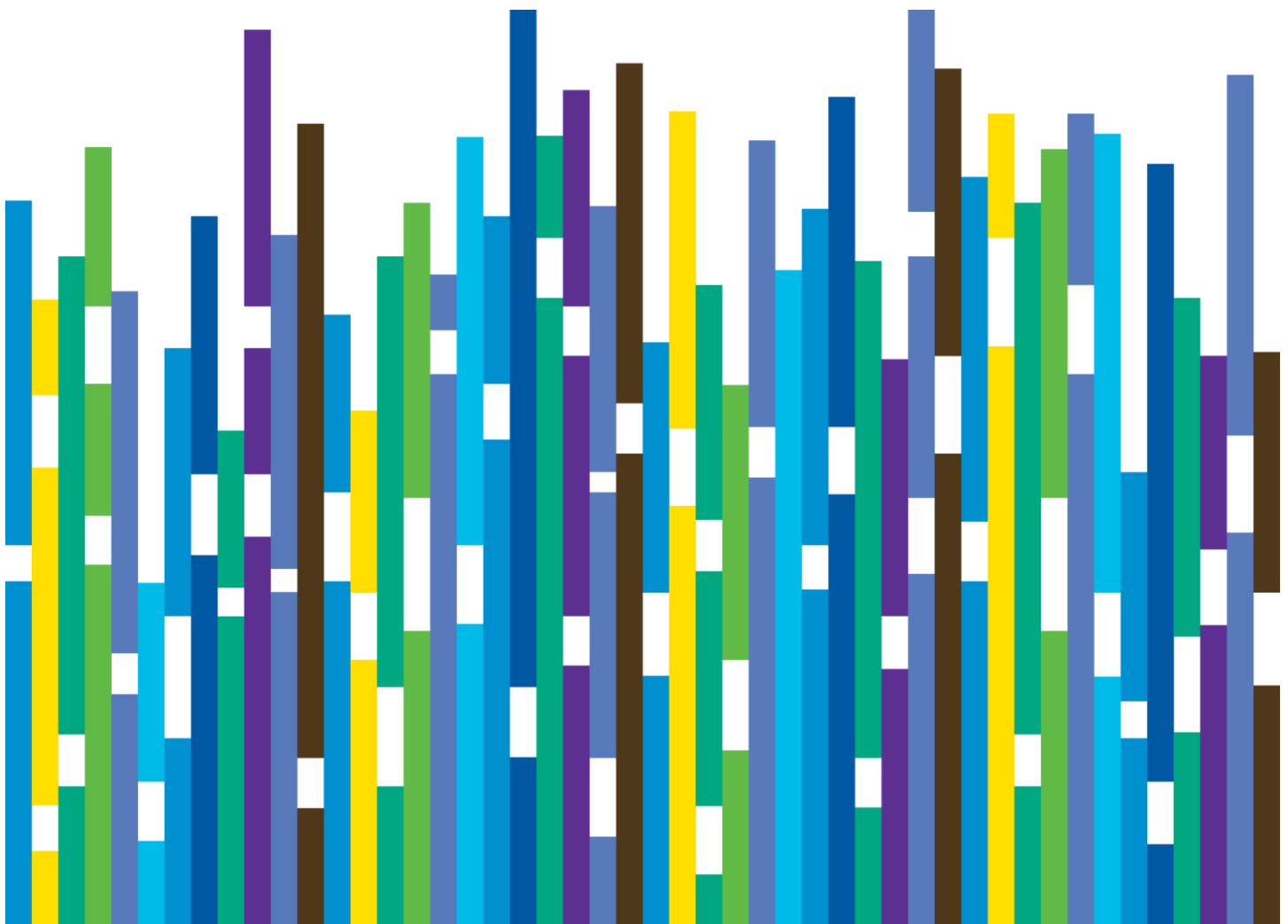


REGULATION NMS

Review and Recommendations

September 2017



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Introduction

The U.S. equity market is the world's most liquid, efficient and low-cost. The quality of the markets has, by most measures, improved substantially since 2005, when Regulation NMS was adopted and implemented. Consider the following:

- US equity market trading averaged 7.3 billion shares per day in 2016, compared with 4.7 billion shares in 10 months between the effective date of Reg NMS and implementation in June 2005, and 1.75 billion shares in 2003.
- Average large-cap spreads have fallen to \$0.01 per share or less, from \$0.04 in 2005. Small-cap stock spreads have fallen to around \$0.05 per share from \$0.08 in 2004.¹
- Today, some brokerages charge as little as \$0.005 per share for stock trades², versus \$0.045 per share in 2004.³
- Typical trades execute in less than one second today, compared with 8 seconds on the New York Stock Exchange in the early 2000s.

Given these significant improvements, a good argument could be made that significant changes to Reg NMS should come only after careful consideration and data-based analysis. Yet, concurrent with the improvements cited above have come other innovations that are not seen as similarly positive in their effect. The growth of dark pools⁴, maker-taker and taker-maker exchange trading models, greater competition in providing market liquidity, and the technological advances in high-frequency trading all have raised concerns about the future and integrity of equity markets.

In its 22 September 2004 response (the "2004 Letter")⁵ to the U.S. Securities and Exchange Commission ("SEC" or the "Commission"), CFA Institute⁶ expressed general

¹ See Angel, Harris and Spatt, <http://www.g-group.org/wp-content/uploads/2014/01/Equity-Trading-in-the-21st-Century-An-Update-FINAL1.pdf>. The authors of that 21 June 2013 research also provided input to this report.

² Interactive Brokers charge fees of \$0.005 per share covering all commissions, exchanges and regulatory fees, "apart from the transaction fees, which are passed through on all stock sales." See:

<https://www.interactivebrokers.com/en/index.php?f=1590&p=stocks1>. Disclosure: Larry Harris, CFA, a member of the panel of experts advising CFA Institute on this paper, is a member of Interactive Brokers' board of directors.

³ <http://www.investmentexecutive.com/-/news-29437>

⁴ Brokers often handled large, institutional orders through what was called the "upstairs trading desks" prior to electronic trading and trading through systems known as crossing networks, or dark pools." Upstairs desks were seen as risks for information leakage on block trades.

⁵ <https://www.sec.gov/rules/proposed/s71004/usacci092204.pdf>

⁶ CFA Institute is a global, not-for-profit professional association of more than 149,000 investment analysts, advisers, portfolio managers, and other investment professionals in 163 countries, of more than 143,000 hold the Chartered Financial Analyst® (CFA®) designation. The CFA Institute membership also includes 148 member societies in 73 countries and territories

support for the SEC-proposed rules known collectively as Regulation NMS (“Reg NMS” or “National Market System”). We noted the system in existence at that time was “permeated with trading practices that often obfuscate the manner in which best price is determined or how some limit orders are filled.” The letter called for changes to “bring uniformity and transparency to the current system, ultimately leveling the playing field as much as possible among market participants.”

The desire for a fair and transparent equity market structure that provides a level and competitive market for all types of market participants remains the guiding principle for CFA Institute when assessing such structures globally. In this sense and based on the benefits noted above, Reg NMS has been a resounding success.

Issues remain, however. Reg NMS has done little to address diminished issuance of, and trading in, securities of small and mid-sized companies, though this was an issue predating even the Securities Act Amendments of 1975⁷. While some agency conflicts pre-dated Reg NMS, others are seen as unintended by-products of the regulation’s mandates. Finally, Reg NMS introduced a higher level of complexity than existed previously, which has made it difficult for retail investors to understand market structure and trade at lowest cost.

Inducements that trading markets offer to influence routing decisions and build market share have exacerbated the potential for conflicts of interest at broker-dealers. The inducements can work to the detriment of investors while potentially undermining the mandated minimum price variance established in the regulation. This has led to net prices that are fractions of a penny above or below public price quotations.

In this White Paper, CFA Institute addresses the main issues relating to Reg NMS, offers its positions on these matters and, where appropriate, suggests what changes are needed and to whom they should be addressed.

Expert Panel

To help inform our analysis and recommendations, CFA Institute sought the counsel of a panel of experts and practitioners, whose names are listed in the appendix to this White Paper. The input received was valuable and provided important insights into Reg NMS, its history, and the regulation in action in today’s markets. Nevertheless, we must make it clear that the opinions and recommendations expressed within this White Paper are those of CFA Institute and CFA Institute, alone, and may or may not reflect in whole or in part the views of the panel or any individual panelist.

⁷ See: <https://site.warrington.ufl.edu/ritter/files/2017/07/IPOs2016Statistics.pdf>, page 24. There were just 9 IPOs in 1974 and 12 in 1975, a substantial decline from nearly 500 per year between 1968 and 1972.

Fair and Transparent Markets: Trade-Through Rule

The trade-through rule⁸, adopted in 2005 as a key part of Reg NMS, gives trading precedence to electronically accessible orders at the best available price (the National Best Bid or Offer, or NBBO). The Commission saw the rule as a means to prevent exchanges and broker-dealers from arranging trades at prices inferior to those seemingly available at other exchanges – trade-throughs. It also ended the effective monopoly of manual quotations on the floor-based New York Stock Exchange, and was applied to Nasdaq dealers to ensure they provided best execution for clients' orders.

While making the electronically accessible NBBO the primary determinant for order execution, the trade-through rule has created complications, if not complexity, in the market. For example, a trading venue must send orders it receives at the NBBO but cannot fill to other marketplaces to enable the order to trade against the NBBO. It is understandably difficult in such a competitive environment for a trading venue to send business to its chief competitors.

Some institutional investors, too, find the trade-through rule problematic. The primacy of price and electronic accessibility in determining execution sequence forces large investors to formulate complicated plans to achieve their trading objectives. These plans may require accessing and executing against orders at the top of the order books of trading venues displaying the NBBO before executing a large block order with a broker. Alternatively, the plans may involve sending large parts of an order to crossing networks known as dark pools to hide the magnitude of their orders. They may involve combinations of these two strategies, or others beyond the purpose of this White Paper. The point is that implementing such strategies complicates institutional trading.

CFA Institute Perspectives and Recommendations on the Trade-Through Rule

In our 2004 Letter, CFA Institute expressed support for the trade-through rule and urged its application for all securities, without exceptions or opt-outs. Application of this rule to all stocks, the letter stated, was needed to ensure a uniform and transparent inter-market system that ensured all market participants were functioning under a common set of trading regulations. At the same time, we did not agree with the proposal to permit automated markets to trade through non-automated markets, though our concern was largely definitional — we suggested focusing the rule on automated quotes rather than on the type of trading venue.

We generally disapprove of regulatory complexities, in part because they often lead to higher costs for investors and create opportunities for exploitation. Most market participants would agree that, despite its advantages, Reg NMS employs a complex solution to the difficult problem of trade-throughs. Nevertheless, in this instance, we

⁸ 17 CFR 242.611

continue to support the trade-through rule as the best structure for providing a fair and competitive marketplace for all investors.

During its deliberations, the Expert Panel considered whether the trade-through rule remains relevant, and whether all or part of the rule should be abandoned. When adopted in the mid-2000s, the rule addressed investor confusion about how the best price was determined and how some orders were filled. Since then, improved technology, such as affordable smart order routers, have given institutions and retail investors, alike, the ability to direct trades to the venues they believe can produce the best outcome. It is not clear, however, that all investors understand how best to exploit this technology, and therefore may be better off benefiting from the trade-through rule.

Some have suggested modifying the trade-through rule by exempting large block orders. We see such an exemption as producing potential benefits to a large group of investors – those investing in large funds or beneficiaries of pension funds. There are two primary arguments against doing so, however. First, a special carve out for such orders would worsen market complexity. Second, institutional trading costs for large cap stocks in the U.S. equity markets are the lowest in world, and such costs are significantly lower since the implementation of Reg NMS.⁹ Further reductions, therefore, may produce only marginal benefits, but at a cost of greater complexity.

A second alternative to retaining the trade-through rule is complete abolition of the rule. Adopting this alternative would certainly have the benefit of reducing overall regulatory complexity. On the other hand, we fear it would create greater operational complexity for many investors. For example, while many retail platforms utilize smart-order routing, some also give customers authority to route their orders directly to the venue of their choice. However, the speed of modern markets could create a situation where a retail investor using a direct order-routing system sends a marketable order to a venue that is not posting the NBBO when the order arrives. This could lead to a trade-through situation and an inferior execution. Because of this potential pitfall, we believe the SEC must conduct a thorough pilot study of how eliminating the rule for certain stocks would affect market integrity. The SEC also should conduct a thorough public consultation on the advisability of eliminating the rule, including specifically whether the change would lead to a significant increase in trade-throughs, particularly for retail investor orders.

Agency Conflicts Arising from Inducements

Trading venues employ inducements to get market participants to execute trades on their platforms, and thereby benefit from the increased trading activity and fees generated. Trading venues also hope these inducements will help build their market

⁹ See “Equity Trading in the 21st Century: An Update” (<http://www.g-group.org/wp-content/uploads/2014/01/Equity-Trading-in-the-21st-Century-An-Update-FINAL1.pdf>) – The authors present charts describing the decline in costs for large trades and the decline in costs relative to other global equity markets on pages 23 and 25, respectively.

share over time. In this paper, we focus on the three inducement types we see as most commonly used and most influential in their effect upon market behavior and ethics. These are described below:

Payment for order flow – These are payments, typically made by wholesale dealers to retail broker-dealers, when the latter send their clients' orders to the wholesale dealer for execution. Wholesalers pay retail brokers for their clients' orders because the wholesalers can profitably fill those largely uninformed orders within their own systems without incurring trading fees while using the prices determined in the lit markets—prices that reflect more informed order flows. An example of this type of inducement would involve a small broker serving customers in its local area. The broker collects its customers' trade orders and sells the orders upstream to an internalizing or wholesale broker/dealer, who then decides whether to cross those trades against other orders within its own network, send some or all the orders to a trading venue for execution, or fill the order against its own account.

Wholesale and internalizing brokers make most of their money, however, by filling marketable sell orders at the bid and marketable buy orders at the ask, and then capturing the spread between the two, less some minimal amount of price improvement. For example, for an investor sending a marketable sell order when the bid is \$19.95 and the ask is \$20.00, a wholesaler might step ahead of the bid of \$19.95 to buy the shares - plus \$0.0001 price improvement. Then another investor sends a marketable buy order which is routed to the same wholesaler. The wholesaler sells directly to them at \$20.00 - less \$0.0001 price improvement, leaving \$0.0498 difference ($\$19.9999 - \19.9501) as its profit. And it would do so without enduring the adverse selection risk of quoting prices in the lit markets.

Maker-taker pricing systems – Through these systems, trading venues pay rebates for orders — often resting limit orders — that provide, or “make” liquidity, and charge access fees for those orders that “take” the liquidity. Such liquidity providers tend to be patient and willing to wait for market prices to move in their direction.

For example, consider an investor placing a limit order to sell a stock for \$20 per share and directs the order to a maker-taker market where the rebate is \$.001. When the order executes, the seller will receive the “make” fee, and the buyer (transacting against the resting limit sell order) will pay the “take” fee. Therefore, the offer is effectively worth \$20.001 to the seller, because the seller receives the \$20.00 ask price plus the \$0.001 rebate from the exchange. The buyer, on the other hand, will pay the \$20.00 ask price plus the “take” fee, which is typically higher than the “maker” rebate (the difference is the net revenue for the exchange on the transaction. An illustrative example of the net payments

involved when the take fee is \$0.0015 and the maker rebate remains \$0.001 is provided Figure 1 below.

Taker-maker pricing systems – These systems are the inverse of maker-taker systems. Through these systems, trading venues encourage trading activity by giving the subsidies or rebates to investors who “take” liquidity through immediately marketable orders, and charge fees to those who “make” liquidity. Liquidity suppliers use these systems when they want to trade quickly. They effectively pay the exchange to pay takers to trade with them. Consider again the above example, where a sophisticated investor offers to sell shares at \$20, but this time goes to a taker-maker market. If the rebate is \$.001, the offer is effectively \$19.999 to the buyer, because the buyer (transacting against the resting limit sell order) will pay the limit price of \$20.00 and receive a rebate of \$.001.

Figure 1

Maker-Taker Example			
	Seller	Buyer	Exchange
Limit price	20.00	(20.00)	
Make fee (rebate)	0.001		(0.0010)
Take fee		(0.0015)	0.0015
Net price received (paid) \$	<u>20.001</u>	<u>(20.0015)</u>	<u>0.0005</u>

Taker-Maker Example			
	Seller	Buyer	Exchange
Limit price	20.00	(20.00)	
Inverse take fee (rebate)		0.001	(0.0010)
Inverse make fee	(0.0015)		0.0015
Net price received (paid) \$	<u>19.9985</u>	<u>(19.999)</u>	<u>0.0005</u>

The Equity Market Structure Advisory Committee of the SEC has proposed a pilot study to test the effects of more-limited fees and/or a reduction in the extent of the maker-taker pricing system. Some stakeholders see the proposed study as an important step toward either eventual elimination of maker-taker or at least a reduction in its use. One concern about the pilot is that it will operate within the current NMS framework and will not study the effects of taker-maker systems.

CFA Institute Perspectives and Recommendations on Inducements

In many cases, inducements in the absence of a legal and enforced best execution requirement create potential agency conflicts for broker-dealers. Specifically, broker-

dealers are induced to route their clients' limit orders to maker-taker markets offering rebates for making liquidity, even if the quality of execution at those markets (e.g. in terms of speed or likelihood of execution) may be comparatively poor. In other words, broker-dealers may decide where to route such orders based on whether they retain the benefits of these inducements. These benefits, broker-dealers and wholesalers argue, are needed to subsidize low commission rates for retail investors. We believe that other factors, such as technology and competition, may play an even greater role in keeping commission rates low. Ultimately, though, it is difficult to imagine that brokers would pay make fees at taker-maker exchanges even when doing so would provide the best representation of standing customer limit orders. It is this conflict that is the essence of the agency problems associated with the current market pricing system.

As noted above, CFA Institute believes fundamental changes to Reg NMS should come only with evidence of significant problems and a thorough public consultation. Regarding the inducement payments described above, we believe they create actual conflicts of interest for broker-dealers, though we also believe that broker-dealers would succumb to these conflicts only if they ignored their duty of best execution for their clients' orders. To ensure these inducements do not persuade broker-dealers to disregard their best execution requirements, therefore, we urge the SEC and the self-regulatory organizations ("SROs") to whom the Commission delegates such tasks, to vigorously enforce broker-dealers' best execution requirements. This, we believe, will ensure they route client orders to trading venues where the execution is best from the clients' perspectives.

As part of improved best-execution enforcement, we also recommend the SEC enhance disclosures under Reg NMS sections 605 and 606 to make the required disclosures easier to understand and useful to retail investors. Possible enhancements include:

- Presentation of summary statistics on firms' websites for average price relative to the quoted price at order receipt; percent of orders executed outside the bid-ask spread; percent of orders executed at the quote; percent of orders executed inside the bid-ask spread; number of orders; and number of complaints.¹⁰
- Disclosures on how execution quality varies with the size of fees and rebates to provide indications of how inducements distort brokers' routing decisions;
- Information about the length of time nonmarketable limit orders rest at the top of the book before execution; and
- Combining 605 (order execution) and 606 (order routing) disclosures to help assess execution quality of a broker's order flow on a venue-by-venue basis.

¹⁰ In a response to a 2016 SEC proposal on order handling information, Expert Panelist, James J. Angel, CFA, provided tables describing the kind of disclosures most useful in different situations. The letter can be found here: <https://www.sec.gov/comments/s7-14-16/s71416-1.pdf>. In the bullet point above, we have noted those deemed most useful to retail investors on marketable orders received during normal trading hours.

These types of disclosures will benefit their institutional and retail customers in decisions concerning which broker-dealers to use for their trades and to which venues their orders should be routed. It also will demonstrate to the SEC that the broker-dealers have processes in place to ensure best execution of all market orders and best representation for standing limit orders.

If, on the other hand, neither the Commission nor its SRO delegates can adequately enforce such best-execution requirements, then we believe Congress or the regulators should either ban the above-described inducements, or otherwise mandate that the benefits they produce accrue to the clients whose orders generate the payments. This assignment of fees and rebates to the customers would include fees and rebates from maker-taker and taker-maker markets, and all payments for order flow.

The Need for Pricing Standards: Sub-penny Trades and Tick Size

An important element of Reg NMS section 612¹¹ establishes a pricing standard applicable to all trading venues within the national market system. It prohibits all market participants from displaying, ranking or accepting bids, offers, orders or indications of interest in increments smaller than one penny (the minimum price variance or MPV) for NMS stocks priced above \$1.00.¹²

Despite these restrictions, broker-dealers regularly execute trades at price increments much smaller than the MPV. Price improvement of \$0.0001 per share is regularly provided by broker-dealers when filling customers' market orders.

One possible solution provided by a member of our Expert Panel was to permit issues to choose the size of the tick for their securities from a limited number of optional tick sizes. The benefits of such a solution is that issuers have direct interests in getting the size of their ticks correct.

Consistent with our 2004 Letter, CFA Institute supports price transparency for ensuring all market participants are operating under the same set of rules: "Preserving a two-tiered system of using sub-penny quotes, but without revealing that information to investors violates fundamental principles of market integrity by providing one group with information that is used to the disadvantage of another."¹³

We also expressed concern about the long-term value of section 612 in the 2004 Letter. Specifically, we noted that advances in technology were likely to make trading in sub-

¹¹ 17 CFR 242.612

¹² For stocks priced below \$1 per share, the minimum increments are \$0.0001. The rule also gives the SEC authority to exempt any participant, security, quote or order if it were deemed to be in the public interest and to protect investors.

¹³ See page 4 of the 2004 Letter

pennies inevitable, and urged the SEC to consider mechanisms to ensure continued transparency and fair treatment for all investors.

CFA Institute Perspectives and Recommendations on Subpenny Pricing

CFA Institute believes it is vital for the same pricing standards to apply to all markets and all market participants. We believe it is important that the SEC take steps to ensure and enforce its pricing standards. Failing to do so undermines the integrity of lit markets because when internalizers or wholesale brokers step ahead of limit orders their actions remove the rewards typically afforded those limit orders and creates disincentives for investors to establish such orders on lit markets in the future. In the example in Figure 1, this would occur if the internalizer or wholesale broker stepped ahead of the NBBO asking price of \$20.00 by providing price improvement of as little as \$0.0001. The internalizer's or wholesaler's clients are better off by \$0.0001 per share, while the investor's \$20.00 limit order that was at the NBBO goes unfilled. The limit-order investor might respond by canceling the original order, waiting for the market to return to \$20 (and hoping that the same thing does not occur again), or by altering the price of the order. Regardless, the incentive for the investor to submit future limit orders is significantly impaired.

To that end, and as we suggested in the 2004 Letter, the Commission could amend the rule to make the minimum tick size dependent on the liquidity in a particular security, which may include subpenny quotes. At the same time, internalizers and wholesale brokers, who are permitted to step ahead of the NBBO because of the important role they play in the making of markets, should nevertheless have to provide meaningful price improvement to be able to step in and trade ahead of the NBBO. We suggest meaningful price improvement should amount to at least half of one tick.

A standard of this type will ensure that intermediaries cannot obtain execution priority ahead of the NBBO without incurring an economically meaningful cost. It thereby better balances the gains to retail investors from price improvement with the costs to displayed liquidity providers from lost opportunities to trade.

Recommendations in Summary

As stated above, we believe any significant and fundamental change to Reg NMS come only after the collection of data-driven evidence and public consultation. With these qualifications in mind, we summarize our recommendations below:

1. The trade-through rule should remain a fundamental part of Reg NMS. Material change to the rule should come only after data evidence proves it should be modified – for an exemption on large institutional orders – or abandoned completely, and then only after public consultation of market participants.

2. The SEC and designated SROs should vigorously enforce broker-dealers' best-execution duties to ensure inducement payments are not negatively affecting order-routing decisions on behalf of clients.
3. As part of its increased best-execution enforcement, the SEC should amend disclosures under sections 605 and 606 to require broker-dealers to publicly disclose their execution-quality statistics both for market orders and for standing limit orders.
4. If stronger or enhanced enforcement of best-execution duties proves impractical, the SEC should evaluate whether it might ban certain inducements or otherwise mandate that all inducement payments from maker-taker and taker-maker exchange models, and from payment-for-order flow arrangements should pass-through for the benefit of the clients whose orders and assets generated the payments.
5. We believe it is important that the SEC take steps to update and then enforce its pricing standards.
6. Broker internalizers and wholesale brokers should have to provide meaningful price improvement equal to at least half of one tick to be able to step in and trade ahead of the NBBO.

Appendix

Panelists

CFA Institute assembled a panel of equity market structure experts to consider how best for CFA Institute to address issues related to Regulation NMS. The panel included the following individuals:

- James J. Angel, CFA – Associate Professor of Finance at the McDonough School of Business, Georgetown Univ.; member of CFA Institute Capital Markets Policy Council. Professor Angel was unable to make the call but provided comments before and after the meeting via email.
- Dennis Dick, CFA – Proprietary trader and equity market structure analyst at Bright Trading; former member of the Capital Markets Policy Council at CFA Institute, advising on policy responses to regulatory proposals and market concerns
- Larry Harris, CFA – Fred V. Keenan Chair in Finance, Professor of Finance and Business Economics at the Marshall School of Business, Univ. of Southern California; former Chief Economist at the US Securities and Exchange Commission.
- Albert “Pete” Kyle – Charles E. Smith Chair Professor of Finance at the Univ. of Maryland’s Robert H. Smith School of Business; staff member of the Presidential Task Force on Market Mechanisms (Brady Commission), former member of NASDAQ’s economic advisory board, former member of FINRA’s economic advisory board, and former member of CFTC’s technology advisory committee
- Chester Spatt – Pamela R. and Kenneth B. Dunn Professor of Finance at the Tepper School of Business, Carnegie Mellon Univ.; Golub Distinguished Visiting Professor and Distinguished Senior Fellow at the Golub Center for Finance and Policy, Sloan School of Management, MIT; former Chief Economist at the U.S. Securities and Exchange Commission; and member of the SEC’s Equity Market Structure Advisory Committee

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