF and price improvement, which makes this notice not applicable. Specifically, one broker states “<Broker> believes that the receipt of payment in the form of a portion of the spread earned by non-exchange third party market centers does not interfere with <Broker>’s pursuit of best execution or the price improvement obtained on customer orders.” In both cases, these brokers could set any PFOF that still allows their trades to comply with the Options Order Protection and Locked/Crossed Market Plan.

¹⁰ See the comment letter on SR–NASDAQ–2025–103 for more details, available at <https://www.sec.gov/comments/sr-nasdaq-2025-103/srnasdaq2025103-717467-2246454.pdf>

While the rule does not explicitly list spread capture as a “monetary or in-kind amount,” spread capture is a monetary motivation.

In summary, there appears to be a large gap between the common sense meaning of best execution and currently how those duties are being executed by broker-dealers. Brokers execute trades within the same market and are instructed not to allow PFOF to impact price execution. Yet their executions differ by almost the entire spread, and those differences are highly correlated with PFOF.

B. Extended Hours

In our paper “Trading-through Extended and Overnight Hours,” we again run a similar RCT experiment during extended and overnight hours. All our trades are one share, so we measure price improvement and trade-throughs against the best bid and offer available at any size. As presented in the paper, we find similar results if we use exchange executed trades as the benchmark. Thus, our results are not due to stale or inaccessible quotes.

We trade one share deliberately. Since all quote sizes are unprotected during extended hours, a one-share order isolates execution quality from market impact, information leakage, and order-splitting behavior. Those issues would otherwise make it difficult to attribute any price dis-improvement to routing decisions versus order characteristics. Additionally, single-share and odd-lot orders are far from edge cases. For our symbols, in March 2025, which is in the middle of our sample, single-share trades account for 21% of all trades outside regular market hours while odd-lots comprise 77%.

We trade at three brokers. Two brokers (WS-Broker #1 and WS-Broker #2) route all of their trades to wholesalers (WS) in return for payment for order flow (PFOF). The third broker (Commission Broker or Com.-Broker) charges commissions and either routes our trades directly to exchanges or to a mixture of dark pools.¹¹

Execution at:	Mean Price Improvement (PI)		Trade-Throughs (PI < 0)		
	PI (% QS)	PI/price (bps)	% of Trades	PI (% QS)	PI/price (bps)
All Brokers	-28.3	-9.1	25.4	-131.8	-49.2
Com.-Broker	-24.5	-6.4	28.3	-112.2	-41.6
WS-Broker #1	-42.5	-15.4	31.6	-148.5	-56.4
WS-Broker #2	-12.8	-3.9	12.0	-132.7	-46.7

¹¹ Our execution statistics do not include any commissions.

In summary, in a market segment where orders are supposed to improve on the quote, average price improvement is *negative*, -28.3% of quoted spread, or -9.1 bps of price. All brokers have negative average price improvement. Trade-throughs are common (25% of all trades) and large, averaging more than a full quoted spread.¹² Given that spreads are wide outside regular hours, our average trade-through is almost 50 basis points of price.¹³

These results are again difficult to reconcile with a plain language reading of the rules. FINRA Rule 5310(a)(1) says find the best market and trade there. By any plain reading, our orders are executing in the same market. Our two WS Brokers use the same wholesalers. Even our Commission Broker uses many of the same firms when routing to dark pools. And exchanges are plainly the same market for our orders.

Yet, here are three pairwise sell trades from our experiment at our two WS Brokers; because these are sells, a higher price is the better execution. We provide the wholesaler (WS) that received our trade, whether it was executed on- or off-exchange (Exchange), and the price.¹⁴ We also provide the difference in dollars and basis points (using the average price as the denominator).

WS-Broker #1			WS-Broker #2				
WS	Exchange?	Price	WS	Exchange?	Price	Diff (\$)	Diff (bps)
A	No	\$107.5000	B	Yes	\$113.3200	\$5.8200	527
B	Yes	\$117.4300	A	No	\$113.1812	\$4.2488	368
A	Yes	\$72.0200	A	No	\$69.2000	\$2.8200	399

In all three cases, we have trades executed at one broker that are on-exchange and then another off-exchange, with execution penalties exceeding 350 bps on the off-exchange side.¹⁵ In the third example, both of our trades are routed to the *same* wholesaler, yet one is executed on-exchange and the other is executed off-exchange at an almost \$3 penalty, or 400 bps. The question becomes, what price would be a best-execution violation? If a 400 bps penalty is consistent with best execution, what would not be? Had our sell been priced at a penny, would that too be acceptable?

¹² Toxicity is often used as an explanation for differential price execution across brokers due to clientele differences. However, on-exchange execution should be the lower limit for the cost of any level of toxicity since exchange quotes are accessible to any order.

¹³ In the manuscript, we provide three pieces of evidence to show that our results are due to how our orders are handled. First, we show that trades placed from 4 AM to 7 AM ET, when more trades are routed to exchanges, have better execution despite being less liquid. Second, we show the 2026 Commission Broker changing its routing leads to worse execution quality. Third, we compare same-wholesaler on/off-exchange pairs. We will show examples of these comparisons later.

¹⁴ Wholesaler labels are consistent across tables.

¹⁵ An investor may see the subpenny pricing on the off-exchange execution for WS-Broker #2 in the second example provided and believe they actually received “price improvement.”

Either “best market” means something different from what a plain reading suggests, such that no broker within our execution chain is required to perform an order-by-order review, or the standard for compliance is so broad as to be largely ineffective.

FINRA Rule 5310(a)(2) states (with our emphasis):

In any transaction for or with a customer or a customer of another broker-dealer, no member or person associated with a member shall interject a third party between the member and the best market for the subject security in a manner inconsistent with paragraph (a)(1) of this Rule.

Across all brokers, our trades average price dis-improvement; that is, our trades overall would be better off being directly routed to exchanges. A plain-language reading of this rule states that our trades should then simply be routed to exchanges without any third party. Yet a majority of our trades are routed to dark pools, which is where our price dis-improvement occurs.

Finally, FINRA Rule 5310, Supplementary Material .09(b) states that (with our emphasis):

In conducting its regular and rigorous review, a member must determine whether any material differences in execution quality exist among the markets trading the security and, if so, modify the member's routing arrangements or justify why it is not modifying its routing arrangements. To assure that order flow is directed to markets providing the most beneficial terms for their customers' orders, the member must compare, among other things, the quality of the executions the member is obtaining via current order routing and execution arrangements (including the internalization of order flow) to the quality of the executions that the member could obtain from competing markets.

This rule states that brokers who conduct regular and rigorous reviews should be modifying routing so more orders are executing on better markets. If we examine our routing at WS-Broker #1, we see the following routing and price improvement for the first and second half of our 2025 sample.

	January to April 2025		May to July 2025	
Execution at:	Share (%)	Mean PI (% QS)	Share (%)	Mean PI (% QS)
Wholesaler A	64.9	−65.4	74.7	−56.2
Wholesaler B	14.1	1.9	16.8	−1.6
Wholesaler C	20.9	−0.6	8.6	−10.6

We do not see routing changes consistent with our expectations. Wholesaler A during the first half of our sample has the lowest price improvement and the highest share. In the second half of our sample, we see Wholesaler A continues to have the highest share and the lowest price improvement. We also do not see any shifts to routing our trades directly to exchanges instead of to Wholesaler A, even though that is a better market. All three of these wholesalers are executing trades on- and off-exchange so speed and other characteristics are homogeneous, making price the primary differentiator.

Either our trades are not being rigorously reviewed, our trades are not part of the scorecard being used for routing, or again the standard for compliance is so broad as to be largely ineffective.¹⁶

C. Held vs. Not Held Classification

Most retail brokers, based on our experience, handle our equity trades as held, even during extended and overnight hours. However, some brokers do handle our orders as “not held.” This is an important distinction for execution quality review in three ways.

First, SEC Form 606(a) reports only apply to held orders. Thus, routing and PFOF information do not have to be disclosed for these data. Second, many customers will not be able to get their own routing report on these trades because SEC Form 606(b)(1) also only applies to held orders. Rule 606(b)(3) is available for not held orders. However, most customers would likely not pass the trading volume needed to force brokers to provide this report, which requires an average trading volume of \$1 million in notional per month over the prior six months.¹⁷ Third, “not held” orders are not covered by Rule 605. By classifying the orders as not held, brokers avoid having to report execution quality statistics.

One particular broker on their website and customer agreement states that they handle fractional trades as “not held.” However, on that same website, they state explicitly (emphasis ours):

Not Held is an order handling designation that gives <Broker> time and price discretion to secure the best possible execution for you. This doesn't change the ownership of your shares, how your shares are held in your account, or the execution speed for fractional orders.

¹⁶ It seems our trades are reviewed by WS-Broker #1 separately for extended hours since its extended-hours routing is different from its regular-market-hours routing for our trades. On the other hand, the routing for WS-Broker #2 is the same in both sessions so it is unclear whether they aggregate all trades and have one set of routing parameters. Regardless, both WS-Brokers have different routing during Twilight than the rest of extended hours. The Commission Broker's routing during Twilight also differs from its routing during the rest of extended hours.

¹⁷ We have been denied 606(b)(3) requests in the past due to this threshold requirement.

The broker explicitly states that customers should expect the same execution speed as full-share orders.

The SEC provided an “FAQ” on Rule 606, which specifically answered how these order should be handled.¹⁸

Question 15.02: Assume the same customer sends a cash order for \$100 worth of a NMS stock to Broker-Dealer A, resulting in an order with a fractional share component (15.625 shares at \$6.40 per share). How should Broker-Dealer A treat such customer order for purposes of categorizing the order as a held or not held order for Rule 606 reporting?

Answer: Since the customer reasonably expects Broker-Dealer A to attempt to execute its orders in NMS stocks immediately, the broker-dealer should categorize the order as a held order for purposes of Rule 606 reporting.

This is yet another example of an inconsistency in the plain language reading of explicit guidance and the handling behavior of broker-dealers.

III. Strengthening Best Execution Rules for a Post-611 World

FINRA’s notice for comments says it preliminarily believes Rule 5310 "remains appropriately calibrated" for a post-611 world. However, as seen in our extended hours experiment, if Rule 611 is rescinded, many of the issues we discuss above become even more important as there are several limits to competition in the retail broker market.

A. Individual Orders

Structurally, most retail brokers route trades to intermediate wholesalers and therefore do not perform an order-by-order review for best execution. Rather, they perform a regular and rigorous review of execution quality based on aggregate execution statistics (discussed in the next section). The broker sets routing parameters from prior execution quality. New orders follow those parameters.

Importantly, because brokers do not receive quotes before routing a trade to a wholesaler, wholesalers are not competing for individual orders. Once wholesalers have the order, they have monopolistic pricing power on that order. Nor can the aggregate review effectively discipline it.

¹⁸ See <https://www.sec.gov/rules-regulations/staff-guidance/trading-markets-frequently-asked-questions/faq-rule-606-regulation>

Across potentially millions of orders, the price outcome of that single order has no measurable effect on the aggregate statistics that govern future execution reviews. And when an order falls in a deprioritized segment, its execution may be made even worse, cross-subsidizing orders in segments the broker prioritizes.

This gap is precisely what Rule 611 was designed to close. Regulation NMS sought both “competition among individual markets and competition among individual orders.”¹⁹ It tried to balance competition across trading venues, achieved through fragmentation, against investor protection, achieved through the order-protection rule itself: the guarantee that no order could be executed at a price worse than the best available elsewhere. The two were meant to work together: fragmentation was made safe for investors only because every order carried a floor.

Removing Rule 611 without replacing order-level competition reintroduces the exact scenario Regulation NMS was built to prevent: order flow directed to a single counterparty with no real-time pricing check and no floor on the resulting execution price. It is this lack of competition on individual orders that produces the trade-throughs we document in extended hours. A market-maker is willing to provide a better price (i.e., the exchange quote), but the executing broker-dealer uses its monopoly pricing power to fill the order through it.

Without a floor tying each execution to the best available quote, otherwise-identical orders receive systematically different prices depending on where they are routed—a decision the investor neither sees nor controls. The same order, at the same moment, can be filled at the exchange quote by one broker and well through it by another, even if both orders end up at the same intermediary broker-dealer. Rule 611 disciplined this dispersion by making the best displayed price a binding reference for every order; removing it lets execution quality vary not with the order, but with the routing arrangement behind it. Investors sending economically identical orders would bear unequal costs, determined by a shrouded routing choice rather than by anything they can observe or improve.

B. Aggregate Order Flow

Revoking Rule 611 might appear to affect only the pricing of individual orders for retail traders, but it could impact aggregate levels of execution quality as well.

First, retail brokers that route flow to wholesalers set the same terms (e.g., payment for order flow) across all of their wholesalers. It is possible that one of the reasons we observe differential

¹⁹ Regulation NMS, Exchange Act Release No. 34-51808 (June 9, 2005), 70 Fed. Reg. 37496, 37499 (June 29, 2005), available at <https://www.sec.gov/files/rules/final/34-51808.pdf>.

pricing across brokers in our studies is that terms differ across brokers.²⁰ In other words, some brokers may set terms that lead to a lower ceiling on the price improvement that wholesaler competition can deliver.

Assuming terms impact price improvement, Rule 611 bounds the terms a broker can set and their impact. All of a broker's trades currently have to be executed at NBBO or better. Without Rule 611, if wholesalers can price outside NBBO, then brokers could set terms that wholesalers can only meet by executing trades outside the currently protected NBBO, which could lower aggregate price improvement.

Second, there is no prescription concerning how brokers design their "scorecard" for their reviews. Brokers can underweight one particular part of their order flow, allocate price improvement to some orders over others, or even ignore parts of their order flow. This can potentially lead to suboptimal competition for some order types. For example, our coauthored work finds that in some cases, within brokers, our trades are more likely to be routed to wholesalers who provide lower price improvement.²¹ Ernst, Malenko, Spatt, and Sun (2025) show that, when one broker did not include some orders in its routing parameters, those orders had significantly worse execution than when those orders were included.

Rule 611 again provides a hard floor for the execution quality of any order flow that is not included or underweighted in the scorecards or may be used to cross-subsidize other order flow. Without Rule 611, these orders could potentially see a drop in execution quality to subsidize order flow that brokers prioritize.²²

²⁰ As noted previously, the primary argument by brokers for differential pricing is "toxicity." Some academic research, including our own coauthored work, has documented that toxicity differences could explain a portion of the differential pricing in regular-hours equities (Schwarz et al. (*Journal of Finance*, 2025) and Eaton et al. (*Journal of Financial Economics*, 2022)). But that finding reflects a setting where PFOF is negligible: equity PFOF is so small that it has little explanatory power for pricing differences, leaving toxicity as one primary source of variation. Where PFOF is large, the picture changes. In the options market, where PFOF magnitudes are far higher, we find a strong correlation between PFOF and price improvement (see "Some Anonymous Trades Are More Equal than Others"). Extended hours resemble the latter case. Although we only have two WS Brokers in our sample, their difference in dollar price improvement is lower in magnitude than the difference in dollar PFOF. One broker's PFOF is at minimum multiple times the other. More fundamentally, toxicity can explain why a wholesaler offers less price improvement within the spread, but it cannot explain execution through the exchange quote: any order can be routed to the exchange regardless of its toxicity, so a fill worse than the displayed quote reflects the routing arrangement, not order toxicity. Since our average price improvement is negative relative to exchange quotes, it is difficult to attribute the across-broker differences in that study to toxicity differences.

²¹ There are numerous recent academic studies examining order routing decisions by brokers. See "The Retail Execution Quality Landscape" by Dyhrberg, Shkilko, and Werner, *Journal of Financial Economics*, 2025. Available at <https://www.sciencedirect.com/science/article/pii/S0304405X25000595>. "What Does Best Execution Look Like?" by Ernst, Malenko, Spatt, and Sun, 2025. Available at <https://microstructure.exchange/papers/BrokerRouting.pdf>, and "Many Facets of Best Execution: Order Routing and Competition in Retail Trading" by Huang, Jorion, Lee, and Schwarz, 2026. Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4609895.

²² One critique of our experiments is that our orders are small and scorecards are focused on larger orders. That critique speaks exactly to our points in this section with respect to limits to competition.

IV. Recommendations

Across both of our experiments, we find results that are difficult to reconcile with a plain reading of FINRA rules as they exist today. More generally, it is difficult to reconcile how our orders are being handled is consistent with the fundamental basis of best execution duties: Common agency law and fiduciary obligations.

Any changes to FINRA rules should clarify whether or not the issues that we document above are allowed or not. If they are allowed, then FINRA and the SEC should make clear to retail investors that they bear the responsibility of comparing execution quality across brokers themselves to achieve best execution on their orders because brokers do not necessarily need to.

More generally, any updated FINRA rules should address the following explicitly:

- Given that brokers give the same terms (e.g. PFOF) to all of their wholesalers, how will exams police whether those terms impact the ceiling on the price improvement that wholesaler competition can deliver?
- Are executing broker-dealers allowed to trade-through the best prices they can see or access, at the size of the order?
- Does any broker-dealer in the execution chain need to perform an order-by-order review?
- Can brokers classify orders that are expected to “held” by regulators as “not held” simply through disclosure in the customer agreement (and potentially advertising), reducing disclosure requirements at the same time?
- Are brokers allowed to cross-subsidize across their flow? e.g. Can brokers favor price execution in round lot orders over odd lot orders? Can brokers favor price improvement in one order type over another?

Our suggestions for these questions and other issues are as follows:

- Mandatory order-by-order review by executing broker-dealers, with justification for any trade-through based on one of the other best-execution criteria. Alternatively, exception-based surveillance where any trade-through beyond some threshold must be flagged and justified.
- Mandatory aggregate reviews by routing broker-dealers for sub-samples of order flow that exceed a threshold share of total quoted spread traded to prevent some customers’ orders execution quality being prioritized over others.
- Extensive study on what broker terms impact the price improvement ceiling obtainable from wholesaler competition.

- Clarification on what “material” items and what detail need to be provided in SEC Rule 606(a) filings.²³
- FINRA should work with the SEC to amend Rule 606(a) to require disclosures within 15 days when routing terms change. For example, almost all PFOF changes we have observed are in the first month of the calendar quarter, which leads to a four-month delay in its communication to customers.
- More disclosure requirements about the negotiation between wholesalers and brokers, including scorecards that are used to evaluate wholesalers and any customer agreements and disclaimers provided to brokers by wholesalers.
- Require any retail order with reasonable expectation of immediate execution to be classified as held.
- FINRA or the SEC may also want to run its own randomized mystery-shopper trading to more formally test what our experiments are meant to test. Given their resources, they could test more brokers, larger orders, and so forth.

V. Specific Responses to the Notice

We respond below only to questions where our trading data provides direct evidence.

Question 1.c. (Best Execution Post-611) The Notice asks whether odd-lot handling differs because of the absence of a trade-through requirement or because of market characteristics. Our extended-hours results (Section II.B) suggest the former. When no quote is protected, a quarter of our one-share orders trade through the best available price, by more than a full quoted spread on average. The same wholesalers execute otherwise-identical orders on-exchange at or better than the quote. We caution FINRA against firms “leveraging” their odd-lot practices for round lots after 611 is rescinded without a corresponding order-level protection.

Question 1.d. The NBBO should remain the primary benchmark, and FINRA should treat any execution through the best accessible quote at that order’s size as presumptive price dis-improvement. Where no consolidated quote exists, executions on exchanges at the same moment provide a practical benchmark. Our extended-hours results are robust to using exchange-executed trades as the benchmark (Section II.B).

²³ Many brokers say that PFOF is “up to” some amount without providing details on how that is determined for example. No brokers disclose any commitments on time duration, volume, and so forth. Both the SEC and FINRA provided clarifications on this issue in 2022 due to issues observed during exams. (See <https://www.finra.org/rules-guidance/guidance/reports/2022-finras-examination-and-risk-monitoring-program/disclosure-routing-information> and <https://www.sec.gov/rules-regulations/staff-guidance/trading-markets-frequently-asked-questions/faq-rule-606-regulation>).

Question 1.f. Yes. FINRA should state whether a firm may provide systematically different price improvement to different customer orders, such as odd lots versus round lots, one order type versus another, or orders excluded from or underweighted in routing scorecards (Section III.B). Firms should also not be permitted to negotiate order flow terms that lower the price improvement ceiling available from wholesaler competition. The relationship between PFOF and price improvement in our options data (Section II.A) suggests Regulatory Notice 21-23's prohibition is not constraining this in practice.

Question 1.g. "Prevailing market conditions" should not excuse execution through an accessible quote. Our evidence shows session conditions do not explain our results. Execution is better during the least liquid portion of extended hours, when more orders go to exchanges. A routing change at one broker, not a change in conditions, caused its execution to deteriorate. And the same wholesaler executed simultaneous orders on-exchange at the quote and off-exchange hundreds of basis points worse (Section II.B).

Additionally, as noted, retail brokers largely use the same wholesalers. Thus other factors used for best execution review, such as speed of execution, are largely homogenous across retail brokers.

Question 1.i. We oppose a safe harbor for "documented regular and rigorous methodologies." Our results show documented reviews coexisting with persistent routing to the worst-performing venue and a failure to reverse a routing change that degraded execution (Section II.B). A safe harbor would protect the process even when outcomes show it isn't working.

Question 1.j. FINRA should conduct its own randomized trading experiments. Simultaneous, identical orders placed across firms isolate handling from order characteristics and market conditions in a way aggregate statistics cannot. Our experiments show this is feasible at low cost, and FINRA could test more firms, order sizes, and sessions than we can.

Questions 3.b. and 3.c. (Review Standards) Aggregate reviews cannot discipline pricing on an individual order: once a wholesaler receives an order, no competitor quotes on it, and its outcome has no measurable effect on the aggregate statistics (Section III.A). Executing broker-dealers should conduct order-by-order review. At a minimum, they should have exception-based surveillance that flags any execution through the best accessible quote beyond a threshold and requires a documented justification based on another best-execution factor. Order-by-order review by executing firms is practical given current automation. Routing firms should also be required to review sub-segments of their flow, such as odd lots, order types, and sessions, that exceed a threshold share of quoted spread traded.

Question 5.c. (Introducing and Receiving Firms) Yes. Rule 5310(a)(2) prohibits interposing a third party "in a manner inconsistent with" best execution. In aggregate, our extended-hours orders would have received better prices routed directly to exchanges. Yet most were routed to intermediaries, and that is where the dis-improvement occurred (Section II.B). FINRA should clarify that routing to an intermediary that delivers systematically worse prices than direct exchange access is interpositioning.

Questions 6.a. and 6.b. (Extended Hours) In our experience, routing differs substantially within extended hours and across brokers. All three brokers route differently during the first hours of the pre-market session than during the rest of extended hours (Section II.B). Guidance should require firms to review extended-hours execution separately from regular hours, and by session segment, and to compare off-exchange executions against accessible exchange quotes.

Questions 7.a. and 7.b. (Held and Not Held) Classification should follow the customer's reasonable expectation, consistent with the SEC's Rule 606 guidance cited in the Notice. A firm cannot treat an order as held for customer expectations and advertising, and not held for handling and disclosure (Section II.C). Blanket not held provisions for small retail orders, including fractional shares, should not relieve firms of time-of-execution obligations. The same applies when a firm receives held orders from retail customers and routes them away as not held. The downstream firm should inherit the held obligations, since the customer's expectation has not changed. Given the disclosure obligation gap between held and not held orders, only exceptional circumstances should allow orders by retail customers who expected immediate execution to be classified as not held.

Questions 8.a. to 8.c. (Listed Options) Yes, further guidance is needed. Although all options execute on exchanges with anonymized orders, our execution varied across six brokers by almost the entire quoted spread. About 90% of that variation came from two broker-specific instructions: the share of orders sent to price improvement auctions, and the auctions' starting price (Section II.A). Guidance should require introducing firms to evaluate these handling instructions directly, not just consolidator-level averages. It should also address unbundling of multi-contract orders. Because options have no Rule 605 reports, to our knowledge our paper provides the only public broker-level options execution data. FINRA should encourage or require comparable statistics or coordinate with the SEC to create a comparable Rule 605 for listed options.

Conclusion

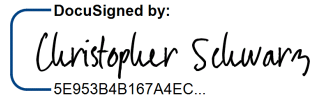
In summary, there appears to be a large gap between the common sense meaning of best execution, a plain language reading of the requirements, and how those duties are currently fulfilled by broker-dealers. While we understand the need for flexible rules given the myriad

trade types and possibilities, rules must also provide basic protection for investors. FINRA should *either* strengthen and clarify the best-execution rules so that broker-dealers deliver execution quality the rules appear to promise *or* make clear to retail investors that they bear the responsibility of comparing execution quality across brokers themselves.

Sincerely,

Signed by:

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Xing Huang and Christopher Schwarz