

SECURITIES AND EXCHANGE COMMISSION**17 CFR Parts 200 and 242**

[Release No. 34–84875; File No. S7–05–18]

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Transaction Fee Pilot for NMS Stocks**AGENCY:** Securities and Exchange Commission.**ACTION:** Final rule.

SUMMARY: The Securities and Exchange Commission (“Commission” or “SEC”) is adopting a new rule of Regulation National Market System (“Regulation NMS”) under the Securities and Exchange Act of 1934 (“Exchange Act”) to conduct a Transaction Fee Pilot (“Pilot”) for National Market System (“NMS”) stocks to study the effects that exchange transaction fee-and-rebate pricing models may have on order routing behavior, execution quality, and market quality. We expect the data generated by the pilot, combined with data from existing sources, will facilitate an empirical evaluation of whether the existing exchange transaction-based fee and rebate structure is operating effectively to further statutory goals.

DATES:

Effective date: April 22, 2019 through December 29, 2023.

Compliance date: As designated by Notice pursuant to 17 CFR 242.610T(c)(2).

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SUPPLEMENTARY INFORMATION: The Commission is adopting new 17 CFR 242.610T (Rule 610T) to conduct a Transaction Fee Pilot for NMS stocks.

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I. Executive Summary of Rule 610T

Congress directed the Commission, through Section 11A of the Exchange

Act, to facilitate the establishment of a national market system and use its broad authority to carry out the objectives of Section 11A, including, among others, to assure the economically efficient execution of securities transactions.¹ In furtherance of these goals, and as part of its oversight of registered national securities exchanges, the Commission periodically undertakes reviews of various aspects of market structure and current regulations to evaluate whether, in light of changes in technology and business practices, the current regulatory framework continues to fairly, effectively, and efficiently promote fair and orderly markets, serve the public interest and the protection of investors, and promote capital formation.

As discussed below, one aspect of the current regulatory framework focuses on the current pricing and fee structure for transactions in securities. As the Commission discussed in its Pilot proposal, the predominant transaction pricing structure that developed among equities exchanges to attract order flow is the “maker-taker” fee model.² Specifically, out of thirteen equities exchanges, seven utilize the “maker-taker” fee model, in which they pay a rebate to a provider of liquidity and charge a fee to a taker of liquidity. Among the remaining exchanges, four utilize a “taker-maker” pricing model (also called an inverted model) where they charge a fee to a provider of liquidity and pay a rebate to a taker of liquidity,³ and two have a “flat fee” model.⁴ In recent years this area has

¹ 15 U.S.C. 78k–1(a)(1)(C)(i). See also *supra* Section II.G (discussing the Commission’s authority to conduct the Pilot).

² See Securities Exchange Act Release No. 82873 (March 14, 2018), 83 FR 13008 (March 26, 2018) (“Proposing Release” or “Proposal”).

³ See Choe BYX U.S. Equities Exchange Fee Schedule (as of December 2018), available at https://markets.cboe.com/us/equities/membership/fee_schedule/byx/; Cboe EDGA U.S. Equities Exchange Fee Schedule (as of December 2018), available at https://markets.cboe.com/us/equities/membership/fee_schedule/edga/; Nasdaq BX Fee Schedule (as of December 2018), available at https://www.nasdaqtrader.com/Trader.aspx?id=bx_pricing; NYSE National Schedule of Fees and Rebates (as of December 2018), available at https://www.nyse.com/publicdocs/nyse/regulation/nyse/NYSE_National_Schedule_of_Fees.pdf. EDGA adopted a taker-maker fee schedule in July 2018. See Securities Exchange Act Release No. 83643 (July 16, 2018), 83 FR 34643 (July 20, 2018) (SR–CboeEDGA–2018–012).

⁴ See Investors Exchange Fee Schedule (as of December 2018), available at <https://iextrading.com/trading/fees/>; NYSE American Equities Trading Fees and Price List (as of December 2018), available at https://www.nyse.com/publicdocs/nyse/markets/nyse-american/NYSE_America_Equities_Price_List.pdf. NYSE American offers rebates to eDMMs in their assigned NYSE American-listed securities.

attracted considerable attention and generated significant debate, focusing on the effects, both positive and negative, that exchange transaction-based pricing models may have on market quality and execution quality, with some commenters advocating action by the Commission.

The Commission is uniquely situated and vested with the responsibility under Section 11A of the Exchange Act to examine the impact that this aspect of our market structure has on our national market system. And, in light of the questions raised about the impact of these fee models and the amount of attention garnered, we believe this is an area ripe for Commission review. But,

the Commission currently lacks the data necessary to meaningfully analyze the impact that exchange transaction fee-and-rebate pricing models have on order routing behavior, market and execution quality, and our market structure generally. To address this information gap, the Commission has designed the Pilot to produce data that will facilitate a more thorough understanding of the potential issues associated with exchange transaction-based pricing models. In particular, the Commission has designed the Pilot to gather data on the effect both current regulatory fee caps and rebates have on market quality and execution quality. The data

gathered will assist the Commission in determining whether any changes in the current regulatory framework are appropriate and enable the Commission to make more informed and effective policy decisions. This, in turn, enables the Commission to carry out the objectives of the national market system and oversee the national securities exchanges.

As discussed fully in the proposing release, the Commission proposed a pilot to test the effect of exchange transaction fees and rebates.⁵ The following chart summarizes the terms of the Pilot as adopted, which are discussed in more detail below:

TRANSACTION FEE PILOT FOR NMS STOCKS

Duration	2 years with an automatic sunset at 1 year unless, no later than 30 days prior to that time, the Commission publishes a notice that the pilot shall continue for up to 1 additional year; plus a 6-month pre-Pilot Period and 6-month post-Pilot Period.			
Applicable trading centers.	Equities exchanges (including maker-taker & taker-maker) but not ATs or other non-exchange trading centers.			
Pilot securities	NMS stocks with average daily trading volumes ≥30,000 shares with a share price ≥\$2 per share that do not close below \$1 per share during the Pilot and that have an unlimited duration or a duration beyond the end of the post-Pilot Period.			
	Group	Number of NMS stocks	Fee cap	Rebates permitted?
Pilot design	Test Group 1	730	\$0.0010 fee cap for removing and providing displayed liquidity (no cap on rebates).	Yes.
	Test Group 2	730 (plus appended Canadian interlisted stocks).	The 17 CFR 242.610(c) (Rule 610(c)) \$0.0030 cap continues to apply to fees for removing displayed liquidity.	No. <i>Rebates and Linked Pricing Prohibited</i> for removing and providing displayed and undisplayed liquidity (except for specified market maker activity).
	Control Group	Pilot Securities not in Test Groups 1 or 2.	The Rule 610(c) cap continues to apply to fees for removing displayed liquidity (no cap on rebates).	Yes.
Pilot data	1. Pilot Securities Exchange Lists and Pilot Securities Change Lists. 2. Exchange Transaction Fee Summary. 3. Order Routing Datasets.			

II. Discussion of Rule 610T

In response to its proposal to conduct a Transaction Fee Pilot in NMS stocks (the “Pilot”), the Commission received a number of comment letters from a diverse group of commenters, including exchanges, investment managers, broker-dealers, and other market participants, as well as academics, listed issuers, analytics firms, market observers, and industry associations.⁶ As discussed below, after review and consideration of the comments received,

the Commission is adopting Rule 610T with certain modifications from that in the proposal.

A. Focus on Exchange Pricing Models and the Effects They Can Cause

1. Exchange Fee Models and Regulatory Framework

Regardless of the fee model, all fees of a registered national securities exchange (“exchange”) are subject to the standards and process requirements set forth in the federal securities laws.⁷ In

particular, Section 6 of the Exchange Act requires, among other things, that the rules of an exchange provide for the “equitable allocation” of “reasonable” fees and that they not be “designed to permit unfair discrimination.”⁸ Section 11A of the Exchange Act directs the Commission to use its authority to facilitate the establishment of a national market system for securities that assures economically efficient execution of securities transactions, fair competition, availability of information with respect

⁵ See Proposing Release, *supra* note 2.

⁶ The Proposal was developed, in part, by reference to a recommendation for an access fee pilot submitted to the Commission by the Equity Market Structure Advisory Committee (the “EMSAC”). See Proposing Release, *supra* note 2, at 13009, 13012–14.

⁷ Under the Exchange Act, exchange fee changes are effective on the day that the exchange files them with the Commission, and neither advance notice nor Commission action is required before an exchange may implement a fee change. See 15 U.S.C. 78s(b)(3)(A)(ii). The Commission may, within 60 days after an exchange filed its fee change

with the Commission, summarily suspend the new fee and institute proceedings to determine whether to disapprove it. See 15 U.S.C. 78s(b)(3)(C).

⁸ See 15 U.S.C. 78f(b)(4)–(5).

to quotations for and transactions in securities, and the practicability of brokers executing investors' orders in the best market.⁹ In addition, Rule 610(c) of Regulation NMS imposes upon exchanges a fee cap of \$0.0030 per share for the execution of an order against its "protected quotation."¹⁰

In 2005, when it adopted the fee limitation in Rule 610(c), the Commission noted, in part:

The adopted fee limitation set forth in Rule 610(c) of Regulation NMS is designed to preclude individual trading centers from raising their fees substantially in an attempt to take improper advantage of strengthened protection against trade-throughs and the adoption of a private linkage regime. In particular, the fee limitation is necessary to address 'outlier' trading centers that otherwise might charge high fees to other market participants required to access their quotations by the Order Protection Rule. It also precludes a trading center from charging high fees selectively to competitors, practices that have occurred in the market for Nasdaq stocks. In the absence of a fee limitation, the adoption of the Order Protection Rule and private linkages could significantly boost the viability of the outlier business model. Outlier markets might well try to take advantage of intermarket price protection by acting essentially as a toll booth between price levels. The high fee market likely will be the last market to which orders would be routed, but prices could not move to the next level until someone routed an order to take out the displayed price at the outlier market.¹¹

In light of the considerable debate surrounding exchange fee models that pay rebates, which is well documented in the comment letters submitted on the proposed Pilot, and the passage of time since the Commission first adopted the Rule 610(c) fee cap as part of Regulation NMS in 2005, the Commission now seeks to gather data to facilitate an empirical assessment of the effect of exchange transaction fees and rebates broadly—including the impact and continued appropriateness of the Rule 610(c) fee cap¹²—by testing the effects of changes to exchange fees and rebates

⁹ See 15 U.S.C. 78k-1(a)(1).

¹⁰ 17 CFR 242.610(c); Securities Exchange Act Release No. 51808 (June 9, 2005), 70 FR 37496, 37543-46 (June 29, 2005) ("NMS Adopting Release"). See also 17 CFR 242.600(b)(58) (defining "protected quotation"); 17 CFR 242.600(b)(57) (defining "protected bid or protected offer"); 17 CFR 242.600(b)(3) (defining "automated quotation").

¹¹ NMS Adopting Release, *supra* note 10, at 37545.

¹² At the time of its adoption in 2005, the fee cap codified the then-prevailing fee level set through competition among the various trading centers. See NMS Adopting Release, *supra* note 10, at 37545 (stating that "the \$0.003 fee limitation is consistent with current business practices, as very few trading centers currently charge fees that exceed this amount").

on the markets and market participant behavior.

2. Impact of Exchange Fee Models

In response to the Proposing Release, the Commission received a number of comment letters criticizing existing fee-and-rebate pricing models, but also a number of comment letters expressing support for those same pricing regimes.¹³

Many commenters focused on one potential distortion—whether current pricing models "present broker-dealers with a potential conflict of interest," because their "duty to pursue best execution could be compromised when their trading venue decision is driven by the economic incentive to minimize access fees paid and maximize rebates received."¹⁴ As another commenter explained, "a broker is incentivized to route an order to the venue that pays it the most (or costs the least), instead of the venue that has the highest likelihood of offering the best execution for its customers, such as the one that offers a higher probability of execution or meaningful price improvement."¹⁵ As evidence of the potential harm that can result from the conflicts presented by exchange rebates, one commenter noted that institutional investors "that specifically instruct brokers to remove rebate-driven trading behaviors from their algorithms achieve significantly lower trading costs that result in higher returns to their investors."¹⁶ One commenter attributed this harm to the tendency of rebates to "affect the length of the order queue of passive limit orders on the major maker-taker exchanges, while high take fees on these

¹³ The potential distortions mentioned by the commenters (and discussed in this section) include, among others: (1) Conflicts of interest faced by routing broker-dealers; (2) excess intermediation and potential adverse selection; (3) market fragmentation; (4) exchange fee avoidance; (5) complexity; (6) transparency; and (7) elevated fees to subsidize rebates.

¹⁴ Capital Group Letter, at 2. See also, e.g., ICI Letter I, at 2; Vanguard Letter, at 2; Invesco Letter, at 2; CFA Letter, at 2; Oppenheimer Letter, at 2; Spatt Letter, at 4; AJO Letter, at 1; Larry Harris Letter, at 3.

¹⁵ Healthy Markets Letter I, at 5. See also, e.g., Copeland Letter, at 1; Wellington Letter, at 1; Norges Letter, at 2.

¹⁶ Babelfish Letter, at 1-3 (also referencing a Clearpool Group study that found that a "fee sensitive VWAP algorithm executed during volatile times incurred seven times as much cost as a fee agnostic algorithm"). See also T. Rowe Price Letter, at 2 (stating that "[r]etail orders . . . are generally placed on the exchange that offers the highest rebate to the broker, but show[s] lower execution quality in terms of reduced probability of execution"); Capital Group Letter, at 2 ("Our internal trade analysis suggests that execution quality may be negatively impacted when broker-dealers' routing decisions are made to minimize access fees.").

markets make them less attractive for marketable orders that cross the spread." The commenter argued that the "net result of this perverse pricing dynamic is a lower likelihood of execution and a higher likelihood of adverse selection for orders in the maker-taker queues," because orders at the "middle or back of the queue . . . are less likely to trade at their desired price, and when they do trade, the overall market price as reflected by the [National Best Bid and Offer ("NBBO")] is more likely to move against them, than when trading on venues that do not pay rebates."¹⁷

A number of commenters discussed other potential effects of exchange pricing models. Some commenters believed that transaction fees and rebates contribute to market fragmentation¹⁸ because they encourage investors to "turn to inverted markets to improve queue priority"¹⁹ or to "route orders to non-exchange trading centers to avoid the higher access fees that exchanges charge to subsidize the rebates they offer."²⁰ Likewise, one commenter thought that "transaction fees and rebates contribute to market complexity through the proliferation of new order types . . . designed to exploit different transaction pricing models."²¹ Other commenters believed that "[t]ransaction fees and rebates . . . undermine market transparency because the prices displayed by exchanges—and provided on trade reports—do not include fee or rebate information and therefore do not fully reflect net trade prices."²² Finally, some commenters

¹⁷ IEX Letter I, at 6, A-1-A-2; IEX Letter II, at 7; IEX Letter IV (appending research to support these views). See also, e.g., Babelfish Letter, at 2 (stating that a "frequently realized scenario is that flow sent solely to a high rebate destination waits in queue, often winds up canceled because price moves away, and then receives an inferior price upon the eventual execution"); Larry Harris Letter, at 1, 3; Brandes Letter, at 1-2. But see Grasso Letter, at 3 ("waiting for a rebate[] may be fine" if "you have low confidence about future prices for a large order and don't mind if the order trades slowly while you accumulate shares").

¹⁸ See, e.g., ICI Letter I, at 2.

¹⁹ Credit Suisse Commentary, at 2. See also, e.g., Larry Harris Letter, at 3 (noting that "orders standing at inverted exchanges usually execute before orders standing at the same price at maker-taker exchanges").

²⁰ Capital Group Letter, at 2. See also, e.g., IEX Letter I, at 3 ("Excessive take fees . . . have been criticized as leading to the migration of some order flow to less-regulated non-exchange venues in search of reduced transaction costs, resulting in increased market fragmentation and market complexity.").

²¹ ICI Letter I, at 2. See also, e.g., Vanguard Letter, at 2 (indicating that the "desire to maximize rebate revenue and avoid fees created order complexity within the equity markets as traders sought profitable trading strategies").

²² ICI Letter I, at 2. See also, e.g., Goldman Sachs Letter, at 3; Invesco Letter, at 2; State Street Letter,

asserted that current pricing models unfairly subsidize rebates²³ or benefit sophisticated market participants like market-makers and proprietary traders at the expense of other market participants.²⁴

Other commenters expressed support for current exchange pricing models. For example, one commenter believed that maker-taker pricing “provides important benefits to issuers and investors,” because exchanges “use rebates as a tool to promote displayed liquidity and price discovery, which results in competitive bid-ask spreads, saving transaction costs that investors may otherwise incur.”²⁵ Another commenter argued that rebates can promote displayed liquidity by providing “a payment in exchange for posters of liquidity giving up several valuable options,” including “the power to decide the time of the trade” and the ability to conceal trading intentions until the point of execution.²⁶ Building on this idea, one commenter characterized “[a]ccess fee caps and related rebates” as features that “enable exchanges to compete with non-exchange trading venues by essentially subsidizing the posted prices . . . and narrow[ing] the NBBO, making it slightly more expensive to either match or improve upon those prices off-exchange.”²⁷

at 2; Wellington Letter, at 1; Oppenheimer Letter, at 2; Capital Group Letter, at 3.

²³ See, e.g., Clearpool Letter, at 3 (stating that “exchanges chase order flow and provide rebates and other pricing incentives to the largest trading firms at the expense of smaller market participants who cannot take advantage of such rebates and, in effect, end up subsidizing the trading of larger firms”); IEX Letter I, at 3 (stating that transaction fees are “used in effect to subsidize the payment of rebates,” which “results in a substantial penalty on investors and other participants who . . . have a need for immediate liquidity”).

²⁴ See, e.g., T. Rowe Price Letter, at 2 (stating that rebates lead to “excessive intermediation . . . benefiting short-term intermediaries at the expense of long-term investors”); ModernIR Letter, at 3 (stating that rebates “promote[] arbitrage, and price-setting as its own end,” leading to a “paucity of real orders”); Larry Harris Letter, at 1, 5–6 (stating that current pricing models facilitate “the execution of various parasitic trading strategies by proprietary traders to the detriment of public investors”); Capital Group Letter, at 3.

²⁵ State Street Letter, at 2. See also, e.g., Virtu Letter, at 3; Fidelity Letter, at 3; Nasdaq Letter I, at 9; Cboe Letter I, at 15–16. See also Nasdaq Letter III, at Exhibit A (providing graphs using data from September 2018 on average quoted spread across exchanges in S&P 500 stocks and time at the best quote across those stocks). But cf. Larry Harris Letter, at 6–9 (acknowledging that “quoted spreads are narrower under maker-taker pricing,” but opining that “the narrower quoted spreads do not benefit the public”).

²⁶ Magma Letter, at 3. See also, e.g., NYSE Letter IV, at 2 (arguing that “pricing incentives enhance the quality and reliability of display markets”); FIA Letter, at 4.

²⁷ FIA Letter, at 3–4. See also NYSE Letter I, at 6 (stating that rebates “allow liquidity providers to

As commenters fundamentally disagreed about the effect of exchange transaction fee models and whether they have a positive or a negative impact on the U.S. equities markets, commenters also held conflicting views regarding whether and how the Commission should conduct the Pilot.

3. Focus on Exchange Fee Models

Recognizing the unique regulatory framework applicable to exchange fees, and the disagreement over the impact of exchange fees and rebates on the markets and market participants, the Commission focused its proposed Pilot on studying the effect of exchange transaction fees and rebates on order routing behavior, execution quality, and market quality. Accordingly, the Commission proposed to include within the Pilot all equities exchanges regardless of fee model.

A large number of commenters supported applying the Pilot to all equities exchanges.²⁸ For example, one commenter believed that the Pilot “should include all equities exchanges . . . because rebates of any kind provide inducements to trade and distort markets.”²⁹ A different commenter thought that including taker-maker exchanges was “both logical and feasible, given that all equities exchanges assess fees that are subject to the Exchange Act and its rule filing requirements.”³⁰ Other commenters “agree[d] with the Commission’s assessment that the Pilot should apply to all equity exchanges . . . thus treating all similarly situated exchanges equally,” because this would be “critically important in determining what impact the reduction of access fees or the elimination of rebates will have on order routing practices.”³¹ Some other commenters, however, opposed including taker-maker exchanges in the

quote narrower spreads by providing another source of revenue”); Grasso Letter, at 4 (“the main outcome of exchange pricing seems to be that it forces exchanges to compete for customers,” because it “keeps their margins tight and gives them incentives to improve the quality of their offerings”).

²⁸ See, e.g., Joint Asset Managers Letter, at 2; Brandes Letter, at 2; Themis Trading Letter I, at 3; AJO Letter, at 1–2; OMERS Letter, at 2; Copeland Letter, at 2; Virtu Letter, at 6; Nuveen Letter, at 2; BlackRock Letter, at 1; RBC Letter I, at 3; Vanguard Letter, at 2; CFA Letter, at 4; Wellington Letter, at 2; Joint Pension Plan Letter, at 2; Oppenheimer Letter, at 2; Clearpool Letter, at 5 n.8; TD Ameritrade Letter, at 4; Capital Group Letter, at 3; Healthy Markets Letter I, at 10; Morgan Stanley Letter, at 3 n.5; AGF Letter, at 1.

²⁹ AJO Letter, at 1–2.

³⁰ See RBC Letter I, at 3–4.

³¹ Capital Group Letter, at 3. See also, e.g., Clearpool Letter, at 5 n.8; Oppenheimer Letter, at 2; Brandes Letter, at 2; Copeland Letter, at 2.

Pilot, noting that Rule 610(c) does not apply to taker-maker exchanges.³²

After considering the comments on this issue, the Commission continues to believe that focusing the Pilot on equities exchanges regardless of fee model is appropriate because it treats alike similarly situated entities that all are subject to the same regulatory framework and thereby will allow the Commission to evaluate the effect of exchange fee-and-rebate pricing models and the continued appropriateness of the Rule 610(c) fee cap. Further, it would be incongruous to study rebates and fees offered by one type of equities exchange (maker-taker), but not another type of equities exchange (taker-maker) where the fees of both types of entities are subject to the same legal requirements and can introduce the same types of distortions that the Pilot seeks to study.

4. Non-Exchange Trading Centers

As proposed, the Pilot would exclude non-exchange trading centers such as alternative trading systems (“ATs”).³³ Several commenters opined on this aspect of the proposal. A number of commenters agreed with the Commission’s proposal to exclude non-exchange trading centers from the Pilot.³⁴ Some of those commenters noted that exchanges are subject to various fee-related regulatory provisions that are entirely inapplicable to non-exchange trading centers. For example, one commenter noted that non-exchange trading centers are not currently subject to any access fee caps, and including such trading venues in the Pilot “would have the unintended and harmful effect of unnecessarily changing ATS business models”³⁵

In addition, several commenters emphasized the fundamental ways in which the fee structures employed by

³² See, e.g., Cboe Letter I, at 28.

³³ See Proposing Release, *supra* note 2, at 13014. As discussed in the Proposing Release, the term “trading center” as used there and throughout this release is a collective term that refers broadly to the venues that trade NMS stocks. See *id.* at 13009 n.7. For purposes of this release, the term “trading center” includes national securities exchanges that are registered with the Commission and that trade NMS stocks (referred to herein as “equities exchanges” or “exchanges”), as well as other types of “non-exchange venues” that trade NMS stocks, including ATs and broker dealers that internalize orders by matching them off-exchange with reference to the national best bid and offer.

³⁴ See, e.g., Brandes Letter, at 2; AJO Letter, at 2; MFA Letter, at 2; BIDS Letter, at 1–2; BlackRock Letter, at 1; SIFMA Letter, at 5; Virtu Letter, at 6; Fidelity Letter, at 10; Citi Letter, at 2; Clearpool Letter, at 4–5; Luminex Letter, at 1; Morgan Stanley Letter, at 3 n.5.

³⁵ Virtu Letter, at 6. See also, e.g., SIFMA Letter, at 5; Clearpool Letter, at 5.

non-exchange trading centers are different from the fee models utilized by the equities exchanges and, as a result, concluded that excluding non-exchange trading centers was appropriate.³⁶ For example, one such commenter explained that “inducements (low fees, no fees, rebates) offered by ATSS and other off-exchange venues are not universal across all broker-dealers or market participants. Instead, the fees paid (or not paid) by market participants to ATSS and other off-exchange venues are negotiated between each market participant and the trading venue,” such that “the number of fee permutations and inconsistencies across brokers for any single ATS could be substantial.”³⁷ Still other commenters believed that excluding non-exchange trading centers from the Pilot was appropriate because “ATSS are not protected venues, and thus free market competition among them constrains their pricing power.”³⁸ One commenter supported excluding ATSS because “there is nothing to be gained by including venues that don’t have the same underlying issues that exchanges present with their rebate and ‘maker-taker’ pricing models.”³⁹

On the other hand, other commenters expressed concerns with omitting non-exchange venues from the Pilot.⁴⁰ One concern was that by excluding non-exchange venues, the Pilot data would be incomplete. For example, one commenter believed that excluding non-exchange venues “could create an imperfect picture of the overall impact of the transaction fees put in place under the Pilot program” and could compromise the value and utility of the data collected during the Pilot.⁴¹ Another commenter argued that by excluding non-exchange venues, the

Pilot will not return “meaningful data upon which to make informed analysis and conclusions” because it would “ignore off-exchange trading representing approximately 39 percent of total U.S. equities market trading.”⁴² This commenter further believed that the Pilot would be unable to properly assess the potential conflicts of interest because it will not know “the baseline for remuneration occurring off-exchange, or know what impact the Proposal has on that baseline[.]”⁴³ One commenter objected to excluding ATSS “based on the fact that the proposed Pilot is a ‘new regulatory regime’ for ATSS”⁴⁴ While one commenter recognized the complexity involved with subjecting non-exchange trading centers to the access fee cap under Rule 610(c), it argued that such complexity did not provide a sufficient basis to treat exchanges and non-exchange trading centers disparately.⁴⁵ A few commenters recommended excluding ATSS, but requiring them to submit the required order routing data.⁴⁶

The Commission believes that excluding non-exchange venues from the Pilot should not negatively impact the Pilot’s data or impact its results. As noted above, the Pilot is designed, among other things, to assess the effects of exchange fee models. Because exchange fee models are materially different both in their structure and regulatory treatment, the potential effects that may be associated with exchange fee models are not applicable in the same manner to ATSS. Similarly, the question of whether rebates narrow the quoted spread is inapplicable to ATSS, which do not publicly display an automated quotation. Further, ATS activity is not being overlooked as increases or decreases in ATS volume during the Pilot will be reflected in other existing data sources.

Accordingly, Commission researchers (hereinafter “researchers”) will be able to assess market-wide changes in order flow during the Pilot.

Further, even if non-exchange venues provided order routing data pursuant to the Pilot, researchers would be unable to meaningfully correlate changes in an ATS’s order flow with the fees of that ATS because those fees are bespoke, typically bundled, and are not as transparent as exchange fees.⁴⁷

Exchange fees are not only fully transparent in published fee schedules, but exchange fee changes must be filed with the Commission and thus they have a precise effective date attached to each filing. This level of transparency for exchange fees and rebates, which is not present for ATSS,⁴⁸ is an important component facilitating researchers’ ability to draw causal connections with the Pilot’s results. While obtaining order routing data from ATSS might provide interesting insight into their business, it could not be meaningfully correlated with ATS fees and fee changes and is not necessary to study the Pilot’s results. Rather, existing sources of data on ATS activity, including data published by the Financial Industry Regulatory Authority (“FINRA”), will permit researchers to observe changes in ATS activity during the Pilot.

Among commenters critical of excluding non-exchange venues, some believed it could raise competitive issues to apply the Pilot’s pricing limitations to the equities exchanges, but not impose the same pricing limitations on non-exchange trading centers that trade the same equities securities.⁴⁹ One exchange commenter found it “inexplicabl[e]” that the Pilot “focuses only on exchanges and entirely ignores off-exchange venues, which are the venues that are most likely to benefit from a pilot that pointedly decreases the incentive (*i.e.*, rebates) to post protected quotes on-exchange.”⁵⁰

Several commenters suggested that the exclusion of non-exchange trading centers from the Pilot could “create incentives for market participants to move more order flow to off-exchange platforms,” thereby putting the national securities exchanges at a competitive disadvantage as compared to off-exchange trading centers.⁵¹ However, a

equities exchanges charge transaction-based fees, non-exchange trading centers may not charge separate transaction-based fees, but instead may use bundled pricing such that a particular order is not necessarily associated with a particular fee. *See, e.g.*, Morgan Stanley Letter, at 3 n.5 (stating that “many broker-dealer[] operators of ATSS generally charge clients an overall commission rate (rather than an access fee) for a bundle of services, including access to their ATSS”); BIDS Letter, at 1–2, AJO Letter, at 2; Healthy Markets Letter I, at 10.

⁴⁸ *See supra* notes 310–312 and accompanying text (discussing recent amendments to Regulation ATS and their relevance to the proposed Pilot).

⁴⁹ *See, e.g.*, ASA Letter, at 3; Cboe Letter I, at 12, 26–27; Nasdaq Letter I, at 5–7; NYSE Letter I, at 3–8.

⁵⁰ *See* Cboe Letter I, at 12. *See also* Nasdaq Letter I, at 6; NYSE Letter I, at 3–5; NYSE Letter II, at 12.

⁵¹ *See, e.g.*, Wellington Letter, at 2; Oppenheimer Letter, at 3; Angel Letter II, at 2; Nasdaq Letter I, at 6–7; Cboe Letter I, at 12; NYSE Letter I, at 3–5; Curtiss-Wright Letter, at 1; ASA Letter, at 3.

³⁶ *See, e.g.*, Morgan Stanley Letter, at 3 n.5 (stating that “many broker-dealer[] operators of ATSS generally charge clients an overall commission rate (rather than an access fee) for a bundle of services, including access to their ATSS”); BIDS Letter, at 1–2, AJO Letter, at 2; Healthy Markets Letter I, at 10.

³⁷ AJO Letter, at 2.

³⁸ Citi Letter, at 2. *See also, e.g.*, Fidelity Letter, at 10 (stating that “ATS’ fee structures are already subject to competitive market forces and have more complex pricing models than exchanges[,] making their participation in the Proposed Pilot less useful”); SIFMA Letter, at 5 (opining that “competitive forces already push access fees [at ATSS] to an appropriate level . . . lower than the access fees charged by exchanges,” because ATS access fees “are included in the total cost consideration of trading”).

³⁹ Luminex Letter, at 1.

⁴⁰ *See, e.g.*, Nasdaq Letter I, at 2, 5–7; Cboe Letter I, at 12–13; MFS Letter, at 2; RBC Letter I, at 4; ASA Letter, at 3; ViableMkts Letter, at 2; Angel Letter II, at 2.

⁴¹ *See* Wellington Letter, at 2 (acknowledging, however, that it is “impractical for the Commission to include off-exchange venues”). *See also, e.g.*, RBC Letter I, at 4; ProAssurance Letter, at 2.

⁴² Nasdaq Letter I, at 2, 5–7. *See also, e.g.*, NYSE Letter I, at 2.

⁴³ *See* Nasdaq Letter I, at 7.

⁴⁴ *See, e.g.*, Cboe Letter I, at 13.

⁴⁵ *See* NYSE Letter I, at 7–8.

⁴⁶ *See, e.g.*, Better Markets Letter, at 8.

⁴⁷ As noted by several commenters, equities exchanges and non-exchange trading centers currently employ different fee models. While

commenter suggested the opposite could happen and that the Pilot might actually “encourage more order flow to gravitate to the exchanges” because the Pilot would reduce the access fee cap on the equities exchanges thereby making it less expensive to transact on an exchange.⁵²

The Commission does not believe that the Pilot necessarily will put the equities exchanges at a competitive disadvantage or disproportionately harm them when competing with non-exchange trading centers for investors’ orders. Currently, only exchanges are subject to the Rule 610(c) fee cap, and Test Group 1 is designed to test a lower cap. The Commission does not believe that exchanges charging lower fees will necessarily make them less competitive with other venues for natural order flow, for example order flow that removes liquidity. Rather, it is possible that lower fees in Test Group 1 across all exchanges may actually improve their competitive position in attracting that order flow,⁵³ particularly with respect to fee sensitive routing algorithms because, all else being equal, fee sensitive algorithms generally seek to minimize trading costs and would likely rank exchanges more favorably in their routing tables when exchanges reduce their fees to remove liquidity.

In addition to testing a lower fee cap level, the Pilot also will test a prohibition on rebates and “Linked Pricing,” which, as discussed further below, is defined as a discount or incentive on transaction fee pricing applicable to removing (or providing) liquidity that is linked to providing (or removing) liquidity.⁵⁴ The intent of this is to gather data to assess, among other things, the effect of exchange rebates. Potential distortions, which may be caused or exacerbated by exchange rebates, may themselves be placing exchanges at a competitive disadvantage, in which case the elimination of rebates could improve the competitive position of exchanges, for example if taker fees are set at levels independent of the need to subsidize maker rebates. Once again, data is needed to empirically assess this issue, and the Commission believes that the Pilot is the best way to obtain that data.⁵⁵

Further, while exchanges may compete with non-exchange trading

centers for order flow, exchange fees and the fees of non-exchange trading centers are treated very differently under the federal securities laws. Indeed, one of the distinguishing features of registered national securities exchanges is that—unlike non-exchange trading centers—their fees are subject to the principles-based standards set forth in the Exchange Act, as well as the rule filing requirements thereunder. In particular, the federal securities laws require the entirety of each and every fee, due, and charge assessed by an exchange to be transparent and publicly posted for all to see, and must be an equitable allocation of reasonable dues, fees and other charges and not be unfairly discriminatory.⁵⁶ On the other hand, similar requirements do not apply to the fees of non-exchange trading centers that do not provide public transparency into their full itemized fee schedules and typically are individually negotiated on a customer-by-customer basis.⁵⁷ By including all equities exchanges regardless of fee model, and excluding other types of trading centers, the Pilot is designed to include all trading centers whose fees are subject to the principles-based standards set forth in the Exchange Act as well as the rule filing requirements thereunder.⁵⁸ Thus, the Pilot will produce data to empirically evaluate the effects that transaction-based fees and rebates may have on, and the effects that changes to those fees and rebates may have on, order routing behavior, execution quality, and market quality more generally.

The Commission believes that subjecting non-exchange trading centers to the Pilot would go beyond the scope of the current regulatory framework that applies only to exchanges and would not further the Commission’s evaluation of the impact of the existing regulatory regime, including, but not limited to, the Regulation NMS fee cap, which applies exclusively to exchange fees and rebates. In effect, the Pilot will help the

⁵⁶ See 15 U.S.C. 78f(b)(4)–(5).

⁵⁷ All exchange fee changes are published for public comment and required to be publicly posted on the internet, whereas fees of non-exchange trading centers are typically bespoke. Fee changes of non-exchange trading centers are not subject to the provisions of the federal securities laws requiring that fees be an “equitable allocation” of “reasonable” fees and not “unfairly discriminatory.”

⁵⁸ See 15 U.S.C. 78f(b)(4)–(5) (requiring, among other things, that an exchange’s fees be an “equitable allocation” of “reasonable” fees and that they not be “designed to permit unfair discrimination.”). In addition, only exchange fees are subject to the rule filing requirements under Section 19(b) of the Exchange Act and 17 CFR 240.19b–4 (Rule 19b–4) thereunder. See also Proposing Release, *supra* note 2, at 13016.

Commission carry out its statutory responsibility to assess the effect of exchange fees and rebates, which do not apply to non-exchange trading centers.⁵⁹

5. Options Exchanges

Finally, the Commission proposed to exclude options exchanges from the Pilot, because options and equities are materially different types of securities. In addition, the access fee cap under Rule 610(c) does not currently apply to the options exchanges.⁶⁰

Several commenters agreed with the Commission’s exclusion of the options exchanges.⁶¹ No commenters suggested that the Commission include options markets in the Pilot. For the reasons noted above and discussed in the Proposing Release, the Commission is not including options markets within the scope of the Pilot.⁶²

B. Securities

As proposed, all NMS stocks⁶³ that meet specified initial and continuing minimum standards would be eligible for inclusion in the Pilot (collectively, “Pilot Securities”).⁶⁴ The Commission received a number of comments regarding the scope of Pilot Securities to be included in the Pilot.

1. The Share Price Threshold of Pilot Securities

The Commission proposed that an NMS stock must have a minimum initial share price of \$2 at the time the pre-Pilot Period commences to be included in the Pilot and that any Pilot Securities that close below \$1 at the end of a trading day during the proposed Pilot would be removed from the Pilot.⁶⁵

⁵⁹ While exchange fees are filed with the Commission on Form 19b–4 and the Commission publishes notice of them for public comment and has an opportunity to summarily suspend them within 60 days, the Commission’s non-action on a fee filing within that period does not constitute an endorsement or approval of an exchange fee. Issues with fees and how they impact market participants and market structure may or may not be obvious at first and adverse effects may take time to manifest as the market adjusts to a new fee. The Commission, and the exchanges as self-regulatory organizations, must enforce their rules and the federal securities laws with the goal of protecting investors and the public interest.

⁶⁰ See Proposing Release, *supra* note 2, at 13015.

⁶¹ See, e.g., MFA Letter, at 2; SIFMA Letter, at 5; Fidelity Letter, at 10.

⁶² See Proposing Release, *supra* note 2, at 13015.

⁶³ See 17 CFR 242.600(b)(47) (defining “NMS stock”).

⁶⁴ See Proposing Release, *supra* note 2, at 13017. See also Proposed Rule 610T(b)(1)(ii).

⁶⁵ See Proposing Release, *supra* note 2, at 13017; Proposed Rule 610T(b)(1)(ii). The Commission notes that the proposed language in Rule 610T(b)(1)(ii) has been modified slightly. As proposed, Rule 610T(b)(1)(ii) contained the phrase

⁵² See, e.g., Citi Letter, at 2; Decimus Letter, at 5–6.

⁵³ See, e.g., Citi Letter, at 2; Decimus Letter, at 5–6. See also, *infra* Section IV.D “Impact on Efficiency, Competition and Capital Formation” and note 782 *infra* and accompanying text.

⁵⁴ See Rule 610T(a)(2).

⁵⁵ See *infra* Section IV.A.2. and C.1.a.i.

One commenter opposed the \$2 initial minimum share price threshold as overly restrictive.⁶⁶ Other commenters, however, agreed that the securities in the Pilot should have an initial minimum \$2 per share price threshold at the time of the initial stock selection, because this threshold “will capture virtually all NMS stocks while minimizing the risk that securities will drop out of the Pilot”⁶⁷ One of these commenters believed the proposed thresholds would “help ensure consistency among the Test Groups and limit the risk of data anomalies due to changes in the composition of those groups.”⁶⁸ Another commenter noted that the choice of “\$2 and \$1 thresholds . . . follows the reasonable parameters established during [the] . . . Tick Size Pilot” and asserted that the “determination to pull out securities that close at under \$1 during the pilot seems appropriate, especially given the fundamentally different fee structures applicable to stocks with prices less than \$1.00.”⁶⁹

The Commission continues to believe that the proposed share price thresholds for Pilot Securities are appropriate. The Commission notes that no commenters opposed the proposed \$1 minimum continuing price threshold, which will exclude such stocks from the Pilot because stocks with quotations of less than \$1 are subject to different regulatory and fee treatment.⁷⁰ The Commission continues to believe that an initial \$2 share price threshold will best balance the need to include a broad set of NMS stocks in the Pilot with the desire to ensure that substantially all of the securities selected at the outset of the Pilot remain part of their respective Test Groups throughout the duration of the Pilot, including during the pre- and post-Pilot periods. The Commission does not believe that the \$2 threshold is overly restrictive because, as discussed

“minimum initial share price of at least \$2” As adopted, the clause “minimum initial share price of \$2” is being substituted for the phrase “minimum initial share price of at least \$2” to delete redundant text. In addition, as proposed, Rule 610T(b)(1)(ii) explained that a Pilot Security that closes below \$1 would be “removed from the Test Group or the Control Group and will no longer be subject to the pricing restrictions set forth in (a)(1)–(3). . . .” As adopted, this language is being modified slightly to make it more concise. Accordingly, as adopted, this language provides that if the share price of a Pilot Security closes below \$1 at the end of a trading day “it will be removed from the Pilot.”

⁶⁶ See Angel Letter I, at 2.

⁶⁷ RBC Letter I, at 5. See also, e.g., Better Markets Letter, at 6; Healthy Markets Letter I, at 11–12.

⁶⁸ RBC Letter I, at 5.

⁶⁹ Healthy Markets Letter I, at 12.

⁷⁰ See Proposing Release, *supra* note 2, at 13017.

in the Proposal, it is uncommon for securities priced at \$2 or more to fall below \$1.⁷¹ Lowering the initial stock selection threshold below \$2 could increase the likelihood that securities selected for the Pilot get dropped from the Pilot if their share price closed below \$1 during the Pilot. Such a result would change the composition of the Test Groups during the Pilot, which might adversely impact the quality of the data produced by the Pilot. For these reasons and the reasons discussed in the Proposing Release, the Commission adopts as proposed the share price thresholds set forth in Rule 610T(b)(1)(ii).

2. The Duration of Pilot Securities

The Commission proposed that, in order to be included in the Pilot, an NMS stock must have an unlimited duration or a duration beyond the end of the post-Pilot period in order to be included in the Pilot.⁷² No comments were received regarding this condition. For the reasons outlined in the Proposing Release, the Commission adopts this aspect of the Pilot as proposed.⁷³

3. Selecting Pilot Securities From All NMS Stocks

The Commission proposed to select Pilot Securities from among the entire universe of NMS stocks, subject to the minimum share price threshold and duration requirements. As proposed, the Pilot would include a broad and diverse cross-section of securities, including, for example, stocks of all market capitalizations as well as ETPs.

The Commission received comments on the universe of Pilot Securities that generally fell into four categories: (1) The inclusion of stocks with market capitalizations below \$3 billion, (2) the inclusion of ETPs, (3) the inclusion of Canadian interlisted stocks, and (4) the inclusion of NMS stocks other than stocks of operating companies and ETPs. Each of these points is discussed below.

a. Market Capitalization and Liquidity

The Commission proposed to select Pilot Securities from among NMS stocks of all market capitalizations.⁷⁴ A few

⁷¹ See *id.* at 13017 n.102 (noting that only 4.3% of publicly traded common stocks and ETPs with a share price above \$2 during 2012–2016 dropped below \$1 in that period).

⁷² See Proposing Release, *supra* note 2, at 13017; Proposed Rule 610T(b)(1)(ii).

⁷³ See Proposing Release, *supra* note 2, at 13018 n.103.

⁷⁴ See *id.* at 13018. The EMSAC’s recommendation was to limit a pilot to stocks above \$3 billion in market capitalization in order to avoid overlap with the Tick Size Pilot. See *id.* The

commenters recommended that the Pilot exclude securities with smaller market capitalizations and/or thinly-traded securities. One commenter suggested that the “majority of securities within the Test Groups should be more liquid” and that thinly-traded securities, if included, “should be a minority of all securities in the Test Groups.”⁷⁵ Similarly, one exchange commenter stated that the Pilot “should exclude less active stocks as the liquidity in such stocks will likely be severely and negatively impacted by this Pilot.”⁷⁶ This commenter asserted that “[l]ess active stocks are highly dependent on professional liquidity providers to post liquidity” and speculated that “[d]ecreasing incentives for liquidity providers to post liquidity in less active stocks will have a pronounced impact on liquidity . . . manifest[ing] in significantly wider spreads and significantly less depth in these securities.”⁷⁷ Noting that “many industry participants appear to advocate for increased incentives for liquidity provision in thinly-traded stocks,” the commenter did not believe that the Pilot’s goals were “worth the risk to liquidity and capital formation that the Commission itself identifie[d.]”⁷⁸

Another commenter was similarly concerned that the Pilot would “have a significant impact on small to medium issuers since exchanges will not be able to provide incentives to market makers to support trading in those companies’ securities.”⁷⁹ This commenter stated that “[l]iquidity rebates can be critical for such securities to motivate market makers to support the stock with aggressive and actionable quotations.”⁸⁰ Further, the commenter opined that the Pilot would “risk damaging companies’ ability to efficiently raise capital,” which it believed would “particularly harm small and medium sized companies, for which the current market structure is already not

Commission notes, however, that the Tick Size Pilot ended on September 28, 2018 and the Pilot Period for the Transaction Fee Pilot will not start before the post-pilot period for the Tick Size Pilot ends on April 2, 2019. See Section II.C.3. *infra*.

⁷⁵ RBC Letter I, at 6. See also, e.g., Harris Letter, at 1; T. Rowe Price Letter, at 4.

⁷⁶ Choe Letter I, at 28.

⁷⁷ *Id.* See also, e.g., Morgan Stanley Letter, at 4; Leaf Letter, at 1.

⁷⁸ Choe Letter I, at 19. See also, e.g., Proposing Release, *supra* note 2, at 13069.

⁷⁹ Nasdaq Letter I, at 8–9.

⁸⁰ *Id.* at 3, 9 (alleging that the Pilot was “arbitrary and capricious and not in accordance with law,” because it gave “short shrift” to these concerns). See also Virtu Letter, at 7 (expressing concern that the Pilot would “harm investors in . . . less liquid ETPs, which will be faced with less liquidity and wider spreads when they seek to sell their holdings”).

optimized.”⁸¹ The commenter further argued that “incentives (rebates) are important to creating two-sided markets across all stocks, especially thinly traded stocks.”⁸²

Many other commenters supported including a broad scope of Pilot Securities. For example, a group of twenty-one asset managers submitting a joint letter stated that “[a]s many NMS stocks as possible should be in scope, including those with market capitalizations below \$3bn,” in order to create a “meaningful” dataset.⁸³ Another commenter agreed that the Pilot “should encompass the broadest universe of securities, as is feasible, in order to maximize the sample size and provide the most robust dataset possible,” further arguing that “[o]mitting securities of a specific market cap seems arbitrary, would provide an incomplete view of the overall market, and runs the risk of excluding meaningful data and biasing the study.”⁸⁴

Building on these arguments, other commenters believed it was important to specifically “test the argument that rebates are required to promote liquidity provision in illiquid stocks.”⁸⁵ One commenter noted that this debate “has raged for years,” which is “the point of the pilot: To provide market participants and the Commission with the data needed to make those analyses.”⁸⁶ Another commenter similarly asserted that the Pilot should include a broad set of NMS stocks to “help settle academic debates on the relative impact of rebates on liquid vs. less-liquid stocks and other supposedly beneficial aspects of rebates.”⁸⁷

⁸¹ Nasdaq Letter I, at 2. See also ASA Letter, at 5.

⁸² Nasdaq Letter III, at 1. The commenter provided a chart showing how the exchanges compare to each other with respect to maintaining a two-sided quote at least 50% of the day. In the chart, some of the exchanges with a higher percent of two-sided markets more than 50% of the day have taker-maker pricing, in which they incentivize the removal of liquidity and charge fees to the provider of liquidity. *Id.* at Exhibit A. *But cf.* NYSE Letter II, at 9–10 (arguing that rebates are necessary to promote display of liquidity).

⁸³ Joint Asset Managers Letter, at 2. See also, e.g., Spatt Letter, at 1–2 (stating that the Pilot was a “very significant improvement over the EMSAC proposal” and that one of the “major improvements” was “the inclusion of lower market value stocks”); Healthy Markets Letter I, at 11–12; Wellington Letter, at 2; MFA Letter, at 2; Nuveen Letter, at 2; Lipson Letter, at 1; BlackRock Letter, at 1; Vanguard Letter, at 2; CFA Letter, at 4; CIEBA Letter, at 2; Joint Pension Plan Letter, at 2; Oppenheimer Letter, at 2.

⁸⁴ AJO Letter, at 2.

⁸⁵ Babelfish Letter, at 3.

⁸⁶ Healthy Markets Letter I, at 13.

⁸⁷ Better Markets Letter, at 6. See also, e.g., Vanguard Letter, at 2 (“By including all NMS stocks, the SEC will receive data to analyze the

Notably, some of these commenters directly challenged the argument, set forth by a number of other commenters, that thinly-traded or smaller-capitalization NMS stocks would be harmed by the Pilot’s pricing restrictions. One commenter explained that, “for less liquid stocks, spreads tend to be wider, and as a result rebates become less relevant as a matter of simple mathematics.”⁸⁸ To illustrate the point, the commenter referred to a “stock that typically trades at a five-cent quoted spread,” noting that a “typical .0025 per share rebate would equal *one-twentieth* of the quoted spread, so in these instances a market maker’s revenue from capturing the spread would far outweigh the contribution of the rebate”⁸⁹ (emphasis in original). Another commenter also questioned the “significance of liquidity rebates for making markets in less liquid/smaller-cap stocks,” because it believed this “marginal incentive to provide liquidity . . . is likely to be weak in the smaller-cap space typically characterized by wide bid-ask spreads”⁹⁰ To support this argument, the commenter referred to “an empirical study of changes in maker-taker arrangements on two European trading venues owned by BATS,” now owned by Cboe Global Markets, which suggested that “an elimination of the make fee and a reduced take fee cap would result in worse market quality for large capitalization stocks but *better market quality for small capitalization stocks*” (emphasis in original).⁹¹ For this reason, the commenter asserted that the “link articulated by the opponents of the proposed pilot is at best uncertain and that the pilot *may* in fact result in improved liquidity for smaller-cap

impacts of transaction fees on market quality across various types of securities.”); TD Ameritrade Letter, at 6–7 n.11 (“including securities of small, mid and large cap companies . . . will include some data on the impact that varying transaction fees will have [on] thinly traded securities”).

⁸⁸ IEX Letter II, at 7. See also Credit Suisse Commentary, at 1, 3 (stating that the Pilot “is likely to affect stocks differently depending on their liquidity profile,” but expecting stocks “with wider spreads” in Test Groups 2 and 3 “to continue to behave similarly given that their liquidity may be less driven by rebate-incentivized trading strategies to begin with”). *But cf.* NYSE Letter II, at 11 (asserting that it was “untrue” that “spreads for less-liquid securities are not sensitive to rebate levels” and referring to chart showing that NYSE American-listed securities, “which are generally less-liquid securities” spent less average time at the NBBO compared to maker-taker venues).

⁸⁹ IEX Letter II, at 7.

⁹⁰ Decimus Letter, at 4–5 (citing Marios Panayides et al., *Trading Fees and Intermarket Competition* 26 (Charles A. Dice Ctr. for Research in Fin. Econ., Ohio State Univ., Working Paper No. 2017–3, 2017, available at, <https://ssrn.com/abstract=2910438>).

⁹¹ *Id.* at 5.

stocks” (emphasis in original).⁹² The commenter therefore contended that it was “imperative to include a set of smaller-cap stocks in the pilot, as the opponents’ claims on the existence of unambiguous harm to liquidity appear to be exaggerated and driven by preconceived notions.”⁹³

The Commission believes that the many commenters have, through their analysis and ultimate disagreement on this issue, emphasized the need for the Pilot to test the effect of transaction fees and rebates on NMS stocks of all market capitalizations. It is unclear whether or not changes to fees and rebates would harm smaller capitalization or thinly-traded NMS stocks.⁹⁴ As some commenters have noted, it also is possible that the Pilot may have little effect on smaller-capitalization or thinly-traded NMS stocks or that the Pilot may even improve the liquidity of such stocks.⁹⁵ The Commission also notes that a pilot focused solely on large capitalization stocks may not produce sufficient data to investigate how changes to transaction fees and rebates will affect liquidity or capital formation across the market. Because including smaller-capitalization NMS stocks in the Pilot will produce a more meaningful dataset to support a broad investigation into the effect of transaction fees and rebates on the full spectrum of NMS stocks and among different segments of the securities market, the Commission adopts this aspect of the rule as proposed.

As discussed further below, notwithstanding the decision to include all NMS stocks regardless of market capitalization, the Commission believes it is appropriate to exclude certain thinly-traded securities (e.g., securities that trade fewer than 30,000 shares per day), in part because rebates at that level of trading would be low enough to be unlikely to impact order routing behavior and researchers would be unlikely to get sufficient statistical power to analyze them in isolation at those volume levels.⁹⁶

⁹² *Id.*

⁹³ *Id.*

⁹⁴ See, e.g., Proposing Release, *supra* note 2, at 13065–66, and 13069.

⁹⁵ See, e.g., notes 88–92 *supra* and accompanying text.

⁹⁶ See *supra* Section II.C.6 (discussing the exclusion of securities that trade fewer than 30,000 shares per day on average from Test Groups 1 and 2). See also *supra* notes 88–92 and accompanying text. Accordingly, the Commission notes that many thinly-traded securities will be excluded from the Pilot, which should assuage commenters’ concerns regarding the impact of the Pilot on less liquid or thinly-traded securities.

b. The Inclusion of ETPs

The Commission proposed to select Pilot Securities from among all NMS stocks, including ETPs. A number of commenters supported including ETPs in the Pilot. Several commenters noted, for example, that including ETPs “would produce a more inclusive analysis of rebates and fees across all segments of NMS stocks.”⁹⁷ One such commenter believed that “the benefits from collecting data that informs long-term market structure improvements will outweigh any potential temporary disadvantage.”⁹⁸

On the other hand, a number of commenters expressed concern with including ETPs in the Pilot. For example, one commenter stated that “[m]any ETP issuers are . . . strongly opposed to the inclusion of ETPs in the Pilot” and suggested that the Commission had not “sufficiently explained why it is appropriate to include ETPs in any Pilot.”⁹⁹ This commenter noted that “exchanges have implemented numerous incentive structures designed to promote liquidity and narrow spreads in ETPs” that could be disrupted by the Pilot, “negatively impact[ing] liquidity and spreads in ETPs to the detriment of both new and existing investors.”¹⁰⁰ Similarly, another commenter expected the Pilot to “result in spreads widening for ETPs holding pilot stocks, even if ETPs are not included in the pilot, given that fair value calculations rely on underlying constituent pricing,” and therefore cautioned that “any negative effects of the pilot on transaction costs could be intensified for ETP investors.”¹⁰¹ A few commenters “believe[d] that the goals of the pilot can be achieved without having to include ETPs in the pilot,” because “[t]he effects of the pilot on stocks will be sufficient to draw conclusions about potential changes to access fee rules.”¹⁰²

The Commission continues to believe that it is important to include ETPs in the Pilot, because excluding them would hamper the Commission’s ability to gather key data that could be used to inform future regulatory action in this area. The Commission does not believe it will be able to draw meaningful conclusions about the impact of changes to transaction fees and rebates on ETPs by observing the effects of the Pilot on other securities, in part because ETPs

have a unique create-and-redeem process that does not apply to other NMS stocks.¹⁰³ Nevertheless, ETPs are subject to the same rules and fees that apply to all NMS stocks. To the extent that the Pilot results may inform future policymaking, Pilot data that includes all types of NMS stocks that would be impacted, including ETPs, will be more useful.

Further, some commenters expressed concern regarding the potential for competitive effects among certain ETP issuers. As one commenter noted, “if two ETPs with similar underliers or that track the same index are placed in the two different [T]est [G]roups, the Pilot would inevitably determine winners and losers.”¹⁰⁴ Another commenter explained that “ETPs with similar investment strategies are more substitutable than stocks of operating companies,” such that “market quality metrics likely play a greater role in driving flows to ETPs.”¹⁰⁵ For that reason, “[i]f competing ETPs are in different test groups—and market quality varies among the test groups,” the commenter believed that “investors might migrate toward products in the test groups with better market quality,” thereby “tilt[ing] the playing field in favor of ETPs that happen to be assigned—at random—to test groups that perform better at the expense of other products.”¹⁰⁶

While a few commenters discussed which treatment group would be most problematic,¹⁰⁷ many of the commenters took no position on the direction of the presumed competitive impact and did not speculate about how (or whether)

inclusion in specific Pilot Groups would help or harm ETPs.¹⁰⁸

To address the potential competitive harm, a few of these commenters recommended that the Commission exclude ETPs from the Pilot altogether,¹⁰⁹ while most recommended that the Commission select ETPs in a manner that may avoid any potential competitive effects among similar ETPs, by: (1) Rotating all of the Pilot Securities through the various treatment groups,¹¹⁰ (2) rotating only ETPs through the various treatment groups,¹¹¹ or (3) placing in the same Test Group ETPs tracking similar indexes or holding similar investments.¹¹²

Other commenters criticized these proposed alternatives for selecting ETPs. One commenter, for example, questioned “whether any of the proposed remedies would address these concerns effectively or fairly.”¹¹³ Another commenter expressed concern that the suggestions to place “similar” ETPs in the same Test Group might be too complex to implement, as determining whether ETPs are “similar” to one another for purposes of Pilot rotation can be extremely nuanced.¹¹⁴ This commenter explained that an “effective classification should take into account an ETP’s underlying index, portfolio constituents and asset class to provide an appropriate ‘apples to apples’ analysis,” in addition to “factors such as assets under management, spread size and daily trading volume,” which the commenter believed “would

¹⁰⁸ See, e.g., SIFMA Letter, at 4–5; Invesco Letter, at 2–3; Morgan Stanley Letter, at 3–4.

¹⁰⁹ See, e.g., Cboe Letter I, at 28; Invesco Letter, at 2–3; State Street Letter, at 3; STA Letter, at 4.

¹¹⁰ See, e.g., ICI Letter I, at 4–5, 5 n.10 (suggesting that the Commission rotate securities every three to six months); Oppenheimer Letter, at 3; Angel Letter II, at 3 (suggesting a quarterly rotation). These commenters did not believe that rotation would “adversely affect the validity of pilot data” or “impose more than a *de minimis* implementation burden or other costs on market participants.” ICI Letter I, at 4. See also Angel Letter II, at 3. These commenters suggested that “[a]nalysis of individual security characteristics before and after a rotation to a new group[] could yield relevant and important results.” Oppenheimer Letter, at 3. See also Angel Letter II, at 3.

¹¹¹ See, e.g., SIFMA Letter, at 5; State Street Letter, at 4; Healthy Markets Letter II, at 8.

¹¹² SIFMA Letter, at 4. See also, e.g., Nuveen Letter, at 2; BlackRock Letter, at 2; FIA Letter, at 4; Fidelity Letter, at 9; State Street Letter, at 4; STANY Letter, at 4; Healthy Markets Letter II, at 8. *But cf.* Angel Letter II, at 3 (stating that “similar ETFs are probably the best natural controls for each other, as their underlying portfolios are virtually identical,” such that “similar ETFs should definitely be in different treatment groups to increase the power of the pilot”).

¹¹³ Schwab Letter, at 3.

¹¹⁴ Invesco Letter I, at 2–3. See also, e.g., Healthy Markets Letter II, at 8 (noting that it may be “difficult to clearly and consistently define ‘similar’ ETPs”).

¹⁰³ See, e.g., Securities Exchange Act Release No. 75165 (June 12, 2015), 80 FR 34729, 34732 (June 17, 2015) (Request for Comment on Exchange-Traded Products) (discussing the create-and-redeem process for ETPs); Transcript of the Division of Trading and Markets’ Roundtable on Market Structure for Thinly-Traded Securities (April 23, 2018), available at <https://www.sec.gov/spotlight/equity-market-structure-roundtables/thinly-traded-securities-roundtable-042318-transcript.txt> (Panel Three discussing ETPs). In particular, large volumes in ETPs can be transacted directly with the ETP issuer in creation units, making the trading center volume in ETPs less relevant to institutional traders that transact in large size orders.

¹⁰⁴ Morgan Stanley Letter, at 3–4. See also Nasdaq Letter I, at 8–9 (stating that the Pilot was “arbitrary and capricious and not in accordance with law,” in part because the Commission had “fail[ed] to consider” the competitive effects of placing “ETPs tracking similar indexes . . . in different test groups”); Cboe Letter I, at 17.

¹⁰⁵ ICI Letter I, at 4 n.8.

¹⁰⁶ *Id.* at 4. See also, e.g., NYSE Letter I, at 7; Nasdaq Letter I, at 8.

¹⁰⁷ See, e.g., Credit Suisse Commentary, at 6 (stating that the Pilot could “unintentionally advantage ETFs in the lower fee group”). *But cf.* Nasdaq Letter I, at 8 (stating that ETPs “in the lower rebate groups would find themselves at a competitive disadvantage to their competitors and may lose market share during the pilot as a result”).

⁹⁷ BlackRock Letter, at 1. See also, e.g., Fidelity Letter, at 9.

⁹⁸ Vanguard Letter, at 2.

⁹⁹ Cboe Letter I, at 17–18.

¹⁰⁰ *Id.*

¹⁰¹ State Street Letter, at 3.

¹⁰² See, e.g., *id.*

introduce unnecessary complexity into the Proposal.”¹¹⁵

The Commission recognizes the concern that securities placed in one treatment group could be impacted differently than similar securities placed in a different treatment group. While that effect could occur for any security (e.g., stocks of different operating companies in the same industry), it could potentially be more prominent for ETPs that may be substantially similar. Nevertheless, the Commission notes that similar ETPs are not necessarily identical and many other factors influence investor demand and trading, including expense ratios, trading commissions, and existing holdings.

The Commission has carefully considered the three alternatives suggested by the commenters¹¹⁶ and declines to adopt them. Rotating either (1) all Pilot Securities or (2) only ETPs would increase complexity and could increase the costs of the Pilot as the Commission, exchanges, and market participants would need to manage a pilot whose securities change treatment groups every several months. In particular, a rotation design would be considerably more complex than the proposed design by, for example, adding more treatment subgroups and requiring frequent rotation of those subgroups. Given the choice between a simple Pilot design with a short duration, on one hand, and a considerably more complex design with a longer duration, on the other hand, the Commission prefers to adopt this aspect of the rule as proposed. Compared to the alternative designs suggested by some commenters, the proposal results in a short narrowly drawn pilot with fewer complexities and burdens, which is an outcome supported by many commenters.¹¹⁷

The Commission also considered the suggestion to group ETPs with similar underlying holdings into the same treatment group. While this suggestion involves slightly less ongoing complexity than rotating securities during the Pilot, the Commission declines to adopt this suggestion because it introduces its own complexity in that categorizing ETPs according to their underlying holdings (and potentially other characteristics) involves the exercise of subjective

judgment. In addition, grouping similar ETPs can negatively impact the representativeness of the different treatment groups, particularly if all of the similar ETPs are similar in volume, price, and market capitalization. The Commission believes it may learn more from a study that compares how different pricing regimes affect similarly-situated ETPs, whereas keeping similar ETPs in the same treatment groups could reduce the quality and usefulness of Pilot’s results by inhibiting the ability of researchers to compare treatment groups. While the potential exists that similar ETPs in different Pilot treatment groups might trade differently during the Pilot, it is not certain—and commenters held divergent views concerning—whether and to what extent the Pilot would be a contributing factor. Whether the absence of rebates or lower fees help or hurt trading in similar ETPs is far from certain, and whether investors would base trading decisions on those distinctions is unclear. Excluding ETPs to avoid speculative harm would, however, decidedly reduce the utility of the Pilot’s results to inform future policy making. Therefore, the Commission has determined not to adopt a requirement to rotate securities or to group like ETPs. For these reasons, the Commission adopts the rule as proposed to include ETPs in the Pilot.

c. The Inclusion of Canadian Interlisted Stocks

In the Proposal, the Commission requested comment on the selection criteria and whether the Commission should consider inclusion or exclusion of certain stocks from the Pilot sample set.¹¹⁸ In response, several commenters discussed the inclusion of Canadian interlisted stocks in the Pilot and recommended that the Commission coordinate with Canadian securities regulators to avoid altering the trading dynamics between Canada and the U.S. in those securities.¹¹⁹ For example, one

¹¹⁸ See Proposing Release, *supra* note 2, at 13019 (Questions #5 and 8). See also *id.* at 13013 n.46 (noting the receipt of a letter from the Canadian Security Traders Association proposing a cross-border study on the effect of rebates on market quality in conjunction with the Canadian Securities Administrators).

¹¹⁹ See, e.g., Fidelity Letter, at 8; OMERS Letter, at 1; FIA Letter, at 4; Healthy Markets Letter I, at 35; STA Letter, at 5. Canadian interlisted stocks are stocks of Canada-based companies that are primarily listed on a Canadian exchange (generally the Toronto Stock Exchange), but that choose to also dually-list on a U.S. exchange. See <https://www.tsx.com/trading/toronto-stock-exchange/fee-schedule/ni-23-101> (for a quarterly list of approximately 187 interlisted securities published by the Toronto Stock Exchange featuring stocks that are listed on the Toronto Stock Exchange or the TSX Venture Exchange).

commenter was “concerned that the inclusion of Canadian interlisted stocks in either one of the reduced access fee or no rebate test groups may materially impact order flow by encouraging transactions to move away from U.S. exchanges and on to Canadian exchanges.”¹²⁰ Other commenters suggested that the Commission coordinate with the Canadian Securities Administrators to avoid “dramatic differences in the trading economics on inter-listed stocks between Canadian and U.S. markets.”¹²¹

The Commission also received a comment letter from the academics retained by the Canadian Securities Administrators (“CSA”) to assist with planning, conducting, and analyzing a Canadian transaction fee pilot (“Canadian Pilot”).¹²² According to the CSA researchers, the Canadian Pilot likely will propose that, for approximately 180 interlisted stocks, 90 of them would be included in a no-rebate test group with the remaining 90 placed in a control group.¹²³ In their letter, the CSA researchers requested that the Commission’s Pilot treat interlisted stocks similarly to their Canadian Pilot proposal—*i.e.*, that both pilots place the same 90 interlisted stocks into their respective no-rebate group and place the other 90 stocks into their respective control group.¹²⁴ By doing so, the CSA researchers believe that both pilots will avoid confounding the analysis for each respective pilot with respect to interlisted stocks because differences in fees and rebates otherwise could incentivize shifts in cross-border routing.¹²⁵

The Commission agrees with the CSA researchers and believes that it is appropriate to coordinate with the CSA on a transaction fee pilot in order to avoid the potential for distortionary effects between U.S. and Canadian markets if rebates in the “no-rebate” interlisted stocks continue to be allowed on one country’s exchanges but not the other.

Accordingly, in the event that the CSA proceeds with the Canadian Pilot concurrently with the Commission’s Pilot, the Commission will append to the no-rebate Test Group the same Canadian interlisted stocks that the CSA selects for its no-rebate treatment group, and the remaining interlisted stocks will

¹²⁰ FIA Letter, at 4. See also Fidelity Letter, at 8.

¹²¹ See, e.g., STA Letter, at 5.

¹²² See CSA Letter. The preliminary details of the pilot contemplated by the CSA, as reflected in the CSA Letter, were not publicly available prior to the Proposing Release.

¹²³ *Id.* at 1.

¹²⁴ *Id.* at 2.

¹²⁵ *Id.* at 1–2.

¹¹⁵ Invesco Letter, at 2–3.

¹¹⁶ The Commission also considered comments providing suggestions relevant to the implementation of these three alternatives. As discussed above, the Commission is not adopting the alternatives.

¹¹⁷ See Section II.D.2 (discussing the duration of the Pilot) and Section II.C.5. through 6. (discussing the number of stocks to be included in the Pilot) *infra*.

be placed into the Control Group.¹²⁶ Placing the same interlisted stocks into the Pilot's no-rebate test group that the Canadian Pilot places into its no-rebate test group will avoid the potential to alter the trading dynamics between Canadian exchanges and U.S. exchanges in those stocks that otherwise could result if not all exchanges were subject to the same conditions, which should support the integrity of the no-rebate test groups in both pilots.¹²⁷ Coordination also will avoid the potential for the Commission's Pilot to interfere with the ability of Canadian securities regulators to conduct a pilot of their own on Canadian-listed stocks which could be adversely impacted in the absence of coordination.¹²⁸ The Commission appreciates the interest expressed by the CSA researchers in coordinating on a pilot with respect to interlisted stocks, and looks forward to cooperating with the CSA on this important data-gathering initiative in a manner that benefits both nations' securities markets.

d. The Inclusion of Other Types of NMS Stocks

A few commenters addressed the inclusion of other types of NMS stocks, such as American Depositary Receipts ("ADRs"), rights, and warrants. One commenter supported the proposed broad scope of Pilot Securities and believed that "analysis of . . . ADRs could provide additional insight into the effect rebates and fees have on liquidity, spreads and the overall trade experience."¹²⁹ Another commenter objected to the Commission's proposal to include rights and warrants in the Pilot, but did not explain the basis for

¹²⁶ In the event that the Canadian pilot does not go forward or does not commence simultaneously with the Commission's Pilot, interlisted stocks will be placed at the Pilot's outset into the Control Group. Placing interlisted stocks in the Control Group will preserve the status quo for interlisted stocks and avoid altering the trading dynamics in them between U.S. and Canadian exchanges, which will avoid adversely impacting Test Groups 1 and 2 with respect to those stocks. If the Canadian pilot does go forward, but the interlisted stocks that will be included in its no-rebate test group are not known by the Commission at the time the Commission issues the initial List of Pilot Securities, the Commission may separately issue a subsequent list identifying the interlisted stocks that will be appended to Test Group 2 or the Control Group for the remainder of the Pilot.

¹²⁷ See, e.g., Proposing Release, *supra* note 2, at 13024 (discussing the design of proposed Test Group 3 and the prohibition in Linked Pricing to support the integrity of a no-rebate test group). See also CSA Letter, at 1 (expressing concern that "the results of the Canadian Pilot may be statistically and economically inconclusive" without coordination with the Pilot).

¹²⁸ See CSA Letter, at 1.

¹²⁹ Oppenheimer Letter, at 3.

its objection.¹³⁰ As noted above, however, most commenters expressed general support for a Pilot that includes all NMS stocks.¹³¹

The Commission continues to believe that it is appropriate to select Pilot Securities from among the overall universe of NMS stocks. Accordingly, the Commission will include all types of NMS stocks in the Pilot, subject to the selection criteria described below. The Commission believes this is appropriate because exchange fees and rebates apply to all NMS stocks, as does the fee cap under Rule 610(c). Aligning the scope of the Pilot with the scope of equities fees and the equities fee cap will best facilitate analysis of the impact of changes to transaction fees and rebates on different segments of the securities market. Excluding from its scope any categories of NMS stocks would deprive the Commission of data to inform future regulatory action regarding this segment of the market. For those reasons, the Commission adopts this aspect of the Pilot as proposed, subject to the selection methodology described below in Section II.C.

4. The Ability of Issuers To Opt Out of the Pilot

The Commission solicited comment as to whether issuers should be allowed to request that their securities not be included in one of the Pilot's Test Groups (*i.e.*, "opt out") and the potential impact that such an approach might have on the extent and quality of the data collected by the Pilot.¹³²

Several commenters argued that issuers should be permitted to opt out of participation in the Pilot based on process concerns. For example, one commenter's "largest concern [was] that the genesis of the proposal . . . deliberately excluded issuer representation" by "excluding the NYSE and Nasdaq from participation on the [EMSAC]."¹³³ This commenter asserted that the "exclusion . . . from participation in the pre-proposal

¹³⁰ TD Ameritrade Letter, at 4.

¹³¹ See, e.g., Vanguard Letter, at 2; Joint Pension Plan Letter, at 2; Oppenheimer Letter, at 2.

¹³² See Proposing Release, *supra* note 2, at 13019.

¹³³ Issuer Network Letter I, at 2 (emphasis omitted) and Issuer Network Letter II. See also Cboe Letter I, at 14–15 (criticizing the Pilot as "based on recommendations made by a committee that, however well-meaning, was flawed in its construction" because it lacked "exchange or issuer representation"); Home Depot Letter, at 2 (stating that the EMSAC "did not include any input from issuers or issuer advocates . . . like NYSE and Nasdaq" and that it was "difficult" for "issuers . . . to understand how this Pilot could be implemented without input from the issuers . . . it will directly impact"); ModernIR Email, at 1 (stating that a "study . . . crafted without input or choice for issuers . . . would be an inexcusable travesty").

discussions renders the 'Opt Out' option absolutely essential."¹³⁴ Another commenter suggested that the Commission could address such concerns by "conven[ing] a summit for issuers and perhaps [creating] a series of webcasts . . . to explain the purpose of the test," as well as by "form[ing] an Issuer Advisory Committee that can weigh data and let companies opt into or out of a test."¹³⁵

The Commission's proposal was subject to a full notice-and-comment rulemaking process during which the Commission received a large number of comments from the public, including issuers and their listing exchanges. While the EMSAC recommendation was one of many inputs that informed the Commission's development of the Pilot, the Commission's Pilot differs substantially from EMSAC's recommendation as numerous commenters have recognized.¹³⁶ Accordingly, the Commission believes that issuers, as well as other market participants, have had ample opportunity to participate in the consideration of the Commission's proposal for the Pilot.

Other commenters supported opt out based on specific concerns surrounding the potential impact of the Pilot. A number of these commenters were listed company issuers that expressed concern about how the Pilot would affect trading in their securities.¹³⁷ Commenters

¹³⁴ Issuer Network Letter I, at 2, 7 (emphasis omitted).

¹³⁵ ModernIR Email, at 1. See also Issuer Network Letter I, at 7 (suggesting that the Commission "[p]lace the Access Fee Pilot on hold for 90 days while [it] gathers a Blue Ribbon Panel . . . of a dozen or so NYSE and Nasdaq listed company financial executives so that we might conduct a comprehensive review" of the Pilot (emphasis omitted)).

¹³⁶ The EMSAC held meetings open to the public, which were publicly webcast, as it was developing its recommendations. To promote awareness of those meetings, the Commission issued press releases to announce those meetings, which included the agenda for those meetings. See, e.g., SEC Press Release 2015–216 (announcing the agenda for an October 27, 2015 EMSAC meeting, highlighting the discussion of fees and rebates, and soliciting comments from the public thereon), available at <https://www.sec.gov/news/pressrelease/2015-216.html>. The Commission also published meeting minutes and transcripts of the full EMSAC meetings. Finally, the Commission provided a mechanism for the public to submit comments to the EMSAC for its consideration, and a number of people did submit comments. See <https://www.sec.gov/comments/265-29/265-29.shtml> (comment file for File No. 265–29).

¹³⁷ See, e.g., P&G Letter, at 1; McDermott Letter, at 1; Level Brands Letter, at 1; ACCO Letter, at 1; NorthWestern Letter, at 1–2; Ethan Allen Letter, at 1; Unifit Letter, at 1; Johnson Letter, at 2; Sensient Letter, at 2; Hawaii Letter, at 1; Cott Letter, at 1; Leaf Letter, at 1–2; First Majestic Letter, at 1; SIFCO Letter, at 2; Weingarten Letter, at 1; Ennis Letter, at 2; Trex Letter, at 1; Genesis Letter, at 1; Tredegar Letter, at 1; Energizer Letter, at 1; ProAssurance

supporting opt out emphasized the importance of giving issuers the ability to avoid potential costs and uncertainty resulting from the Pilot.¹³⁸ For example, one commenter believed that the Pilot could “caus[e] spreads to widen in securities selected for the test groups,” such that “companies conducting a repurchase program or secondary offering would incur higher costs,” and the Commission received a number of comment letters from listed issuers specifically referencing that point and echoing the same concerns.¹³⁹ This commenter further argued that “the Proposal would also harm the ability of issuers whose securities are subject to access fee caps to compete” with issuers not subject to the Pilot’s exchange fee restrictions.¹⁴⁰

Many other commenters opposed opt out.¹⁴¹ Some of these commenters dismissed the concerns described above regarding the potential costs on issuers whose stock is included in the Pilot.¹⁴² For example, one commenter disagreed with the notion that “rebates are needed to incentivize market makers to quote tight spreads” in the stocks of certain issuers who had submitted comment letters.¹⁴³ This commenter explained that the “fifth of a cent rebate is not incentivizing a tight bid-ask spread in these issuers’ stocks,” because that rebate represents an insignificant portion of their average spread.¹⁴⁴ Another commenter disagreed with the

Letter, at 1; Home Depot Letter, at 1; SMP Letter, at 2; Halliburton Letter, at 1; Era Letter, at 2; Natural Grocers Letter, at 2; Newpark Letter, at 2; Knight-Swift Letter, at 2; Farmer Mac Letter, at 1; BancorpSouth Letter, at 1–2; Haverly Letter, at 1; Ampco-Pittsburgh Letter, at 2; Anixter Letter, at 2; Avangrid Letter, at 2; NHC Letter, at 1; HP Letter, at 2; Curtiss-Wright Letter, at 2; Murphy Letter, at 1.

¹³⁸ See, e.g., Cboe Letter I, at 29; ASA Letter, at 4–5.

¹³⁹ See Addendum to Healthy Markets Letter II, at 11 (attaching an email from NYSE to its listed companies). See also note 137 *supra*.

¹⁴⁰ See NYSE Letter I, at 4. In its letter, the commenter mentioned analysis it performed on NYSE-listed issuer secondary offerings in 2017 that suggested that issuers “with average spreads under 20 basis points paid an average discount to market price of 2.6%” and that “companies with spreads above 20 basis points had to discount their offerings nearly twice as much, to 4.9%.” NYSE Letter I, at 14 n.51. It is unclear, however, whether wider spreads cause larger offering discounts or whether they are simply correlated with them. For example, smaller companies that are less well capitalized may have a wider spread compared to a larger, better capitalized company, which could result in spreads being correlated with a company’s cost of capital (*i.e.*, wider spreads could be a reflection of a company’s relative credit risk and cost of capital, not a driver of it).

¹⁴¹ See, e.g., Joint Asset Managers Letter, at 2; Citi Letter, at 5; AJO Letter, at 2; Lipson Letter, at 1.

¹⁴² See *supra* notes 138–140 and accompanying text.

¹⁴³ Themis Trading Letter II, at 3.

¹⁴⁴ *Id.* at 2–3.

suggestion that the Pilot would have a negative impact on issuers, arguing that such position “directly contradicts the public support by investors for the Pilot.”¹⁴⁵ This commenter opined that the “fundamental forces of supply and demand that affect . . . the relative attractiveness of individual public company stocks will be in no way impaired if . . . exchanges are precluded from paying a rebate, or required to accept a lower access fee.”¹⁴⁶

Other commenters asserted that opt out would “adversely affect the quality of the data and the credibility of the Pilot,” which could weaken the findings that could be drawn from it.¹⁴⁷ One commenter explained that opt out “would undercut the ability of economists to draw sharp inferences based upon performance differences between the treated and control stocks” and that the “non-random character of ‘opt outs’” could “disproportionately reflect firms that were especially responsive to feedback from the listing exchange or could disproportionately reflect less liquid stocks, which would be especially important for the access fee pilot.”¹⁴⁸

One listed issuer, which is a large investment manager, “welcome[d] the opportunity for [its] stock to be included in the Pilot, with the ultimate goal of improving the overall market to be one where prices can be set by long-term investors without distortion from speculative market participants.”¹⁴⁹ This issuer did not “expect that a reduction or outright removal of rebates will have any significant or harmful effects on the quality of prices displayed in the public lit market, interfere with genuine liquidity and price formation,

¹⁴⁵ IEX Letter II, at 3. See also, e.g., Joint Pension Plan Letter, at 2 (stating that the “asset manager/ asset owner community is heavily supportive of such a pilot,” which should “provide the necessary confidence to all public companies to be included”); ICI Letter II, at 2 (“market structure is not a primary consideration guiding the investment decisions of long-term investors”); Joint Asset Managers Letter, at 2; Healthy Markets Letter II, at 2. But cf. NYSE Letter II, at 4 (stating that “many buy-side institutions” supporting the Pilot “are willing to experiment with real-world public companies and end investors to ‘get the data,’ even if the expected impact of limiting or eliminating rebates will be a deterioration of the public quote”).

¹⁴⁶ IEX Letter II, at 3–4.

¹⁴⁷ RBC Letter I, at 6. See also, e.g., LATEC Letter, at 2; Joint Pension Plan Letter, at 2; MFS Letter, at 3; Clearpool Letter, at 8.

¹⁴⁸ Spatt Letter, at 3. See also, e.g., Healthy Markets Letter I, at 12; CII Letter, at 4.

¹⁴⁹ T. Rowe Price Letter, at 4. The issuer explained that its stock, “on average, trades about 1.5 million shares daily, with an average displayed size of 200 shares and a spread of nearly \$0.07,” with “40% of [its] average daily volume occur[ing] as displayed on exchange volume.” *Id.* at 4–5.

or negatively impact [its] stock’s trading volume, spread or displayed size.”¹⁵⁰

Finally, two commenters further argued that opt out would be inconsistent with the existing market structure. One of these commenters observed that “[i]ssuers currently have no say over exchanges’ policies” and that “exchanges that modify their access fees dozens of times a year do not survey issuers or permit them to opt-out of these fee changes or creation of order types.”¹⁵¹ The other commenter opined that opt out “may set an unfortunate precedent that would allow an issuer to pick and choose among those aspects of the National Market System that it likes while rejecting other aspects that it may find less attractive to it, but [which] are necessary to the smooth functioning of [the] United States public equity markets.”¹⁵²

After careful consideration, the Commission does not believe that issuers should be permitted to opt out of participation in the Pilot. While the Commission understands issuers’ concerns, allowing issuers to opt out could undermine the representativeness of the Pilot’s treatment groups and potentially bias the Pilot’s results, depending on the number and characteristics of issuers that opt out. In turn, researchers would be less able to rely on the data to perform analyses and draw specific conclusions about the impact of the Pilot, thereby limiting the usefulness of the Pilot’s data to the Commission and future regulatory initiatives.¹⁵³ Although some commenters believe that issuers may incur potential costs or endure competitive harms depending on which of the Pilot’s treatment groups their stock is in, other commenters have argued that such effects are unlikely to manifest. The Commission does not believe it is appropriate to implement an opt out provision that could frustrate the collection of useful and representative data based solely on concerns expressed by some commenters regarding uncertain harms. It is precisely because of this uncertainty that the Commission believes it is necessary to conduct the Pilot to study these contested issues through an objective empirical review of exchange transaction fees and rebates. For those reasons, the Commission

¹⁵⁰ *Id.* at 5.

¹⁵¹ Better Markets Letter, at 7.

¹⁵² MFS Letter, at 3.

¹⁵³ See, e.g., Short Sale Position and Transaction Reporting, Study by the Staff of the Division of Economic and Risk Analysis, June 5, 2014, at 66–67 (discussing selection bias in the context of an “opt in” voluntary pilot design).

adopts this aspect of the Pilot as proposed.

C. Pilot Design

1. Need for a Pilot

As a threshold issue, commenters disagreed about whether the Commission should conduct any kind of pilot study of transaction fees and rebates. One commenter, for example, characterized the proposed Pilot as “a solution in search of problem” and claimed that the Commission “has provided no evidence that existing fee practices are harming investors or interfering with fair competition.”¹⁵⁴ Another commenter believed that the Pilot was unnecessary, but for the opposite reason—namely, that there is ample evidence of the negative effects of exchange rebate pricing models, such that the Commission should instead take immediate action to ban them.¹⁵⁵

Most commenters, however, thought a Commission-led pilot was necessary and supported the Commission’s proposal to conduct one.¹⁵⁶ These

supportive commenters observed that “market participants have heavily debated the effects that transaction-based fees, particularly access fees, and rebates may have on the equity markets” and “commend[ed] the SEC for advancing this discussion through a time-limited, empirical study.”¹⁵⁷ Some of those commenters thought a Commission-led pilot was necessary because competitive pressures among exchanges may serve as a barrier to market-led reforms in this area.¹⁵⁸ The Commission agrees with the commenters that stated that the Pilot is necessary because, as reflected in the comments discussed above,¹⁵⁹ there is strong disagreement about the impact of exchange fee-and-rebate pricing models but a lack of data to study the issue. The Commission believes it is important to further investigate these impacts.¹⁶⁰

2. Pilot Design

For each NMS stock that meets the initial criteria to be a Pilot Security, discussed above, the Commission proposed to assign it to one of three Test

Groups, with 1,000 NMS stocks each, or the Control Group.¹⁶¹ The composition of each Test Group would remain constant for the duration of the Pilot, except, as described below, to reflect changes to the composition of the groups caused by mergers, delistings, or removal from a Test Group due to the share price of a stock closing below \$1.¹⁶²

The Commission received a number of comments on the proposed Pilot design, discussed below, focusing mainly on the number of securities included in each Test Group. After consideration of all the comments received and for the reasons discussed below, the Commission is adopting two Test Groups that each contain 730 NMS stocks, functionally combining proposed Test Groups 1 and 2 into a new Test Group 1 with a blended fee cap of \$0.0010. Accordingly, for the duration of the Pilot, the following pricing restrictions will apply to Test Groups 1 and 2, while the Control Group will remain subject to the current access fee cap in Rule 610(c):

	Proposed	Adopted
Fee Cap Test Group 1	1,000 NMS stocks \$0.0015 fee cap for removing & providing displayed liquidity.	730 NMS stocks. \$0.0010 fee cap for removing & providing displayed liquidity.
Fee Cap Test Group 2	1,000 NMS stocks \$0.0005 fee cap for removing & providing displayed liquidity.	Not adopted.
No Rebate Test Group	1,000 NMS stocks <i>Rebates and Linked Pricing Prohibited</i> for removing & providing displayed & undisplayed liquidity (except for specified market maker activity). Rule 610(c) cap applies	730 NMS stocks (plus appended Canadian interlisted stocks). No change. No change.
Control Group	Pilot Securities not in a Test Group	No change.

¹⁵⁴ Cboe Letter I, at 5. See also, e.g., Virtu Letter, at 1–2; Nasdaq Letter I, at 12–13. But cf. MFA Letter, at 2 (stating that “regulators should periodically assess market practices and regulations to ensure that U.S. equity markets continue to remain efficient, liquid, fair, resilient and transparent for all market participants”).

¹⁵⁵ See Larry Harris Letter, at 9–10.

¹⁵⁶ See, e.g., Decimus Letter, at 4 (stating that the Pilot “would be valuable in generating concrete information and more preferable to back-of-the-envelope calculations based on questionable assumptions”); Wellington Letter, at 1 (stating that the Commission could only “draw[] definitive conclusions on the impact of existing pricing models . . . through an actual implementation” of the Pilot); Verret Letter I, at 4 (stating that the Commission “appears to have considered adoption of a mandatory rule to reshape market structure, and determined instead to take the more deliberative and less costly approach of an initial pilot program to generate more data from which it can determine a path forward on market structure reform”); IAC Recommendation, at 2; MFA Letter,

at 2; ICI Letter I, at 1–2; RBC Letter I, at 2; Joint Asset Managers Letter, at 2; Clark-Joseph Letter, at 1; Babelfish Letter, at 3; State Street Letter, at 2; Themis Trading Letter II, at 3; IEX Letter I, at 2–3.

¹⁵⁷ Fidelity Letter, at 2. See also, e.g., Brandes Letter, at 1 (expressing support for the Pilot and the “Commission’s effort to shed light into a subject of heated debate among market participants”); Barnard Letter, at 1 (stating that the Pilot was “important, as historically there are many views on this topic, but a paucity of credible data from which to draw conclusions”); Angel Letter II, at 1 (stating that “various commenters have wildly differing perspectives on what will happen under the pilot,” which is “strong evidence as to why the pilot is necessary”).

¹⁵⁸ See, e.g., T. Rowe Price Letter, at 3; Clearpool Letter, at 2. The Commission notes that Nasdaq conducted an independent access fee experiment in 2015, but the limited nature of that experiment makes it difficult to draw conclusions from the data gathered by Nasdaq. See Proposing Release, *supra* note 2, at 13011–12. See also, e.g., IEX Letter III,

at 6 (“Nasdaq’s experiment and its outcomes aren’t a perfect proxy for what is likely to happen in the Transaction Fee Pilot. That experiment was done unilaterally and only in highly-liquid securities.”); Larry Harris Letter, at 9 (noting that Nasdaq’s “experimental fee reduction did not occur at all trading venues that traded the subject securities,” demonstrating that “regulatory action is necessary to establish a common pricing standard because market forces alone will not do it”).

¹⁵⁹ See Section II.A.2 for a discussion of these comments.

¹⁶⁰ See also Section II.A.2 for a discussion of these impacts.

¹⁶¹ See Proposing Release, *supra* note 2, at 13019. The Commission notes that the proposed language in Rule 610T(b)(2)(ii)(E) has been modified slightly. As proposed, Rule 610T(b)(2)(ii)(E) was labeled as “Test Group.” As adopted, the label “Pilot Group” is being substituted for the phrase “Test Group” to provide additional clarity.

¹⁶² See *id.*

3. No Overlap With Tick Size Pilot

While the Commission's proposed Pilot design took into consideration the possibility that the Pilot could have been adopted before the end of the Tick Size Pilot Program, the Commission also noted that the overlap design would not be necessary if that were not the case.¹⁶³

A few commenters opined on the potential overlap between the proposed Pilot and the Tick Size Pilot, disagreeing on whether overlap would be appropriate.¹⁶⁴ However, because the Tick Size Pilot ended on September 28, 2018, there no longer is any need for the Transaction Fee Pilot to control for potential data distortions that could have otherwise resulted from the simultaneous operation of the two pilot programs. Accordingly, the Commission is not adopting the proposed Tick Size Pilot overlap design.

Relatedly, some commenters discussed whether there should be a delay between the end of the Tick Size Pilot and the start of the proposed Transaction Fee Pilot, with commenters disagreeing on that point. For example, one commenter thought a delay would be appropriate to allow markets to normalize before conducting a subsequent pilot¹⁶⁵ while another commenter thought markets would revert to their baseline state extremely quickly after the Tick Size Pilot ends.¹⁶⁶

The Tick Size Pilot concluded, but post-pilot data continues to be collected until April 2, 2019. However, the Transaction Fee Pilot is subject to a one-month implementation period followed by a six-month pre-Pilot Period. Accordingly, the core of the Transaction Fee Pilot will not commence until *after* the post-pilot period for the Tick Size Pilot ends. By then, the Commission believes that the markets will have had sufficient time to normalize and any overlap between the Transaction Fee Pilot's pre-Pilot Period and the Tick Size Pilot's post-pilot period will be minimal. In both cases, the respective pre- and post-pilot periods are collecting benchmark data on the status quo. As such, the overlap between them should not compromise either dataset.

Finally, two commenters recommended that the Commission

analyze the Tick Size Pilot data prior to proceeding with the Transaction Fee Pilot.¹⁶⁷ While preliminary results from the Tick Size Pilot have been made public, the two pilots are sufficiently dissimilar that the Commission sees no reason for delay. The Tick Size Pilot tested a wider minimum increment (from one cent to five cents) for smaller-capitalization stocks, whereas the Transaction Fee Pilot will test a lower rate for the Rule 610(c) fee cap and a prohibition on exchange rebates (which typically are less than one-third of a penny) for stocks of all market capitalizations. Accordingly, findings from the Tick Size Pilot are not relevant to the design of the Transaction Fee Pilot.

4. Stratified Selection of Pilot Securities

The Commission proposed to select the stocks to be included in each of the Test Groups and the Control Group through stratified sampling in a manner that permits comparisons between each Test Group and the Control Group.¹⁶⁸

One commenter expressed support for the proposed approach to stratification and noted that it was "fundamental to the ability to undertake causal inference in this setting"¹⁶⁹ In contrast, a number of public company commenters expressed concern that stratified sampling could result in their stocks being placed in a different Test Group from other similar stocks in their "peer group," which could complicate comparisons of their stock's performance against peer-group metrics.¹⁷⁰ As discussed above, those commenters supported allowing companies to "opt out" of the Pilot, which could impact the stratification.¹⁷¹ Further, as discussed above, some commenters recommended that the Commission select ETPs for the Pilot in a manner that may avoid any potential competitive effects among similar ETPs, either by: (1) Rotating all of the Pilot Securities through the various treatment groups, (2) rotating only ETPs through the various treatment groups, or (3) grouping ETPs with similar underlying holdings into the same treatment group.¹⁷²

While the Commission understands the concerns of these commenters, as discussed above in Section II.B, allowing issuers to opt out of the Pilot could undermine the representativeness of the Pilot's treatment groups and bias

the Pilot's results. Further, also as discussed above in Section II.B, rotating ETPs would require the Commission to implement a more complex and lengthy design in order to maintain sufficient statistical power, both of which would increase the costs and complexity of the Pilot—a result viewed unfavorably by most commenters. Finally, grouping similar ETPs also could negatively impact the stratification of the different treatment groups, particularly if all of the similar ETPs are similar in volume, price, and market capitalization. In turn, this could reduce the quality and usefulness of Pilot's results by inhibiting the ability of researchers to compare treatment groups. In order to ensure that the Pilot Securities are selected in a way that permits researchers to investigate causal connections, it is imperative to stratify the Test Groups so that researchers can study the effects of changes in fees and rebates within each Test Group, between Test Groups, and between a Test Group and the Control Group. In permitting this type of analysis, the Pilot should be better able to inform future policy considerations to improve the operation of the national market system to the benefit of investors and issuers alike. Accordingly, the Commission is adopting the stratified sampling construct as proposed.

5. Number of NMS Stocks Included in Each Test Group

The Commission proposed to include 1,000 Pilot Securities in each Test Group (*i.e.*, 3,000 total across three Test Groups) with the remainder to be included in the Control Group in order to be representative of the overall population of NMS stocks and provide sufficient statistical power to identify differences between the Test Groups with respect to common stocks and ETPs.¹⁷³

Several commenters supported including 1,000 stocks in each Test Group, believing that including 1,000 stocks in each Test Group would facilitate analysis of transaction fees and rebates on a broad cross section of different types of NMS stocks and generate statistically significant conclusions.¹⁷⁴

Many commenters, however, thought that the Pilot should include fewer

¹⁶³ See Proposing Release, *supra* note 2, at 13019–13020 n.117, 13020 (describing the proposed composition of the Tick Size Pilot overlap subgroups). In the Proposal, the Commission specifically solicited comment on whether the Pilot should overlap with the Tick Size Pilot. See *id.* at 13025.

¹⁶⁴ *Cf.*, *e.g.*, Clark-Joseph Letter, at 2 (noting that overlap "certainly would not be a serious impediment"); SIFMA Letter, at 3 (arguing against an overlap).

¹⁶⁵ See Choe Letter I, at 30.

¹⁶⁶ See Healthy Markets Letter I, at 14.

¹⁶⁷ See Choe Letter I, at 29; Nasdaq Letter I, at 4.

¹⁶⁸ See Proposing Release, *supra* note 2, at 13019.

¹⁶⁹ See Spatt Letter, at 3.

¹⁷⁰ See, *e.g.*, Mastercard Letter, at 2; Avangrid Letter, at 2; Energizer Letter, at 1.

¹⁷¹ See *supra* Section III.C.4.

¹⁷² See *supra* Section III.C.3.b.

¹⁷³ See Proposing Release, *supra* note 2, at 13019–20.

¹⁷⁴ See Brandes Letter, at 2; Themis Trading Letter I, at 3; Oppenheimer Letter, at 2; Spatt Letter, at 2; IEX Letter I, at 5; Verret Letter I, at 4; AGF Letter, at 2; MFA Letter, at 3.

securities in each Test Group.¹⁷⁵ Several of these commenters believed the Pilot could obtain statistically significant data even with fewer stocks in each Test Group.¹⁷⁶ Other commenters urged the Commission to reduce the number of securities included in the Test Groups in order to reduce costs associated with the Pilot.¹⁷⁷ Several commenters argued that the Pilot was effectively a large scale change to the current equity market structure and that it would be more appropriate for a pilot program to apply to a smaller percentage of the universe of NMS stocks.¹⁷⁸ Further to this point, several commenters believed that a large Pilot may be difficult to unwind, with one commenter stating that an immediate return to current transaction fee and rebate dynamics for stocks included in the Test Groups “could prove to be more disruptive to market participants and overall market quality than the actual implementation of the Pilot.”¹⁷⁹ Some commenters also believed the Pilot would negatively impact trading in the stocks placed in certain Test Groups, such as by adversely impacting spreads, and accordingly recommended including fewer stocks so as to limit potential negative consequences.¹⁸⁰ Of the commenters that advocated for reducing the number of Pilot Securities in each Test Group, some suggested alternative amounts to be included. Several commenters recommended including 100 stocks in each Test Group.¹⁸¹ A few others suggested that each Test Group include 500 stocks.¹⁸² One commenter recommended “a more tailored Pilot that includes the 225 most heavily traded names, 225 mid-cap stocks, 225 small caps and 225 ETFs would provide

statistically significant data without burdening a material portion of the market.”¹⁸³ The Commission has carefully considered the concerns expressed by commenters regarding the size of the Pilot’s Test Groups.¹⁸⁴ As previously discussed, the Commission cannot know in advance the full effects of the Pilot, whether they be positive or negative. Indeed, commenters expressed a variety of contradicting viewpoints and estimations about the potential impacts of the Pilot on the execution quality and market quality of NMS stocks that would be included in the Test Groups.¹⁸⁵

Given this uncertainty, it is crucial that the Pilot be able to produce results that are capable of facilitating an empirical review of the effect of the prevailing fee structures on the equities markets. To achieve this purpose, the Pilot needs to generate a sufficient number of observations over its one-year duration to obtain sufficient statistical power to identify differences among the Test Groups with respect to common stocks and ETPs, thereby permitting researchers to investigate causal connections using economic analysis capable of finding statistical significance. Statistical power refers to the ability for statistical tests to identify differences across samples when those differences are indeed significant and broadly is derived from the number of observations during a study. In other words, statistical power can be present when observing a limited number of subjects over a long period of time or a large number of subjects over a shorter period of time. Because the Commission desires a shorter duration for the Pilot, it therefore needs to have sufficient observable data points over the shorter pilot duration. Accordingly, if the Pilot does not contain enough securities, it may be incapable of producing statistically sound results and will not allow researchers to analyze differences in securities.

With statistical power and a sufficiently large sample size, researchers can conduct analysis of what impact (1) reductions in fees and (2) reductions in or prohibitions on rebates might have, if any, on stocks depending on their trading volume or market capitalization. A pilot design that would not provide this meaningful data about the impact that billions of dollars of exchange fees and rebates may have on the markets and market

structure, would not achieve the Commission’s goal of conducting a pilot capable of facilitating an objective empirical view to advance that debate.

To achieve these aims, using econometric methods designed to allow researchers to detect a 10% change with a standard confidence level of 95%, the Commission has determined that 730 securities in each Test Group are needed to enable the Pilot to produce statistically meaningful results capable of informing the Commission’s future policymaking efforts. The Commission believes that a 10% change in behavior represents an economically meaningful change that will facilitate analysis of the Pilot’s results, and therefore is an appropriate standard for the Pilot.¹⁸⁶ The determination to include 730 securities in each Test Group accounted for the need to obtain statistically significant results among stocks of various liquidity profiles as well as ETPs. While the number of NMS stocks that will be included in each Test Group will be larger than what was recommended by some commenters, the Commission believes that a smaller number of stocks may not have sufficient statistical power given the Pilot’s proposed duration.¹⁸⁷

Furthermore, in response to comments questioning why the Pilot included more securities than did the Tick Size Pilot, the Commission notes that the Tick Size Pilot featured 400 corporate stocks for each of its Test Groups.¹⁸⁸ Importantly, the Tick Size Pilot did not contain ETPs or large-cap stocks. In comparison, the Transaction Fee Pilot will contain ETPs and large-cap stocks. Accordingly, in light of the significantly higher number of securities eligible for inclusion, the Transaction Fee Pilot needs to include considerably more Pilot Securities than did the Tick Size Pilot, while continuing to achieve the same statistical power for each of those groups of securities.

Moreover, while several commenters either implicitly or explicitly referenced the EMSAC recommendation to include 100 stocks in each Test Group, EMSAC’s recommendation differs substantially from the Commission’s proposal. Notably, the EMSAC recommendation was limited to common stocks with a

¹⁸⁶ A confidence level of 95% is a standard accepted confidence level in statistical analyses. See, e.g., William H. Greene, *Econometric Analysis* 1033 (Appendix C.6) (6th ed. 2007) (discussing standard confidence levels in academic research).

¹⁸⁷ See also note 695 *infra*.

¹⁸⁸ See, e.g., Citadel Letter, at 6; TD Ameritrade Letter, at 2; Cboe Letter I, at 27. See also Securities Exchange Act Release No. 74892 (May 6, 2015), 80 FR 27514, 27517 (May 13, 2015) (File No. 4–657) (order approving the National Market System Plan to Implement a Tick Size Pilot Program).

¹⁷⁵ See Magma Letter, at 3; FIA Letter, at 4; SIFMA Letter, at 4; Schwab Letter, at 2; Fidelity Letter, at 8–9; Citadel Letter, at 2; State Street Letter, at 3; Citi Letter, at 5; Clearpool Letter, at 7; TD Ameritrade Letter, at 1; STA Letter, at 3–4; STANY Letter, at 3; Nasdaq Letter I, at 10; Cboe Letter I, at 27; T. Rowe Price Letter, at 4; Mastercard Letter, at 2; NorthWestern Letter, at 1; Energizer Letter, at 1; Era Letter, at 1; Knight-Swift Letter, at 2; ASA Letter, at 4–5.

¹⁷⁶ See Magma Letter, at 3; Schwab Letter, at 2; Fidelity Letter, at 8–9; Clearpool Letter, at 7; STA Letter, at 3–4; Cboe Letter I, at 27.

¹⁷⁷ See SIFMA Letter, at 4; Schwab Letter, at 2; Citadel Letter, at 6; Citi Letter, at 5.

¹⁷⁸ See Magma Letter, at 3; FIA Letter, at 4; Citi Letter, at 5; Clearpool Letter, at 7; Nasdaq Letter I, at 10.

¹⁷⁹ See Citadel Letter, at 6. See also SIFMA Letter, at 4; Citi Letter, at 5.

¹⁸⁰ See STA Letter, at 3; STANY Letter, at 3; State Street Letter, at 3; TD Ameritrade Letter, at 1, 3; Mastercard Letter, at 2.

¹⁸¹ See FIA Letter, at 4; Schwab Letter, at 2; State Street Letter, at 3; STANY Letter, at 3; Era Letter, at 1; Cboe Letter I, at 27.

¹⁸² See SIFMA Letter, at 4; Citi Letter, at 5; STA Letter, at 3.

¹⁸³ See T. Rowe Price Letter, at 4.

¹⁸⁴ See *supra* notes 175–183 and accompanying text.

¹⁸⁵ See, e.g., *supra* notes 75–93 and accompanying text.

market capitalization above \$3 billion and did not include ETPs, mid- and small-cap stocks, or other types of NMS stocks. In order for the Pilot to permit a broader empirical review of the impact of transaction fees and rebates on order routing, execution quality, and market quality, it is critical that the sample size be representative of the population of NMS stocks for which exchange transaction fees and rebates are economically meaningful. The Pilot must contain enough securities to achieve the statistical power necessary to permit closer analysis of the Pilot's results in order to identify differences in order routing behavior, market quality, and execution quality among subgroups of NMS stocks (e.g., ETPs, or tiers of common stock).

6. Reduction to the Pilot Size

To respond to commenters' concerns with the size of the Pilot, including a recommendation from the SEC's Investor Advisory Committee, the Commission has determined to eliminate one Test Group and reduce the number of stocks in each Test Group to 730.

In order to materially reduce the size of the Pilot without sacrificing statistical power, the Commission has determined to: (1) Only place Pilot Securities in a Test Group if, at the time of selection, they trade 30,000 shares or more per day on average and (2) eliminate a Test Group.

With respect to securities that trade fewer than 30,000 shares per day, assuming, at an extreme, that such security trades 100% of its volume on a maker-taker exchange paying a \$0.0030 rebate, then it would generate \$100 in rebates per day. In addition, for thinly-traded stocks with wider spreads, the rebate would be less impactful as it would represent a smaller percentage of the quoted spread. This amount of rebates would be economically insignificant and would be unlikely to impact order routing behaviors of broker-dealers. In addition, this level of trade volume makes it unlikely to produce sufficient statistical power to analyze the securities in isolation because the variability in their quoting and trading characteristics renders it unlikely the Pilot would generate a sufficient number of observations given the Pilot's proposed duration. In addition, for commenters that believe that thinly-traded stocks need rebates to narrow their quoted spreads, excluding these securities from the Pilot will allow exchanges to continue to apply their current fee schedules to them, which will provide another point of reference to analyze when comparing these

securities to those with slightly higher trading volumes.

Finally, the Commission believes that eliminating one Test Group and functionally combining proposed Test Group 1 and Test Group 2 into a new Test Group with a \$0.0010 cap will result in decreasing the number of NMS stocks included in a Test Group in the Pilot by one-third, which is integral in reducing the overall size of the Pilot by more than one-half. The Commission believes this material reduction directly responds to commenters' concerns, while still providing the Pilot with a meaningful group in which to test a reduced fee cap and a prohibition on rebates and Linked Pricing.

Accordingly, the Commission believes that the Pilot's design of 730 NMS stocks per Test Group strikes an appropriate balance by reducing the number of stocks in each Test Group and thus mitigating the concerns of commenters about potential detrimental impacts that could be caused by the proposed larger size of the Pilot,¹⁸⁹ without undermining the ability to obtain useful data to study the impact of changes to transaction fees and rebates on order routing behavior, execution quality, and market quality for a broad spectrum of stocks. It also is large enough to accommodate drop offs among Pilot Securities (e.g., due to mergers, bankruptcies, or stocks closing below \$1).¹⁹⁰

7. Fee Cap Test Groups

The Commission proposed that for Pilot Securities in Test Group 1, equities exchanges could neither impose, nor permit to be imposed, any fee or fees for the display of, or execution against, the displayed best bid or offer of such market in NMS stocks that exceeds or accumulates to more than \$0.0015 per share.¹⁹¹ The level proposed for Test Group 2 was \$0.0005 per share.¹⁹²

After careful consideration of the comments received, which are discussed below, the Commission is eliminating Test Group 2 and adopting a revised Test Group 1 with a \$0.0010 cap.

a. Fee Cap Level

Commenters disagreed about the appropriateness or justification for the proposed fee cap levels.¹⁹³ For example,

¹⁸⁹ See *supra* notes 175–180 and accompanying text.

¹⁹⁰ See Proposing Release, *supra* note 2, at n. 102.

¹⁹¹ See Proposed Rule 610T(a)(1). See also Proposing Release, *supra* note 2, at 13021–22.

¹⁹² See Proposed Rule 610T(a)(2). See also Proposing Release, *supra* note 2, at 13022.

¹⁹³ See Choe Letter I, at 16 (stating that the Proposing Release “does nothing to justify how the

one commenter stated that “exchanges currently compete on fees by offering a range of access fees and rebates within the confines of the current \$0.0030 access fee cap” but the fee caps in Test Groups 1 and 2 “will reduce the exchanges' ability to compete on fees by 50% in Test Group 1” and “83% in Test Group 2” which could be “to the detriment of investors and the public interest.”¹⁹⁴ In contrast, regarding proposed Test Group 1, another commenter stated that “[a]t 15 mils, there is still room for significant fee differentiation and rebates remain sizeable.”¹⁹⁵

With respect to Test Group 2, one commenter stated that “[i]f the ultimate intent of the proposal is to determine whether or not reducing access fees will have an effect on how brokers route their customers' orders, then we fully support the notion of Test Group 2 to see if the incentive to avoid access fees is eliminated with a 5 cents per 100 share cap.”¹⁹⁶ Another commenter further stated that “to the extent that rebates have been traditionally funded by exchanges by the fees collected,” then Test Group 2 “may lead to rebate reductions” and obtaining data on this point is “part of the reason why a study is needed.”¹⁹⁷

Finally, the Investor Advisory Committee recommended that the Commission structure the Pilot's Test Groups “as simply as possible,” and was not persuaded that, in addition to having the no-rebate Test Group, having two additional Test Groups with separate fee caps “will generate enough additional information to justify the additional effort.”¹⁹⁸ Accordingly, the Investor Advisory Committee recommended that the Commission consider having, in addition to the no-rebate Test Group, only one Test Group with a fee cap and suggested a cap of \$0.0010.¹⁹⁹

The Commission appreciates the recommendation of the Investor Advisory Committee and agrees with it. As noted above and further discussed below, eliminating Test Group 2 will decrease the size of the Pilot by one-

“\$0.0015 and \$0.0005 fee cap levels are appropriate” and that lowering the current fee cap “without meaningful discussion or justification is concerning and inappropriate”); Morgan Stanley Letter, at 1. *But cf.* Healthy Markets Letter I, at 15–16 (stating that the fee caps for Test Groups 1 and 2 “appear to be well-justified”).

¹⁹⁴ See Choe Letter I, at 16–17.

¹⁹⁵ See Credit Suisse Commentary, at 3.

¹⁹⁶ See T. Rowe Price Letter, at 2.

¹⁹⁷ See Healthy Markets Letter I, at 15–16.

¹⁹⁸ IAC Recommendation, at 1.

¹⁹⁹ See *id.* For other commenters suggesting a \$0.0010 fee cap, see Goldman Sachs Letter and NYSE Letter III.

third. New Test Group 1 will have a cap of \$0.0010, which adopts the Investor Advisory Committee's recommendation and represents a blended average of the two fee caps the Commission originally proposed.

The Commission believes that new Test Group 1 retains the equities exchanges' ability to compete through differing fees and rebates, as a fee cap of \$0.0010 provides exchanges with an opportunity to utilize various fee and rebate structures to compete for order flow. As some commenters noted, the current access fee cap was set thirteen years ago and may represent an outsized portion of transaction costs in light of the technological efficiencies achieved by the equities markets in the last decade.²⁰⁰

As revised, new Test Group 1 will facilitate an analysis of the extent to which exchanges reduce rebates from their current levels as a result of a materially reduced cap on the fees used to subsidize those rebates, and the impact of a reduced fee and rebate level on order routing behavior, execution quality, and market quality. In addition, by materially reducing the fee cap, the Commission believes that new Test Group 1 will provide useful data on the extent to which current exchange fee levels (bounded by the current access fee cap) serve as a disincentive to take liquidity on an exchange. Obtaining useful information to better understand the potential impact of a significantly reduced access fee cap will ultimately be beneficial to investors and the public interest, as it may help illuminate the extent to which the current fees and rebates effect the market and the extent to which those effects have a detrimental impact on investor transaction costs.

b. Applicability to Depth-of-Book and Non-Displayed Liquidity

As proposed, Test Groups 1 and 2 were designed to isolate and test a reduction in the Rule 610(c) fee cap, with all else remaining unchanged. In the Proposing Release, the Commission asked whether commenters thought the fee caps in Test Groups 1 and 2 also should apply to depth-of-book and undisplayed liquidity.²⁰¹ One commenter recommended that it should.²⁰²

In the Proposing Release, the Commission stated that it preliminarily believed it was unnecessary for the fee cap Test Groups to apply to depth-of-

book and undisplayed liquidity because it would be highly unlikely for an exchange to begin charging *more* to access non-displayed interest or depth-of-book quotes (compared to displayed interest), as it would lead to uncertainty for market participants that remove liquidity because they typically would not be able to know in advance or control with absolute certainty whether they interact with non-displayed interest or depth-of-book quotes.²⁰³ The Commission continues to believe it would be unlikely that either maker-taker or taker-maker exchanges would begin charging differing fees in such a manner.²⁰⁴ Furthermore, the Commission notes that the Rule 610(c) access fee cap does not currently apply to non-displayed interest or depth-of-book quotes. Introducing a new variable into the fee cap Test Groups would make it more difficult to isolate the effects of a particular change and uncover causal connections. Accordingly, for the reasons noted above and discussed in the Proposing Release, the Commission is not adopting this suggestion.²⁰⁵

c. Prohibiting Rebates and Linked Pricing in Test Groups 1 and 2

In Test Groups 1 and 2 the Commission did not propose to cap the level of rebates, prohibit rebates, or prohibit Linked Pricing, the latter two of which it proposed to do in the no-rebate Test Group as discussed below.²⁰⁶ In response, several commenters advocated for applying restrictions on rebates to the fee cap Test Groups, primarily in reaction to the potential for exchanges to subsidize their rebates at or near current levels from sources other than transaction fee revenue.²⁰⁷ For example, one commenter stated that "[t]here is already ample evidence to suggest that some exchanges currently use revenues from other sources to subsidize their order routing incentives, including rebates," such that the proposed fee caps may have no impact on the level of rebates paid for Pilot Securities in the

fee cap Test Groups.²⁰⁸ This commenter therefore suggested that the fee cap Test Groups include two subgroups, one as proposed, and a second that would prohibit rebates and Linked Pricing (and also apply to depth-of-book and non-displayed liquidity).²⁰⁹

The Commission has carefully considered these comments and has determined not to adopt these additional restrictions. While adding more variables or more Test Groups to the Pilot could produce informative results, it would directly complicate the Pilot's design thus raising the Pilot's costs and burdens. For example, if the Commission were to add subgroups to new Test Group 1 to prohibit rebates, it likely would have to expand the number of stocks included in the treatment groups or expand the duration of the Pilot in order to achieve statistical power.²¹⁰ It also would further complicate exchange fee schedules and could lead to more variability in exchange fees if exchanges customized their pricing differently for each Test Group and subgroup. Rather, the Pilot's design represents a comparatively simple construct that is easier to implement and manage and yet should still facilitate the Commission's ability to analyze the impact of fees and rebates on order routing behavior, execution quality, and market quality. Achieving these goals, while minimizing complexity and burdens, will also assist the Commission as it considers potential future policy initiatives informed by the results of the Pilot.

In addition, the fee cap Test Groups were specifically selected to provide the exchanges with the continued ability to offer rebates, should they so choose, albeit at lower levels, without impacting an exchange's ability to maintain its net profit on a per transaction basis. The Commission declines to prohibit rebates in new Test Group 1 as doing so would go beyond the construct and application of the Rule 610(c) fee cap by introducing additional variables, and thus would distinctly alter the status quo in that Test Group, thereby complicating the analysis in that treatment group.

Lastly, the Commission continues to believe that it is unlikely that exchanges will offer rebates at their current levels for Pilot Securities in new Test Group 1 because exchanges will need to charge lower offsetting transaction fees in that group in order to maintain a profitable

²⁰³ See Proposing Release, *supra* note 2, at 13023 n.136–37 and accompanying text.

²⁰⁴ In the Proposing Release, the Commission acknowledged that there were three exchanges that charged different fees for displayed and non-displayed liquidity. See *id.* Currently, there are two, IEX and NYSE American. The Commission notes that the differences in fees are minimal and because a small portion of exchanges have chosen to adopt this fee structure to date, it is unlikely a significant portion will choose to do so.

²⁰⁵ See Proposing Release, *supra* note 2, at 13022–23.

²⁰⁶ See Section II.C.6.d. *infra*. See also Proposing Release, *supra* note 2, at 13021–24.

²⁰⁷ See CFA Letter, at 6; Clearpool Letter, at 2–3; Healthy Markets Letter I at 27–29.

²⁰⁸ See Healthy Markets Letter I, at 28.

²⁰⁹ See *id.* at 16.

²¹⁰ See *supra* Section II.C.5 discussing the need to generate a sufficient number of observations over the Pilot's duration to permit researchers to investigate causal connections using economic analysis capable of finding statistical significance.

²⁰⁰ See Citi Letter, at 1–2; Goldman Sachs Letter, at 2.

²⁰¹ See Proposing Release, *supra* note 2, at 13025.

²⁰² See Clearpool Letter, at 3 n.6.

pricing model. However, the Commission also recognizes, as did commenters, that it is possible that the exchanges may choose to subsidize rebates in Test Group 1 from other sources of revenue, which could result in rebates exceeding the fee cap in that group. Whether and to what extent that would occur in practice would be an important result in new Test Group 1, and so the Commission believes the Pilot should be structured so as not to preclude that possible result. The Commission will closely monitor the fees charged by the exchanges for non-transaction services during the Pilot and will consider the Pilot's impact on such fees.

d. No-Rebate Test Group

The Commission proposed that for Pilot Securities in Test Group 3, equities exchanges generally would be prohibited from offering rebates, either for removing or posting liquidity, and from offering Linked Pricing, which, as discussed further below, is defined as a discount or incentive on transaction fee pricing applicable to removing (or providing) liquidity that is linked to providing (or removing) liquidity.²¹¹ In addition, Test Group 3 would be unique in that its restrictions would apply not only to displayed top-of-book²¹² liquidity, but also would apply to depth-of-book²¹³ and undisplayed liquidity.²¹⁴ Transaction fees for securities in Test Group 3 would remain subject to the current \$0.0030 access fee cap in Rule 610(c) for accessing a protected quotation.

After careful consideration of the comments received on Test Group 3, discussed below, the Commission is adopting Rule 610T(a)(3) as proposed, though it is being renamed as "Test Group 2" since the Commission has reduced the number of Test Groups from three to two.

²¹¹ See Proposed Rule 610T(a)(3); Proposing Release, *supra* note 2, at 13022–24.

²¹² "Top-of-book" means the aggregated best bid and best offer resting on an exchange; in other words, aggregate interest that represents the highest bid (to buy) and the lowest offer (to sell). See 17 CFR 242.600(b)(7) (defining "best bid" and "best offer").

²¹³ "Depth-of-book" refers to all resting bids and offers other than the best bid and best offer; in other words, all orders to buy at all price levels less aggressive than the highest priced bid (to buy) or all offers to sell at all price levels less aggressive than the lowest priced offer (to sell). See 17 CFR 242.600(b)(8) (defining "bid" and "offer").

²¹⁴ "Undisplayed" refers to resting orders that are "hidden" and not displayed publicly in the consolidated market data. See 17 CFR 242.600(b)(13) (defining "consolidated display") and (b)(60) (defining "published bid and published offer").

e. Prohibiting Rebates

While there was significant disagreement among commenters on this aspect of the Pilot, most commenters supported a "no rebate" group as they believed it was critical to fully examine the effect that transaction fees and rebates have on order routing behavior, execution quality, and market quality.²¹⁵

In contrast, several commenters opposed prohibiting equities exchanges from paying rebates. Specifically, three of the four exchange commenters asserted that it would inhibit the ability of exchanges to compete with off-exchange trading venues.²¹⁶ In addition, these three commenters, together with other commenters, expressed concerns that prohibiting exchanges from paying rebates to liquidity providers would widen the quoted bid-ask spread on exchanges, which could raise costs on investors.²¹⁷ Several of these commenters believed that eliminating rebates for "less-liquid" or "small and medium sized companies" would disproportionately impact the quoted spreads for such stocks as they believed that rebates are a more significant incentive to provide liquidity for less actively traded securities.²¹⁸ Other commenters also expressed concerns that spreads would widen for ETPs, specifically less liquid ETPs, if rebates were prohibited or significantly reduced.²¹⁹

The Commission is aware of the potential for adversely impacting

²¹⁵ See, e.g., Joint Asset Managers Letter, at 1; Clark-Joseph Letter, at 2; Brandes Letter, at 1; CII Letter, at 3; Themis Trading Letter I, at 3; AJO Letter, at 3; OMERS Letter, at 2; Copeland Letter, at 2; ICI Letter I, at 3; Nuveen Letter, at 2; SIFMA Letter, at 3–4; Better Markets Letter, at 2, 5; RBC Letter I, at 3; Vanguard Letter, at 2–3; Fidelity Letter, at 9; Invesco Letter, at 2; CFA Letter, at 4; MFS Letter, at 2; Wellington Letter, at 2; Joint Pension Plan Letter, at 2; Citi Letter, at 2; Oppenheimer Letter, at 2; Clearpool Letter, at 2; Spatt Letter, at 2; Capital Group Letter, at 3; Healthy Markets Letter I, at 17; IEX Letter I, at 5; Verret Letter I, at 4; Norges Letter, at 2; AGF Letter, at 1; Decimus Letter, at 3; JPMorgan Letter, at 3.

²¹⁶ See Cboe Letter I, at 7, 15–16; NYSE Letter I, at 3–6; Nasdaq Letter I, at 7–8. See also, e.g., Mastercard Letter, at 1–2; Capital Group Letter, at 3; Magma Letter, at 2; FIA Letter, at 4.

²¹⁷ See, e.g., Cboe Letter I, at 7; Nasdaq Letter I, at 9; NYSE Letter I, at 6; Magma Letter, at 2; State Street Letter, at 3; Morgan Stanley Letter, at 4; Cboe Letter II, at 4–7. See also Nasdaq Letter III, at Exhibit A (providing graphs using data from September 2018 on average quoted spread across exchanges in S&P 500 stocks and time at the best quote across those stocks). *But cf.* Larry Harris Letter, at 6–9 (acknowledging that "quoted spreads are narrower under maker-taker pricing," but opining that "the narrower quoted spreads do not benefit the public").

²¹⁸ See, e.g., Nasdaq Letter I, at 9; NYSE Letter II, at 11; RBC Letter I, at 5; Nasdaq Letter III.

²¹⁹ See, e.g., Virtu Letter, at 7; Schwab Letter, at 3; State Street Letter, at 2.

smaller capitalization securities, however, the Commission does not agree with the commenters that believe that the Pilot necessarily will result in such harm, or if there are adverse effects in the trading of all or some portion of smaller capitalization securities, that the net effect across securities will be negative. Rather, the Commission agrees with the many commenters who believed that it is unclear what the ultimate net impact of a no-rebate Test Group will be on quoted spreads and trading costs for NMS stocks of different market capitalizations and trading characteristics.²²⁰ The purpose of the Pilot is to generate results that can offer data-driven insight on these questions as a basis for possible future policy making in this area. As discussed elsewhere, the revised Pilot has excluded securities that trade fewer than 30,000 shares per day, as they are less likely to provide actionable data.

This lack of empirical clarity is reflected in the divergent views of commenters who offered conflicting predictions of the outcome of a no-rebate Test Group. For example, one commenter questioned whether rebates were necessary to attract displayed liquidity, opining that "[p]ublic data shows that inverted and flat-fee exchanges often have quotes on both sides of the NBBO, which shows that market participants are willing to pay these exchanges to post quotes at the NBBO based on their intrinsic desire to trade and not just in response to an exchange rebate"²²¹ (emphasis in original). In response, one exchange commenter suggested that Cboe EDGA Exchange, which does not pay rebates, has wider spreads for displayed liquidity as compared to Cboe EDGX Exchange, which does pay rebates for posting liquidity.²²² A different commenter did not "anticipate a material widening for the most liquid names (where rebates aren't necessary to incentivize liquidity providers) or the most illiquid names (where rebates aren't sizable enough to incentivize liquidity providers)," and instead anticipated "a likely outcome of increased spreads for the middle tier of

²²⁰ See, e.g., Decimus Letter, at 5 (observing that "claims on the existence of unambiguous harm to liquidity appear to be exaggerated and driven by preconceived notions"). See also Section IV *infra* (discussing the uncertainty of the Pilot's outcomes).

²²¹ IEX Letter II, at 7.

²²² See NYSE Letter II, at 2. One commenter questioned NYSE's analysis in this regard, noting that in general EDGA's volume is limited to "the most liquid names." This commenter stated that NYSE "distorts the real likely impact of the [P]ilot" by including spreads on less liquid securities. See Mulson Letter II, at 2.

securities, where rebates have perhaps kept spreads artificially narrow.”²²³

Another commenter believed that quoted prices are “almost always set by natural investors” and therefore, “[r]emoving rebates will not disrupt the desire of natural investors to post liquidity and tighten spreads.”²²⁴ In response, one commenter was “skeptical” about this and stated that “it is not realistic for the buy-side to be continuously active on both sides of the market across all stocks impacted by the Transaction Fee Pilot.”²²⁵ That said, another commenter, which also is a listed issuer, stated that it did not “expect that a reduction or outright removal of rebates will have any significant or harmful effects on the quality of prices displayed in the public lit market, interfere with genuine liquidity and price formation, or negatively impact [its] stock’s trading volume, spread or displayed size.”²²⁶

The Commission believes that the significant disagreement among commenters on the potential impacts of prohibiting rebates demonstrates the need to include a no-rebate bucket in the Pilot. For example, it is unclear what effect—if any—the payment of a rebate has on a stock that trades over 10 million shares per day with an average natural quoted spread width constrained by the minimum trading increment of \$0.01. Likewise, it is unclear what effect—if any—the payment of a rebate has on a stock that trades less than 100,000 shares per day with an average quoted spread of \$0.10 or more. In either case, the absence of rebates may have little or no effect on quotes or competition for natural order flow in such securities. Data is needed to empirically evaluate commenters’ diverging views of the effect of rebates. The Pilot is designed to produce this and other data.

By prohibiting rebates in one Test Group the Pilot should produce results that facilitate a direct study of the effect of rebates, including on fees, order routing, execution quality, and market quality.²²⁷ The Commission believes that the no-rebate Test Group will provide useful information on trading in the absence of rebates that will facilitate a data-driven approach to better understand the role and effect of rebates in our current market structure. The results generated by this Test Group will

allow researchers to study the relationship between rebates and quoted spreads for stocks of varying liquidity profiles and market capitalizations. It also will allow market participants to directly test with their own order flow whether, in the absence of rebates in the most actively traded stocks, they are better able to compete for queue priority and thereby capture the quoted spread when posting liquidity.²²⁸ Therefore, the Commission continues to believe that the Pilot will be substantially more informative with a no-rebate bucket and the value of generating that information to inform the Commission’s consideration of the effect of exchange transaction fee models justifies proceeding with the Pilot to better inform both sides of the rebate debate with data to test their hypotheses.

In summary, the Commission has carefully considered commenters’ suggested alternatives and whether to include the no-rebate feature in the Pilot, and in light of the important regulatory purpose the Pilot is designed to achieve, the Commission has determined that, for the reasons discussed throughout, it is important to have a Test Group that specifically focuses on the removal of rebates and the corresponding impact on conflicts of interest, execution quality, and market quality.

Finally, one commenter asserted that banning rebates “presents [a] misapplication of Rule 610(c)” because the Commission has never before banned rebates.²²⁹ While neither Rule 610(c), nor any other Commission rule, currently prohibits a national securities exchange from paying a rebate to provide or remove liquidity, the Commission does not believe that the no-rebate Test Group misapplies Rule 610(c), or any other rule. The no-rebate Test Group is not based on or related to Rule 610(c). Rule 610(c) caps fees for removing a protected quotation, whereas the no-rebate Test Group does not further limit fees and instead prohibits rebates, among other things. Indeed, the Rule 610(c) fee cap continues to apply—unchanged and in its entirety—to the no-rebate Test Group.

The data generated by the Pilot will help empirically assess, in light of changing market conditions, whether the existing transaction-based fee and rebate structure continues to further the

statutory goals.²³⁰ Importantly, while exchanges would retain the ability to charge transaction fees as high as the current \$0.0030 cap in the no-rebate Test Group, they would no longer need to charge transaction fees at levels priced to offset the rebates they formerly paid. Accordingly, the no-rebate Test Group is intended to test, within the current Regulation NMS regulatory structure, natural equilibrium pricing for transaction fees.

f. Application to Depth-of-Book and Non-Displayed Liquidity

Several commenters supported applying the prohibition on rebates in the no-rebate Test Group to depth-of-book and non-displayed liquidity as they believed it would avoid the risk that the Pilot’s results could be subject to distortions if exchanges continue to offer rebates for depth-of-book and non-displayed liquidity.²³¹ In contrast, two exchange commenters opposed this aspect of the proposal. One characterized this aspect of the proposal as an “unjustified pricing restriction[.]” that was part of a “new regulatory scheme”²³² The other argued that “[t]he Proposal lacks internal coherence” in that it excludes ATSS “because they do not have protected quotes, but then includ[es] unlit exchange orders that also are unprotected.”²³³

For the reasons stated in the Proposing Release, the Commission continues to believe that allowing exchanges to continue to offer rebates in the no-rebate Test Group for depth-of-book and non-displayed orders could substantially distort the Pilot results.²³⁴ The no-rebate Test Group is designed to test the absence of exchange transaction rebates. It would weaken the Pilot’s results to prohibit rebates on displayed orders but allow them on non-displayed orders, as the Pilot would not be able to collect data on what would happen in the absence of rebates. Only by prohibiting the payment of all rebates in one Test Group will the Commission be able to gather data on a pure “no rebate” environment, thereby facilitating a direct observation of the impact of rebates on order routing behavior, execution quality, and market quality

²³⁰ For example, if take fees are set at levels to subsidize maker rebates, and if those rebates have little or no impact on quoted spreads of certain NMS stocks, then the take fees on trades in those stocks may constitute a tax on takers of liquidity without a corresponding benefit to the market.

²³¹ See, e.g., Clark-Joseph Letter, at 2; Clearpool Letter, at 3 n.6; Healthy Markets Letter I, at 18; IEX Letter I, at 7.

²³² NYSE Letter I, at 12.

²³³ Nasdaq Letter I, at 6.

²³⁴ See Proposing Release, *supra* note 2, at 13023.

²²³ Citi Letter, at 3–4. See also Credit Suisse Commentary, at 3.

²²⁴ See Mulson Letter I, at 1. See also IEX Letter II, at 6.

²²⁵ NYSE Letter II, at 11.

²²⁶ See T. Rowe Price Letter, at 5.

²²⁷ See Proposing Release, *supra* note 2, at 13022–23.

²²⁸ See, e.g., T. Rowe Price Letter, at 2; Brandes Letter, at 1–2; Babelfish Letter, at 2.

²²⁹ See Cboe Letter I, at 12–13. See also Section II.G (responding to comments regarding the Commission’s legal authority to conduct the Pilot).

when compared to the other Test Group and Control Group.

As noted above, the Commission received a significant number of comments in support of directly studying the effects of prohibiting rebates.²³⁵ In order to avoid the potential distortion from a too-narrowly-tailored Test Group that focuses only on one type of rebate but ignores another, the Commission believes that prohibiting rebates on all exchange volume—including depth-of-book and non-displayed liquidity—is necessary to generate the most useful Pilot results on the effect of exchange transaction rebates broadly.

In addition, the Commission believes that the no-rebate Test Group's application to depth-of-book and non-displayed orders is consistent with the Commission's decision to exclude ATSS, which do not have protected quotes.²³⁶ As discussed above, ATSS are excluded from the Pilot based on a number of reasons, including the materially different treatment of exchange fees under the current federal securities laws and their lack of a protected quotation. With respect to the no-rebate Test Group, it would be incoherent for the Commission to purport to test a prohibition on exchange transaction-based rebates but do so only for some rebates (*i.e.*, on displayed interest) while ignoring the potential for exchanges to pay rebates on non-displayed liquidity and depth-of-book interest.²³⁷ The possibility that an exchange could offer rebates for non-displayed and depth-of-book quotes, while eliminating them on displayed interest, could present a loophole with the potential to undermine the design of the no-rebate Test Group and distort the Pilot results for the no-rebate Test Group, rendering the results of the Pilot's "no-rebate" Test Group incapable of speaking to the impact of rebates.

g. Maintaining Rule 610(c) Access Fee Cap

Two commenters recommended that, unlike Rule 610(c), the no-rebate Test Group go beyond Rule 610(c) to also prohibit exchanges from charging fees in excess of \$0.0030 to provide displayed liquidity.²³⁸ As noted in the Proposing Release, the no-rebate Test Group is designed specifically to test, within the

current regulatory structure, natural equilibrium pricing for transaction fees in an environment where exchange transaction-based rebates are prohibited.²³⁹ While this would theoretically allow an exchange to charge fees in excess of \$0.0030 to provide liquidity, the Commission notes that several exchanges stated that one of the perceived benefits in providing rebates to liquidity providers is that it facilitates narrower spreads and therefore believes it is unlikely exchanges would charge such higher fees during the Pilot.²⁴⁰

One commenter expressed concerns that the no-rebate Test Group would "provide exchanges with the flexibility to propose a variety of new fee structures for liquidity-taking orders," which could create new conflicts for brokers routing customer orders.²⁴¹ Accordingly, this commenter believed that the no-rebate Test Group should instead impose a fee cap of \$0.0002, where the expectation would be that rebates would be lowered to a *de minimis* amount and the Pilot would be more symmetrical and thereby more effective in analyzing broker order routing practices.²⁴² The Commission continues to believe that in light of the current debate surrounding the potential conflict of interest posed by the payment of rebates and potential effects they may have on the markets, including the many comments received in response to the Proposal, the Pilot will be substantially more informative with a no-rebate bucket than a bucket that dramatically lowers the fee cap assuming that rebates would follow. While reducing the fee cap to \$0.0002 would reduce the likelihood that an exchange would offer rebates at current levels (assuming the exchange desired to fund transaction-based rebates only through transaction-based fees), exchanges would retain the ability to pay rebates and could subsidize them from other sources of revenue leading to rebates that greatly exceed \$0.0002. In contrast, only a complete prohibition on rebates will permit researchers to observe directly the impact of rebates on order routing behavior, execution quality, and market quality, and compare this Test Group to the Control Group and the other Test Group where rebates can continue to be offered. Further, imposing a fee cap of \$0.0002 instead of prohibiting rebates would not allow Test Group 2 to test, within the

current Regulation NMS regulatory structure, natural equilibrium pricing for transaction fees, particularly if the cap is below where the natural equilibrium price would otherwise be found.

Two commenters expressed concern that because exchanges can continue to charge access fees of up to \$0.0030 per share in the no-rebate Test Group, they may fail to engage in competition on fees.²⁴³ In contrast, another commenter believed that, in the no-rebate Test Group, "the fee for removing liquidity could still move closer to zero in order for exchanges to incentivize takers in the absence of rebates."²⁴⁴ The Commission believes that observing price competition in the absence of any distortive effects caused by rebates is an important aspect of the Pilot. Accordingly, the no-rebate Test Group is intended to test, within our current regulatory structure, whether competitive market forces are sufficient to produce natural equilibrium pricing for transaction fees in the absence of rebates.

h. Prohibiting Linked Pricing

In connection with prohibiting rebates, the no-rebate Test Group also would prohibit Linked Pricing, such that an exchange would be prohibited from adopting any discounts on transaction fees to remove (*i.e.*, "take") liquidity where that discount is determined based on the broker-dealer's posted (*i.e.*, "make") volume on the exchange, which would result in the broker-dealer paying a lower take fee in return for providing a certain level of liquidity on the exchange.²⁴⁵

Some commenters that addressed the prohibition on Linked Pricing were supportive of the proposal and generally believed that the prohibition would preserve the integrity of the Pilot and facilitate an environment where exchanges are able to set transaction fees at a natural equilibrium level.²⁴⁶ In contrast, two exchange commenters opposed the prohibition.²⁴⁷ Specifically, one commenter characterized this aspect of the proposal, in conjunction with the prohibition on rebates, as an "unjustified pricing restriction" that is "unrelated to Regulation NMS's Access

²⁴³ See Fidelity Letter, at 9; Citadel Letter, at 5.

²⁴⁴ Credit Suisse Commentary, at 4.

²⁴⁵ See Proposing Release, *supra* note 2, at 13023. The Commission notes that most exchanges also utilize tiering in their pricing models in which they offer lower fees or larger credits in return for additional volume. See, e.g., Spatt Letter, at 4; RBC Letter II, at 4.

²⁴⁶ See, e.g., Capital Group Letter, at 3; IEX Letter I, at 7.

²⁴⁷ See NYSE Letter I, at 12; Cboe Letter I, at 10.

²³⁵ See *supra* note 215.

²³⁶ Cf. *supra* note 233.

²³⁷ Price-time priority (where orders are prioritized for execution based on ranking by price and, when two orders are at the same price, by time of entry), generally does provide the ability for an incoming order to bypass non-displayed liquidity.

²³⁸ See Healthy Markets Letter I, at 18; CFA Letter, at 6–7.

²³⁹ See Proposing Release, *supra* note 2, at 13023.

²⁴⁰ See *supra* notes 217–218 and accompanying text.

²⁴¹ See Citadel Letter, at 5.

²⁴² See *id.*

Fee Cap.”²⁴⁸ As discussed above, the no-rebate Test Group, including the Linked Pricing prohibition, is not based exclusively on the Rule 610(c) fee cap.

The Commission continues to believe that prohibiting Linked Pricing supports the objective of the no-rebate Test Group, which is to gather data on the impact of creating an environment where fee levels are not potentially distorted by the rebates they subsidize and rebates do not influence routing, particularly for customer orders.²⁴⁹ In the absence of a Linked Pricing prohibition, exchanges could use make (take) volume to subsidize take (make) activity, which could perpetuate the cross-subsidization of fees. For example, if an exchange adopts Linked Pricing for the no-rebate Test Group securities, it might offer a discounted transaction fee to *remove* liquidity only to those market participants that *post* a certain volume on the exchange. Perpetuating this potential distortion could cloud the Pilot results for the no-rebate Test Group if the Linked Pricing incentive interferes with the Pilot’s ability to isolate and analyze the impacts on fees and routing that the no-rebate Test Group is designed to study.

Two commenters recommended that the Commission also prohibit an exchange from offering any inducement, including discounts on *non*-transaction fees, such as those for market data, collocation, or connectivity ports, which are linked to trading volumes in the no-rebate Test Group.²⁵⁰ The Commission is not expanding the application of the Linked Pricing prohibition in the manner suggested by these commenters. The Pilot, and the no-rebate Test Group specifically, is designed to test the extent to which transaction fees and rebates create conflicts of interest that influence order routing or introduce distortions that impede execution quality and market quality. The Pilot is not designed to eliminate or control for all potential inducements to transact on a particular market and the Commission believes that expanding the Pilot to a wider array of variables could inhibit the Pilot’s ability to isolate the impacts of exchange transaction-based rebates and the effects they may have.²⁵¹

Further, two commenters requested the Commission to clarify that the

Linked Pricing prohibition applies across Test Groups such that exchanges may not tie rebates or transaction fee discounts in another Test Group to volume in the no-rebate Test Group.²⁵² As previously stated in the Proposal, the no-rebate Test Group is designed to gather data on the impact of creating an environment where fee levels are not potentially distorted by rebates and rebates do not influence routing. In proposing the Linked Pricing prohibition, the Commission recognized that a Linked Pricing arrangement could potentially distort transaction fee pricing if fees continue to be set at a subsidy level above their natural equilibrium, and it also could perpetuate the potential conflicts of interest associated with rebates and order routing. Any Linked Pricing incentives offered by exchanges that are linked, or otherwise related to, posting or removing liquidity in Pilot Securities included in the no-rebate Test Group would contradict the Commission’s intent for the no-rebate Test Group and frustrate the ability of the Pilot to generate useful data in that group. Accordingly, the Linked Pricing prohibition in Test Group 2 prohibits exchanges from offering any discounts or incentives on transaction fees that are linked to activity, whether it be posting or removing activity, in any securities included in Test Group 2, as well as prohibits exchanges from offering Linked Pricing arrangements in Test Group 2 securities that are based on, or include, activity in any Pilot Securities.

In addition, one commenter “suggest[ed] that the linked pricing prohibition should extend to auction fees or any other transaction fees charged by the exchange,” as “[c]losing auction fees, especially, are a significant source of listing market revenue, and . . . discounts on these fees could likewise lead to the distortions described by the Commission (or even to increases in auction fees to other participants to fund the targeted discounts).”²⁵³ Because Rule 610T(a)(3) prohibits exchanges from providing a discount or incentive on *transaction fees* applicable to removing (providing) liquidity that is linked to providing (removing) liquidity, and auction fees are “transaction fees,” the Linked Pricing prohibition applies to auction fees. Exchanges will not be permitted to consider make (take) volume during intraday trading when calculating auction fees, as such an arrangement would perpetuate potential distortions associated with fee-and-rebate pricing

models including the cross-subsidization of fees.

i. Linked Pricing Market Maker Exception

The Commission proposed an exception to the Linked Pricing prohibition to permit an exchange to adopt new rules to provide non-rebate Linked Pricing to its registered market makers during the Pilot in consideration for the market maker meeting rules-based market quality metrics.²⁵⁴ The Commission explained that to qualify for this limited exception, an exchange would need to propose market making standards in a rule change filing submitted pursuant to Section 19(b)(2) of the Exchange Act, and also would need to propose the fee incentive it would provide for meeting those standards.²⁵⁵

Several commenters requested further clarification about the market maker exception to the prohibition on Linked Pricing. Specifically, one commenter recommended that the Commission provide additional detail about the types of market quality metrics upon which access to Linked Pricing is contingent.²⁵⁶ Other commenters believed that it is important that any such standards adopted by exchanges be sufficiently stringent to prevent market participants from availing themselves of Linked Pricing in a manner that would jeopardize the ability of the no-rebate Test Group to provide valuable data on the impact of the absence of rebates (or a rebate-like incentive) on order routing behavior, execution quality, and market quality or that would permit market participants to unfairly exploit this aspect of the Pilot.²⁵⁷

The Commission continues to believe that permitting exchanges to adopt rules to offer Linked Pricing to their registered market makers for securities in the no-rebate Test Group preserves the ability of an exchange to attract market makers through non-rebate incentives and thereby helps maintain the baseline framework in which exchanges can provide incentives to their registered market makers.²⁵⁸ Commenters highlighted the importance of ensuring that any new rules that exchanges propose to provide Linked Pricing to registered market makers in the no-rebate Test Group be designed so as to not inhibit the Pilot’s ability to

²⁴⁸ NYSE Letter I, at 12.

²⁴⁹ See Proposing Release, *supra* note 2, at 13023–24.

²⁵⁰ See RBC Letter I, at 3; MFS Letter, at 2–3.

²⁵¹ As is the case for any fee or fee change an exchange adopts, if an exchange were to propose such a fee change it would need to analyze in its Form 19b-4 filing how its fee change constitutes an “equitable allocation” of “reasonable” fees and how it is not “unfairly discriminatory.” See 15 U.S.C. 78s(b)(3)(A)(ii).

²⁵² See IEX Letter I, at 7–8; Norges Letter, at 2.

²⁵³ IEX Letter I, at 7.

²⁵⁴ See Proposing Release, *supra* note 2, at 13024.

²⁵⁵ See *id.* at 13024 n.140.

²⁵⁶ See Clark-Joseph Letter, at 2–3.

²⁵⁷ See, e.g., Brandes Letter, at 2; Themis Trading Letter I, at 3; CFA Letter, at 7; Clearpool Letter, at 4; Healthy Markets Letter I, at 33; Decimus Letter, at 6 n.22.

²⁵⁸ See Proposing Release, *supra* note 2, at 13024.

generate useful data on the impact of rebates on order routing behavior, execution quality, and market quality. The Commission agrees that if they are not narrowly tailored, these non-rebate incentive programs could continue to potentially distort transaction fee pricing, particularly if the exchange's fees are set at a subsidy level above the natural equilibrium within the current regulatory structure to subsidize these market maker incentives.

Rather, the market maker exception to Linked Pricing is intended to permit an exchange to impose rules for its registered market makers in ways that would improve its market in a meaningful way, such that it could use the enhanced liquidity provided by its registered market makers to improve its displayed quotation and thereby attract buyers and sellers to the exchange.²⁵⁹ The non-rebate incentives would only apply to trading activity by a registered market maker in its capacity as a market maker (*i.e.*, acting as principal), and would not apply to any customer activity or activity from other trading desks or business units affiliated with the market maker (and possibly using the same MPID), be it agency, principal or riskless principal trading, traded by or through such market maker. Accordingly, only a registered market maker's principal trading activity in its capacity as a registered market maker in the no-rebate Test Group would be able to satisfy any market quality metrics, and the only trades that would be eligible to receive the non-rebate incentive pricing would be a registered market maker's principal trades in its capacity as a registered market maker in the no-rebate Test Group securities.

8. Control Group

The Commission proposed that Pilot Securities that are not placed in one of the Test Groups would be placed in the Control Group.²⁶⁰ One commenter addressed the Control Group and supported the Commission's proposed approach.²⁶¹ The Commission continues to believe that a control group is vital to test the effects of fee changes in the

²⁵⁹ See *id.* While it will be up to each individual exchange to design market quality metrics for offering non-rebate Linked Pricing to their registered market makers, such metrics could include, for example: (1) Requirements to trade to stabilize the market; (2) requirements on consecutive price changes and price continuity; (3) material time quoting on both sides of the NBBO; (4) materially enhanced quoted depth on both sides of the NBBO; (5) frequency of setting an improved BBO on the exchange; (6) frequency of setting an improved NBBO; and (7) compliance with narrow maximum quote widths.

²⁶⁰ See Proposing Release, *supra* note 2, at 13024.

²⁶¹ See Healthy Markets Letter I, at 19.

Test Groups, as a control group subject to the current access fee cap would provide an appropriate baseline for analyzing the effects of the Pilot against the status quo.²⁶² For these reasons and the reasons discussed in the Proposing Release, the Commission is adopting the Control Group as proposed, which will be subject to the current Rule 610(c) access fee cap.²⁶³

9. Alternative Designs

a. Include a Trade-At Requirement

In the Proposing Release, the Commission asked whether the Pilot should include a "trade-at" provision that would restrict price matching of protected quotations.²⁶⁴ Several commenters supported including a trade-at requirement because they believed doing so would increase the amount of liquidity available on exchanges and thereby further price discovery.²⁶⁵

In contrast, other commenters opposed including a trade-at requirement as they believed doing so would increase the Pilot's complexity; impact the ability of the data to assess the impact of transaction fees and rebates on order routing, execution quality, and market quality; be inconsistent with, or unnecessary for, a study of the issues pertinent to the Pilot; and be anti-competitive.²⁶⁶ In addition, two commenters noted that a trade-at requirement would not be necessary because the reduction in the fee cap ultimately could result in more volume being executed on exchanges.²⁶⁷

The Commission believes that adding a trade-at requirement would unnecessarily complicate the Pilot in a manner that would increase costs on market participants and potentially impact the ability of the Pilot to isolate the effects of changes in exchange transaction fees and rebates.

²⁶² See *id.*

²⁶³ See 17 CFR 242.610(c). Consistent with Rule 610(c), the Control Group will only cap fees for taking (removing) a protected quotation; it will not apply to fees for posting liquidity or otherwise cap or prohibit rebates. See also Proposing Release, *supra* note 2, at 13024.

²⁶⁴ See Proposing Release, *supra* note 2, at 13025. A "trade at" provision would require that orders be routed to a market with the best displayed price or be executed at a materially improved price.

²⁶⁵ See *e.g.*, Adorney Letter, at 1; Birch Bay Letter, at 1. In addition, in clarifying its position on rebates in equity market structure, NYSE stated that it could support a prohibition on rebates if "done in a measured manner that creates an offsetting incentive to display liquidity, such as a 'Trade At' provision[]" which the Pilot does not provide. NYSE Letter II, at 5.

²⁶⁶ See, *e.g.*, MFA Letter, at 3; ICI Letter I, at 3; BlackRock Letter, at 2; FIA Letter, at 5; SIFMA Letter, at 4; Fidelity Letter, at 10; Citadel Letter, at 6-7; Citi Letter, at 3.

²⁶⁷ See SIFMA Letter, at 4; Citi Letter, at 3.

Accordingly, the Commission is not including a trade-at requirement in the Pilot. If the Pilot were to also assess the impact of a trade-at requirement, it would need to increase the number of Test Groups, thereby increasing the number of securities included in the Pilot, to be able to isolate the effects of a trade-at requirement separately from the effects of changes in exchange transaction fees and rebates. The Commission believes any potential benefits from analyzing the impact of a trade-at requirement do not justify the additional costs that expanding the Pilot would impose. Rather than introduce another variable into the Pilot, the Commission believes that the Pilot should remain focused on permitting an analysis, in the context of our current market structure, of the effect of exchange transaction fees and rebates. Further, the Commission notes that the Tick Size Pilot featured a trade-at test group, so as that pilot's post-pilot period concludes, the Commission will have access to current data to analyze the impact of a trade-at prohibition in the context of that pilot.²⁶⁸

b. No Fee Cap Test Group

Several commenters advocated for including a Test Group that does not cap transaction fees, believing that it is important to test whether competition alone can constrain pricing and result in a natural equilibrium transaction fee.²⁶⁹ One commenter noted that currently fees tend to "cluster" at the access fee cap imposed by Rule 610(c) and as such recommended including an additional Test Group that does not cap fees.²⁷⁰

When it adopted Rule 610(c), the Commission explained that the access fee cap is necessary to, among other things, inhibit the ability of exchanges to take advantage of the Order Protection Rule by acting as a "toll booth" between price levels and ensure that quotations are fair and useful by limiting the ability of high fees to distort the price of displayed limit orders.²⁷¹

The Commission believes that the no-rebate Test Group will permit analysis of the impact of competitive forces on fees in the absence of current practices

²⁶⁸ See also *infra* Section IV.E (discussing trade-at).

²⁶⁹ See, *e.g.*, Clark-Joseph Letter, at 2; Nasdaq Letter I, at 13; Cboe Letter I, at 27-28.

²⁷⁰ See Barnard Letter, at 1. Another commenter recommended including a Test Group that did not cap fees because it believed that the current structure encourages exchanges to charge fees for data feeds and technology services, which the commenter suggests are higher than they otherwise would be if transaction fees were not capped. See Modern IR Letter, at 3.

²⁷¹ NMS Adopting Release, *supra* note 10, at 37545.

that use fees to subsidize those rebates. Specifically, to the extent exchanges will no longer need to charge access fees up to \$0.0030 to subsidize rebates in that Test Group, the Commission believes that competitive forces among the exchanges may result in fees approaching a new equilibrium level, within the current regulatory structure, for stocks in the no-rebate Test Group.²⁷²

The Commission notes that the order protection requirements of 17 CFR 242.611 (Rule 611) will continue to apply to all of the Pilot Securities including those in the no-rebate Test Group. As such, the basis for imposing a fee cap (summarized above) remains intact during the Pilot and the Commission believes that applying the current fee cap to the no-rebate Test Group will guard against the possibility, albeit highly unlikely, that an outlier exchange could seek to charge exorbitant fees for the no-rebate Test Group stocks that would be inconsistent with the rationale behind the Rule 610(c) fee cap.²⁷³

c. Basis Point Pricing

Two commenters recommended that, because stock prices have increased (*i.e.*, a number of high profile stocks currently trade above \$100 per share), using basis point pricing may be a better reference point than using the current access fee cap because the current access fee cap can impact stocks differently based on their price.²⁷⁴ Specifically, one of these commenters proposed that “Test Group 1 contain the same constraints as Test Group 3 but with an access fee limitation expressed in basis points.”²⁷⁵ However, the Commission believes that doing so would increase the Pilot’s complexity and could interfere with the Pilot’s ability to provide useful data to assess the impact of the current exchange fee models on order routing behavior, execution quality, and market quality because exchange transaction fees and rebates are currently not assessed in

²⁷² See, *e.g.*, Goldman Sachs Letter, at 2 (characterizing \$0.0030 as an “outdated benchmark” that “is too high and far from representative of true prices in the marketplace”).

²⁷³ The Commission notes that the Proposal included a question regarding whether a fee cap would continue to be necessary to constrain exchange pricing if equilibrium pricing is achieved and the Commission expects that some market participants may analyze the Pilot results for answers to this question. See Proposing Release, *supra* note 2, at 13025.

²⁷⁴ See Clearpool Letter, at 3; Cboe Letter II, at 8–9. Another commenter also stated that it thought it was “a worthwhile exercise to explore the possibility of a move to basis points. . . .” See Citi Letter, at 6.

²⁷⁵ See Clearpool Letter, at 3.

basis points and thus this would introduce a new variable into the Test Group as it could raise or lower the fees depending on a stock’s share price, which can vary over time. The more variables that are introduced, the more difficult it could be to isolate the effects of a particular change and uncover causal connections. Accordingly, the Commission is not adopting a requirement that one of the Test Groups include an access fee cap expressed in basis points.

d. Higher Fee Caps and Fees Based on Tick Size

Four commenters addressed a question in the Proposing Release about including a Test Group that would allow for access fees higher than the current cap under Rule 610(c).²⁷⁶ One of these commenters specifically recommended reducing access fees to \$0.0005 per share for the most liquid securities, while imposing gradually higher access fees for stocks of lower liquidity, up to a cap of potentially \$0.0050 for the least liquid securities.²⁷⁷ Another commenter recommended including an additional Test Group with an access fee cap of \$0.0040, believing this would provide data to test whether an increase in the fee cap reduces bid-ask spreads in light of the many comments contending that spreads will increase in conjunction with lower rebates connected to a reduced access fee cap.²⁷⁸ In addition, one commenter suggested that if tick sizes were set based on the characteristics of an individual stock, the transaction fee cap could then be a particular percentage of the tick size.²⁷⁹ Such an approach could result in an access fee cap above \$0.0030 per share for certain securities.

The Commission has carefully considered these suggestions. As discussed above, other commenters have noted that the current access fee cap was set thirteen years ago when markets and technology were markedly different.²⁸⁰ Indeed, a few commenters argued it was outdated and too high.²⁸¹ Accordingly, the Commission does not believe that raising the access fee cap to levels that are above what trading centers were charging thirteen years ago necessarily is consistent with the technological efficiencies that have been realized in the intervening years. While

²⁷⁶ See Nasdaq Letter I, at 13; TD Ameritrade Letter, at 6; Angel Letter II, at 2; Cboe Letter II, at 8.

²⁷⁷ See TD Ameritrade Letter, at 6.

²⁷⁸ See Angel Letter II, at 2. See also Cboe Letter II, at 8.

²⁷⁹ See Morgan Stanley Letter, at 3.

²⁸⁰ See *supra* note 200 and accompanying text.

²⁸¹ See *id.*

market-based solutions and even regulatory responses to enhance the investor experience with trading in thinly-traded securities are worthy of attention, and were the subject of a recent Division of Trading and Markets staff roundtable, the Commission does not believe that the Pilot should introduce the potential for higher rebates—and the further exacerbated distortions that would likely accompany them—when it is attempting to study the effect of the current exchange fee models and fee and rebate levels.²⁸² Accordingly, the Commission is not adopting a higher fee cap in any of the Pilot’s Test Groups.

e. Order Protection Rule

The Commission solicited comment on whether it would be appropriate to suspend the Rule 611 order protection requirements in one or more Test Groups.²⁸³ In response, three commenters opposed eliminating the order protection requirements within the Pilot because doing so would increase the cost and complexity of the Pilot, and also could complicate analysis of the Pilot’s results to the extent it clouded the focus on transaction fees and rebates.²⁸⁴

In contrast, one commenter recommended eliminating the order protection requirements for securities in the no-rebate Test Group.²⁸⁵ This commenter stated that prohibiting rebates is insufficient to “remove the perceived or real conflicts on broker routing or materially address” various negative effects that the commenter believed Rule 611 has had on the equities markets.²⁸⁶

After considering the comments received, the Commission believes that the Pilot should not introduce additional variables by, in this case, removing the Rule 611 protected quotation status for automated quotations in any particular Test Group. In order to add a new variable to the Pilot, the Commission would need to include additional Test Groups and increase the number of securities in order to be able to isolate separately the effects of each variable that is included

²⁸² See Transcript of the Division of Trading and Markets’ Roundtable on Market Structure for Thinly-Traded Securities (April 23, 2018), available at <https://www.sec.gov/spotlight/equity-market-structure-roundtables/thinly-traded-securities-roundtable-042318-transcript.txt>.

²⁸³ See Proposing Release, *supra* note 2, at 13025.

²⁸⁴ See SIFMA Letter, at 4; JPMorgan Letter, at 3; Schwab Letter, at 3 (also stating that eliminating Rule 611 for certain Pilot Securities “would significantly negatively impact retail order flow and the quality of trade execution”).

²⁸⁵ See T. Rowe Price Letter, at 2–4.

²⁸⁶ See *id.* at 4.

in the Pilot or else it would create an asymmetric Pilot that would make it more difficult to evaluate the data and establish causal inferences regarding the impacts of changes to exchange transaction fees and rebates. As discussed above, most commenters were critical of the Pilot's proposed size. The Commission desires to have a narrowly tailored pilot focused on generating useful data on the impact of exchange fees and rebates on order routing behavior, execution quality, and market quality. Adding another variable to the Pilot would increase the Pilot's complexity as well as costs of the Pilot.

f. Other Ideas for Additional Test Groups and Related Questions

In addition to the above questions, the Commission asked a number of other questions in the Proposing Release to solicit commenters' opinions on equities market structure issues and whether the Pilot should be used as a vehicle to further investigate other related areas. The Commission received a few comments on these points. For example, in response to a question about whether commenters believe the minimum trading increment should be reduced for the most actively traded NMS stocks if the Pilot's data suggests that rebates do not significantly improve market quality or execution quality for these securities, one commenter stated it "would strongly support inclusion of a half-penny spread bucket, or consideration of a separate small-tick pilot for highly liquid stocks."²⁸⁷

Another commenter recommended that the Pilot test a prohibition on "tiered pricing," whereby exchanges offer lower per share fees or greater per share rebates to market participants that transact in greater volumes, believing that absent such a prohibition, exchanges would continue to offer these incentives, which would serve "to potentially work around the prohibition on offering rebates."²⁸⁸

Further, one commenter suggested adding a new Test Group "to test an anti-fragmentation policy," in which "the order that sets the SIP NBBO receives the execution in all circumstances (e.g., bypassing hidden orders)."²⁸⁹

The Commission appreciates all of these recommendations. After considering these comments, as well as other comments opposed to including more NMS stocks in the Pilot, the Commission believes that the Pilot

should not introduce additional variables. In order to add a new variable to the Pilot, the Commission would need to include additional Test Groups and materially increase the number of securities (or materially increase the Pilot's duration) to be able to isolate separately the effects of each variable that is included in the Pilot. Otherwise, adding variables would create an asymmetric Pilot that would make it more difficult to evaluate the data and establish causal inferences regarding the impacts of changes to exchange transaction fees and rebates. As discussed above, most commenters were critical of the Pilot's proposed size and the Commission similarly desires to have a narrowly tailored pilot focused on generating useful data on the impact of exchange fees and rebates on order routing behavior, execution quality, and market quality. Adding another variable to the Pilot would increase the Pilot's size, complexity, and costs.

g. Gradual Reduction of Current Fee Cap Across All Stocks

One commenter suggested that, rather than conducting the Pilot, the Commission should instead consider imposing a "gradual reduction of the current fee cap across all stocks periodically."²⁹⁰ The commenter stated that this approach would facilitate data collection and an opportunity "to observe order routing behavior changes, while applying the same economics to all stocks uniformly."²⁹¹ Furthermore, the commenter stated that if a control group was necessary in this scenario "for comparison purposes" it would recommend placing 50% of stocks in the control group and the other 50% in the Test Group subject to the gradual reductions in access fees.²⁹²

The Commission has considered this alternative but believes that the Pilot is a preferable approach because it will permit researchers to conduct differences-in-differences analysis over a much shorter time frame. By establishing stratified treatment groups and simultaneously testing different changes in the same variable, the Pilot will reduce the impact of events (economic, natural, political, etc.) across time and thereby is more conducive to an apples-to-apples comparison of the various treatment groups to one another. Pursuing a simultaneous and linear gradual reduction, such as that proposed by the commenter, could require greatly extending the Pilot's duration depending on the number of

fee cap levels to be tested. More importantly, this proposed alternative would not provide the Commission with the opportunity to directly observe the impact of rebates on order routing behavior, execution quality, and market quality because it would not necessarily include a prohibition on rebates and therefore having a no-rebate bucket will be substantially more informative. Lastly, as the Commission believes that a Control Group is necessary to ensure the usefulness of the Pilot's data, pursuing the proposed structure would impact more NMS stocks than the Pilot (as 50% of stocks would be included in the Test Group and 50% in the control group).

h. \$0.0010 Access Fee

One commenter recommended that rather than pursuing the Pilot, the Commission should instead amend Rule 610(c) to reduce the access fee cap to \$0.0010 and also "conduct an abbreviated study of the effects of eliminating rebates similar to the criteria of Pilot Test Group Three."²⁹³ This commenter stated that "there is broad recognition" that the access fee cap should be reduced and the Pilot will "be lengthy, complex and costly" but "will not yield a different conclusion."²⁹⁴ The commenter stated that reducing the access fee cap to \$0.0010 would be calibrated with present-day trading and execution costs, would better ensure displayed prices reflect the actual economic costs of an execution, and would allow exchanges to continue maintain their current net capture rates, while also choosing to offer rebates to incentivize liquidity provision if they chose to do so.²⁹⁵

The Commission believes that its revised Pilot design responds to this commenter's core recommendation, though the Commission is instituting a \$0.0010 fee cap as part of the Pilot and not as an amendment to Rule 610(c). The Commission continues to believe that a Pilot is necessary to provide data to objectively evaluate the effect of exchange fees and rebates. Ultimately, the Pilot will enable a data-driven analysis of the impact of transaction fees and rebates on order routing behavior, execution quality, and market quality, which will serve as a valuable precursor to the Commission's consideration of future policy making in this area.

10. Metrics To Assess the Pilot

A number of commenters recommended that the Commission

²⁸⁷ Pragma Letter, at 4. See also Proposing Release, *supra* note 2, at 13025.

²⁸⁸ See Clearpool Letter, at 3-4.

²⁸⁹ See Birch Bay Letter, at 2.

²⁹⁰ Morgan Stanley Letter, at 2.

²⁹¹ *Id.*

²⁹² *Id.*

²⁹³ See Goldman Sachs Letter, at 1-4.

²⁹⁴ *Id.* at 1.

²⁹⁵ *Id.*

more clearly articulate what it believes would constitute a “successful” Pilot and how it will judge whether the Pilot achieves that measure of success.²⁹⁶ Several of these commenters suggested specific metrics or criteria they thought the Commission should analyze when evaluating the impact of the Pilot, many of which were measurement criteria suggested by EMSAC.²⁹⁷ One commenter suggested that the Commission provide guidance about how its staff will be evaluating the metrics used to determine whether to recommend market structure changes to the Commission following the Pilot.²⁹⁸ In addition, two commenters suggested the Commission designate an independent third party to conduct an analysis of the Pilot data upon the Pilot’s completion.²⁹⁹ Another commenter stated that the “industry should be afforded the opportunity to comment” on the metrics and criteria used to evaluate the Pilot.³⁰⁰

In response to these comments, the Commission emphasizes that its staff will likely not be the sole entity analyzing data related to the Pilot. As was the case for the recent Tick Size Pilot, the Commission believes that market participants will publish their own analyses of the Pilot using data that is uniquely available to them and the metrics that they believe are most useful or relevant, and encourages market participants to do so.³⁰¹ To the extent that interested parties prepare their own analyses, they may submit them to *tradingandmarkets@sec.gov* with the words “Transaction Fee Pilot Analysis” in the subject line, and the Commission

²⁹⁶ See, e.g., State Street Letter, at 2; Fidelity Letter, at 3–4; Capital Group Letter, at 4; ICI Letter I, at 5; OMERS Letter, at 2; MFS Letter, at 2; Virtu Letter, at 8; FIA Letter, at 2; SIFMA Letter, at 2–3, 5; TD Ameritrade Letter, at 2; STANY Letter, at 3; Morgan Stanley Letter, at 3; Cboe Letter I, at 29; Nasdaq Letter I, at 7; NYSE Letter, at 2; Pragma Letter, at 2; ModernNetworks Letter; Healthy Markets Letter I, at 35.

²⁹⁷ See, e.g., State Street Letter, at 2–3; Fidelity Letter, at 8; Vanguard Letter, at 3; ICI Letter I, at 5; T. Rowe Price Letter, at 4; MFS Letter, at 2; BlackRock Letter, at 2–3; SIFMA Letter, at 5–6; Morgan Stanley Letter, at 3; Spatt Letter, at 5; Cboe Letter I, at 29; IEX Letter I, at 2; Pragma Letter, at 2–3.

²⁹⁸ See SIFMA Letter, at 3. Another commenter requested that the Commission clarify the role it expects the Division of Economic and Risk Analysis to play in analyzing the Pilot’s data and provide an anticipated timeline for the issuance of a report on the Pilot data. See IEX Letter I, at 2.

²⁹⁹ See Fidelity Letter, at 3, 8; MFS Letter, at 2.

³⁰⁰ See Virtu Letter, at 8.

³⁰¹ For example, institutional firms could study their ability to capture the spread when passively posting, and how that is impacted within the Pilot’s treatment groups.

will post those reports on its public website.³⁰²

The Commission encourages market participants to make public any analysis they perform on their own trading activity, such as non-proprietary transaction cost analysis (“TCA”), so that it may be publicly reviewed and used to help inform the public dialogue concerning the effect of exchange fees and rebates.³⁰³ To the extent that independent analyses are made public, they can contribute to the Commission’s consideration of any future regulatory action in this area.

Given the valuable input of independent analysis, the Commission believes that the success or failure of the Pilot will be determined by whether it produces an exogenous shock that generates measurable responses capable of providing insight into the effects of fees and rebates on the markets and market participant behavior.³⁰⁴ In the absence of a Commission Pilot that effects change across all equities exchanges in a coordinated manner, researchers would be unable to collect meaningful, comparative data to test the effects of such changes and perform those analyses.³⁰⁵

Success or failure of the Pilot is thus independent of the outcome of the Pilot.

³⁰² The Commission encourages market participants to disclose what sources of data they used for their analyses and describe the methodology they used, and to make those reports publicly and freely available.

³⁰³ For example, the Pilot’s order routing datasets will collect aggregated data, not individual order-by-order level data, and reflects the “child” orders that are processed by an exchange. Thus, the order routing dataset will not capture the entire lifecycle of a “parent” order from its inception through to execution. Accordingly, the Pilot’s order routing datasets will not by themselves permit analyses on an order-by-order basis, and will therefore be unable to assess the execution quality of orders at the “parent” level. If market participants and other interested parties conduct parent order-level analyses and make their findings public, then the Commission would be able to consider them as it assesses the Pilot’s ultimate impact on order routing behavior, execution quality, and market quality. See, e.g., T. Rowe Price Letter, at 4 (recommending that the Commission view analyses of the Pilot conducted by registered investment advisers as a “key input”).

³⁰⁴ As noted in the Proposal, the Pilot is designed to produce an exogenous shock that simultaneously creates distinct fee environments, each of which restricts transaction-based fees or rebates differently, enabling synchronized comparisons to the current environment for purposes of inferring the existence of causal relationships. See Proposing Release, *supra* note 2, at 13047 and 53. An exogenous shock to a system occurs when an element of the system is changed from without the system. (*i.e.*, the change or shock is not under the control or influence of those within the system) but can induce endogenous (*i.e.*, within the system) responses. In the Pilot’s context, the exogenous shock takes the form of a reduction of the maximum permissible transaction fees and a prohibition on rebates and Linked Pricing on all U.S. equities exchanges. See *infra* Section IV.

³⁰⁵ See *infra* Section IV.B.1.

For example, a Pilot that shows, with statistical significance, that rebates narrow the quoted spread in thinly-traded stocks would be equally “successful” as a Pilot that shows that rebates do not narrow the spread in such stocks. In this sense, the “success” of the Pilot is that it created the conditions that permit measurement and analysis of that issue in a manner that helps resolve speculative assumptions among the commenters about the impact of fees and rebates.

Furthermore, it is worth noting that the data collected pursuant to Rule 610T is only part of what researchers will need to conduct analysis of the impact of exchange fees and rebates on the markets. For example, the Pilot’s order routing datasets contain data to help assess order routing and certain aspects of execution quality, but will not contain any data on exchange quotations, which is available from existing sources. Consequently, researchers will need to use existing data sources to assess the impact of the Pilot on exchange quoting activity and market quality. As such, to the extent that the Pilot data produces null results, for example the Pilot’s order routing datasets do not show any change in liquidity during the Pilot, the Commission believes that independent analysis from market participants, looking at order-level data, may nevertheless detect an impact. Even if the Pilot produces a null result for some metrics, and third-party analysis is not publicly available or does not find an impact, the Commission nevertheless believes the Pilot would still be useful to inform future policymaking that is intended to benefit investors.³⁰⁶

In response to commenters’ requests for additional insight into the types of questions that the Commission hopes the Pilot will be able to answer, the Commission believes that the order routing datasets, as well as other data that is already readily accessible to researchers, should facilitate analysis of the impact of the Pilot through a broad spectrum of metrics. In particular, the Commission will consider, and encourages others to consider, the following questions in contemplating the impact of changes to fees and rebates across the exchanges. These questions include, but are not limited to:

³⁰⁶ For example, a result that shows no impact on liquidity for a Test Group may still be relevant to the Commission’s consideration of the effects of transaction fee-and-rebate pricing models on order routing behavior, execution quality, and market quality and whether the existing exchange transaction-based fee and rebate structure continues to further the statutory goals.

1. To what extent do access fees and rebates impact routing decisions for liquidity-taking orders? Are orders to take liquidity more likely to be routed to an exchange (compared to an off-exchange venue or ATS) in a lower access fee environment than they are currently? To what extent are impacts or changes in routing decisions driven by potential conflicts of interest created by transaction fees and rebates rather than other factors such as fill rates and execution quality?

2. To what extent do access fees and rebates impact routing decisions for liquidity-supplying orders? Are orders to provide liquidity less likely to be routed to an exchange (compared to an off-exchange venue or ATS) in a lower rebate environment than they are currently? To what extent do impacts or changes in order routing appear to be driven by potential conflicts of interest caused by rebates rather than other factors such as execution quality (e.g., fill-rates, time to fill, capturing the quoted spread, adverse selection, or reversion)?

3. What impact does a reduction or elimination in rebates have on the NBBO, including spread width and the depth of interest displayed at the NBBO? To what extent does a potential decrease in depth of interest at the NBBO result in lower fill rates or smaller fill sizes for investor orders? Are natural investors better able to obtain queue priority in exchange order books, and are they more frequently able to capture the quoted spread when posting passively (e.g., buy on the bid and sell on the offer)?

4. Are there common characteristics for securities (e.g., average daily trading volume, price, or market capitalization) where a reduction or elimination of rebates begins to impact quoted spread? If so, what are those common characteristics and at what level do reduced rebates begin to have an impact on quoted spread? To what extent does a change in quoted spread affect transaction costs for investor orders? If quoted spread widens in a security, to what extent is the potential spread cost offset by the reduction in the transaction fees paid, or a change in the ability to capture the quoted spread?

5. Are there common characteristics for securities where a reduction or elimination of rebates does not impact quoted spread? If so, what are those common characteristics (e.g., average daily trading volume, price, or market capitalization)?

6. Are there common characteristics for securities (e.g., average daily trading volume, price, or market capitalization) where a reduction or elimination of rebates begins to impact effective spread?

7. How can we best understand the effects of rebates provided on inverted venues (where rebates are paid to takers of liquidity)?

8. What impact do lower access fees and rebates have on the amount of displayed and non-displayed liquidity on exchanges?

9. In the absence of rebates, do competition and market forces operate to produce a market equilibrium (within the current regulatory structure) that constrains transaction fees to levels at or below today's current access fee cap? What do such market forces, and any resultant equilibrium pricing,

tell us about the need to impose a cap on access fees? Does the Pilot provide any data that suggests, in the absence of rebates, an access fee cap would still be necessary as long as Rule 611 of Regulation NMS continues to impose order protection requirements on exchanges with protected quotes?

10. What is the impact of a lower fee cap on trading volumes on each exchange? What is the impact of a lower fee cap on other measures of liquidity on each exchange? How should we understand the difference between volume and liquidity?

11. What is the impact of lower rebates on the ability of smaller exchanges to attract liquidity-supplying orders?

By providing a mechanism that is uniquely capable of facilitating an empirical review of these and similar questions, the Pilot is an essential tool that can further the understanding of an important component of equities market structure. While other market structure issues also might benefit from a pilot, exchange transaction fees currently are a prime focus for empirical study, as evidenced by, among other things, the EMSAC's recommendation to the Commission and the number and nature of comments the Commission received on its proposal. Ultimately, the Commission desires to use the Pilot's results to help assess whether (and, if so, in which types of NMS stocks) rebates have a positive impact on execution and market quality, or whether they have no or little effect or a negative effect.

D. Timing and Duration

1. Disclosure Initiatives and the Pilot

While a number of commenters urged the Commission to proceed expeditiously with its proposed pilot,³⁰⁷ other commenters believed the Commission should pursue different market structure initiatives before conducting the Pilot³⁰⁸ or in lieu of the Pilot.³⁰⁹ The Commission has adopted two of the market structure initiatives

³⁰⁷ See, e.g., IEX Letter I, at 1; Joint Pension Plan Letter, at 2; Better Markets Letter, at 3; Brandes Letter, at 2; Clearpool Letter, at 7.

³⁰⁸ See, e.g., RBC Letter I, at 4; T. Rowe Price Letter, at 4; Citi Letter, at 2.

³⁰⁹ See, e.g., Nasdaq Letter I, at 1, 3 (“[A] transaction fee experiment is inappropriate at this time because there are alternatives and prerequisites the Commission must further evaluate.”); NYSE Letter I, at 17–19 (stating that the Commission should consider “less costly and more effective alternatives” to the Pilot); Cboe Letter I, at 12, 22, 27 (recommending that the Commission undertake a “holistic examination of the entire equities market framework” including consideration of “possible changes to the Order Protection Rule [and] the Minimum Tick Increment Rule,” “[s]trengthening and [a]rticulating the Duty of Best Execution,” providing “greater broker-dealer transparency,” and adopting amendments to Regulation ATS).

identified by commenters—namely, proposals to enhance the operational transparency of ATSs and to enhance disclosure of order routing behavior.³¹⁰

While some commenters believed that the information and data from those new rules would complement the Pilot and “improve understanding of pilot data,”³¹¹ others believed the new rules would instead allow the Commission to determine “whether a problem exists without risking the potential negative impact of a pilot”³¹² or thought that potential conflicts of interest in order routing behavior would be better addressed through increased transparency and disclosure than by the Pilot.³¹³ The Commission disagrees. Comments urging the Commission to pursue disclosure-based initiatives focused only on one narrow aspect of

³¹⁰ See, e.g., Nasdaq Letter I, at 1, 3; NYSE Letter, at 17–18; Cboe Letter I, at 12, 22, 27; Fidelity Letter, at 4. See also Securities Exchange Act Release Nos. 83663 (July 18, 2018), 83 FR 38768 (August 7, 2018) (“Regulation ATS–N”) and 34528 (November 2, 2018), 83 FR 58338 (November 19, 2018) (“Amendments to Order Handling Disclosure”).

³¹¹ ICI Letter I, at 5–6, 6 n.12; ICI Letter II, at 3. See also, e.g., RBC Letter I, at 4; Citi Letter, at 2; Citadel Letter, at 3, 7 (stating that “it is important to first finalize and implement . . . Rule 606 enhancements before implementing the Pilot” to “safeguard the integrity of the Pilot by ensuring that any changes to broker-dealer order routing practices that result from the increased transparency mandated by amended Rule 606 are isolated from any similar changes that result from the design of the Pilot”); Spatt Letter, at 4 (stating that the “the enhanced disclosures proposed would strengthen the potential causal inference that the response to [the Pilot] would allow”). Some commenters questioned whether the Pilot should proceed, because they believed that the adoption of Regulation ATS–N and the Amendments to Order Handling Disclosure will “impact the very potential conflicts of interest the Commission aims to study” Nasdaq Letter II, at 2–4; see also NYSE Letter IV, at 2–3. As noted in this section, the scope of the Pilot is broader than just conflicts of interest. Therefore, those initiatives, or the impact they may have on order routing behavior, would not provide sufficient data to evaluate the effects of transaction fees and rebates on market quality and execution quality. See *infra* Section IV.B.1.

³¹² Nasdaq Letter I, at 1–2, 4; Nasdaq Letter II, at 2–4 (suggesting that the adoption of these regulations “further reduce[d] the already weak need for the [Pilot]”). See also, e.g., STANY Letter, at 2; ASA Letter, at 5–6; Era Letter, at 1. *But cf.* Verret Letter I, at 4 (stating that the “collection of data from broker-dealers” or the use of “existing data contained in [OATS]” were not “feasible alternatives,” because a “randomized trial is far superior for the purpose of generating robust statistical analysis to inform subsequent rulemaking”); Proposing Release, *supra* note 2, at 13046–47 (outlining the limitations of existing data sources).

³¹³ See, e.g., STANY Letter, at 2; FIA Letter, at 3; Grasso Letter, at 2. *But cf.* ICI Letter II, at 3 (noting that disclosure-based rulemakings “will not directly reduce the potential for exchange transaction pricing models to create conflicts of interest for broker dealers, nor will they provide data that would allow an institutional investor to measure the impact of fee avoidance on routing decisions”); Luminex Letter, at 1; Spatt Letter, at 4; IEX Letter II, at 9.

the Pilot—studying the conflicts of interest between brokers and their customers that are presented when exchanges pay rebates. However, such an approach does not adequately advance the Pilot’s broader purpose—obtaining a better understanding of all potential impacts from fees and rebates, and how fees and rebates may affect stocks differently depending on their liquidity.

Similarly, some commenters recommended that, either before conducting the Pilot or in lieu of the Pilot, the Commission should pursue other market initiatives such as enhancing broker-dealers’ duty of best execution³¹⁴ or undertaking a “broader review of equity market structure,” including the consideration of possible changes to the Order Protection Rule or the Minimum Tick Increment Rule.³¹⁵ Other commenters disagreed and did not believe that the Commission should delay the Pilot in order to pursue other market structure initiatives.³¹⁶ For example, a few commenters advocated proceeding with the Pilot because the Pilot may help to inform future policy changes in these other areas.³¹⁷ Other commenters characterized the “holistic reform” advocated by other commenters as “an elusive goal”³¹⁸ in light of market participants’ competing interests—one that has been used to “slow down market structure reform for the past decade.”³¹⁹

The Commission believes that there is no need to delay proceeding with the Pilot in order to pursue other potential equity market structure initiatives. The Pilot seeks to resolve several equity market structure questions that have been debated for several years. Similarly, the Commission does not believe that it needs to complete the Pilot before proceeding to consider other equity market structure initiatives. Other initiatives may implicate equity market structure questions that are narrower or broader than, or independent of, exchange fee models, such as considering innovative approaches to thinly-traded securities.

³¹⁴ See, e.g., Nasdaq Letter I, at 3–4; Fidelity Letter, at 6; Cboe Letter I, at 21–22.

³¹⁵ See Cboe Letter I, at 12; FIA Letter, at 3; Nasdaq Letter I, at 4.

³¹⁶ See, e.g., IEX Letter II, at 9; Better Markets Letter, at 3; Brandes Letter, at 2; AJO Letter, at 2; OMERS Letter, at 3; Clearpool Letter, at 7. Some of these commenters suggested that the Pilot should proceed in conjunction with action on other market structure initiatives. See, e.g., SIFMA Letter, at 1; Pragma Letter, at 3–4.

³¹⁷ See, e.g., Verrett Letter I, at 5; Better Markets Letter, at 3.

³¹⁸ Brandes Letter, at 2.

³¹⁹ Themis Trading Letter I, at 6. See also ICI Letter I, at 3.

The Commission expects that it will continue to evaluate the need for other changes to equity market structure during the Pilot.

2. Automatic Sunset at Year One

The Commission proposed that the Pilot have a duration of one year with a maximum period of two years. Specifically, the proposed Pilot duration featured an automatic sunset at the end of the first year unless, prior to that time, the Commission publishes a notice that the Pilot shall continue for up to one additional year.³²⁰

After careful consideration of the comments received, the Commission is adopting Rule 610T(c) as proposed. Many commenters supported the proposed duration of the Pilot.³²¹ For example, one commenter asserted that “each pricing experiment needs to be in place for a sufficient length of time to enable the firms to adjust their routing logic.”³²² Others agreed that the proposed duration would reduce the “desire to ‘wait out’ the Pilot” and would avoid “the incentive to alter behavior in order to distort the Pilot’s results”³²³ Several commenters supported the automatic sunset provision after one-year.³²⁴

A few commenters, however, thought the proposed duration was too short and

³²⁰ See Proposing Release, *supra* note 2, at 13025. The Commission notes that the proposed language in Rule 610T(c)(a)(ii) has been modified slightly. As proposed, Rule 610T(c)(1)(ii) contained the phrase “shall continue for up to another year.” As adopted, the phrase “shall continue for up to one additional year” is being substituted for the phrase “shall continue for up to another year” to simplify the rule text without substantively changing the requirement.

³²¹ See, e.g., SIFMA Letter, at 3; AGF Letter, at 2; Wellington Letter, at 2. See also RBC Letter I, at 6 (stating “a pilot of at least one year and no more than two years will ensure that ample data is collected over time, that the restrictions of the various Pilot Test Groups cannot be evaded by delay, and that the Pilot does not exist for a period of time beyond which its data would be cumulative or of marginal significance relative to data produced earlier in the Pilot period”).

³²² See Citi Letter, at 5 (stating that “[c]ost-sensitive firms may be able to more quickly adapt to new pricing, while liquidity-based routers may need time to collect a new sample set to adjust their routing logic,” such that “data in the weeks closer to the conclusion of the Pilot may more accurately reflect the state of the market and what the implications would be if implemented long-term”). One commenter, however, did not believe that certain “broker-dealers, proprietary traders, and algorithm vendors” would “incorporate the new fees into their routing systems on a timely basis, if ever,” because according to this commenter, “[c]hanges are costly and may prove to be ultimately unnecessary if pricing reverts following the termination of the pilot study.” Larry Harris Letter, at 11.

³²³ Joint Asset Managers Letter, at 2. See also Joint Pension Plan Letter, at 2; Brandes Letter, at 2.

³²⁴ See, e.g., SIFMA Letter, at 3; CFA Letter, at 6; Fidelity Letter, at 9; IEX Letter I, at 4.

that a minimum two-year pilot would be necessary.³²⁵ Some other commenters believed that the necessary data could be obtained within a shorter time frame. Among commenters advocating for a shorter Pilot Period, the recommended duration varied and ranged from those who felt there would be an “immediate and measurable impact upon implementation”³²⁶ to those who felt the appropriate time frame should be modified to an absolute maximum of one year.³²⁷ One commenter questioned whether a “1–2 year pilot that changes fees on 3,000 names” was “really a ‘pilot’ or in fact a de facto imposition of a significant reduction of transaction fees[.]”³²⁸ Several commenters expressed their view that the proposed length of the Pilot would “exacerbate[] the negative impact upon the affected issuers.”³²⁹

One commenter took issue with the proposed length of the Pilot by challenging what it believed to be conflicting statements of the Commission in its original Proposal. According to the commenter, the Commission asserted, on the one hand, that the “market quickly reacts to changes in (and elimination of) pricing changes, but on the other hand, claims that the market does not react unless the changes are in effect for at least a year.”³³⁰ The Commission believes both of those statements are correct and do not conflict. While many market participants will react promptly to pricing changes, particularly those with cost-based routing algorithms, others may need additional time to fine tune liquidity-based routing algorithms as order flow changes in response to fee changes.³³¹ More importantly, however, the Pilot needs to be long enough to discourage any market participant inclined to resist adapting its behavior to the fee changes.³³²

A few commenters opposed the one-year sunset provision, but for a variety of different reasons. For example, one commenter thought a full two-year pilot was necessary, another thought the Commission separately has the authority to revise or terminate the Pilot early and does not need a sunset

³²⁵ See, e.g., Babelfish Letter, at 3; Healthy Markets Letter I, at 19.

³²⁶ See TD Ameritrade, at 5; see also, e.g., NorthWestern Letter, at 1.

³²⁷ See, e.g., FIA Letter, at 4; STANY Letter, at 3–4.

³²⁸ Magma Letter, at 3. See also, e.g., Apache Letter, at 1; Unitil Letter, at 2.

³²⁹ See, e.g., Ethan Allen Letter, at 1; ProAssurance Letter, at 2; Knight-Swift Letter, at 2.

³³⁰ NYSE Letter I, at 16.

³³¹ See, e.g., Citi Letter, at 5; Babelfish Letter, at 3.

³³² See Proposing Release, *supra* note 2, at 13071.

provision, and a third was critical of the lack of metrics that would accompany the automatic sunset.³³³

After careful consideration of the comments received, the Commission is adopting the Pilot's duration as proposed. The Commission believes that the Pilot's duration will provide an appropriate balance between providing certainty about the maximum duration for the Pilot while also allowing flexibility to conduct a Pilot for more than one year if necessary to collect representative data. Further, the Pilot's duration should be long enough to make it economically worthwhile for market participants to adapt their behavior and not "wait out" the Pilot. In addition, in light of the number of Pilot Securities selected, which were selected to ensure sufficient statistical power to allow for meaningful analysis, the Pilot's duration will allow for the collection of a robust and representative data set over a sufficiently long period of time. The Commission considered a shorter time period for the Pilot, but is concerned that short-term or seasonal events could unduly impact the Pilot results and therefore data collected over a shorter duration may not yield a sufficiently representative dataset that would be capable of permitting analysis into the impact of transaction-based fees and rebates and the effects that changes to those fees and rebates have on order routing behavior, execution quality, and market quality. For example, a shorter pilot period could be impacted by seasonal idiosyncrasies, macroeconomic factors, or even weather events.

Further, the Commission recognizes that some market participants, for example, broker-dealers whose liquidity-focused routing strategies are based on, and continually updated based on, several weeks' worth of data, will need time to fine tune their revised routing strategies. While some market participants may adjust quickly, others, like proprietary trading market participants, may wait to see how other market participants react before refining their own routing strategies.³³⁴ In other words, it could take a few months before some market participants finish calibrating their routing strategies to the fees and rebates that the exchanges adopt consistent with the Pilot's requirements and adjust them as trading dynamics settle in response to those changes. The exchanges also could take a number of weeks to settle on new fee models as they see how other exchanges modify their fee models to comply with

the Pilot's requirements and then respond accordingly, which could further delay the time it takes for broker-dealers to adjust their routing and trading algorithms. Accounting for all of this, the Commission intends that the proposed duration of the Pilot be long enough to encourage wide participation by all market participants (and discourage "waiting out" the Pilot) and thereby help ensure that the Pilot produces results that are more reliable, robust, and useful.

The Commission also considered extending the Pilot period to two-years as suggested by several commenters, and as was recommended by the EMSAC, but continues to believe that the inclusion of the automatic sunset provision at the end of the first year is preferable because it will provide flexibility in the event that the Commission believes additional time is necessary to ensure the collection of a robust dataset with adequate statistical power for analysis, but will allow the Pilot to automatically end after one-year in the event that sufficient data is collected by that point with sufficient statistical power to allow for meaningful analysis.

3. Pre- and Post-Pilot Periods

The Commission proposed a six-month pre-Pilot Period as well as a six-month post-Pilot Period.³³⁵ During those periods, the Commission proposed to require the equities exchanges to collect and make available the order routing datasets and Exchange Transaction Fee Summaries in order to provide necessary benchmark information against which researchers could assess the impact of the Pilot.³³⁶

Two commenters supported the proposed six-month pre-Pilot and post-Pilot data collection periods.³³⁷ In contrast, two commenters suggested adopting three-month long pre-Pilot and post-Pilot Periods.³³⁸

The Commission desires to implement the Pilot in a manner that imposes the least amount of costs on the exchanges without compromising the

ability of the Pilot to obtain useful data. The Commission believes that six-month pre- and post-Pilot Periods are necessary to establish a baseline against which to compare the data collected during the Pilot Period and any post-Pilot effects following the conclusion of the proposed Pilot. Although the Commission appreciates the desire of market participants to expedite the Pilot while constraining costs, the Commission considers six months to be necessary to provide the targeted statistical power for obtaining baseline data. As discussed above, statistical power largely is a function of the number of observations over a specified period of time. In order to shorten the pre- and post-Pilot Periods (e.g., to three months instead of six months) while maintaining the same statistical power, the Commission would need to increase the number of securities in the Pilot by at least 120 securities. As discussed above and consistent with the comments it received, the Commission desires to limit, not increase, the number of securities included in the Pilot. Accordingly, the Commission is not adopting a shorter duration for the pre- and post-Pilot Periods.

4. Early Termination

Proposed Rule 610T did not contain a specific provision regarding early termination of the Pilot. Several commenters recommended that the Commission develop specific criteria for evaluating the possibility that the Pilot may need to be terminated early.³³⁹ Some recommended that the Pilot specifically include a "kill switch" to effectuate an early termination.³⁴⁰ Several commenters supported the need for the Commission to address unanticipated negative consequences quickly,³⁴¹ but one commenter cautioned that the Commission would need to act in a measured manner because the industry would need time to unwind the Pilot.³⁴² One commenter suggested that the Commission might want to terminate the Pilot early if (1) it produced a "robust statistical sample set earlier than a year, such that [the Commission could] end the Pilot and proceed to adopt permanent rule changes" and (2) "if there is unintended impact from the Pilot that warrants a

³³⁵ See Proposing Release, *supra* note 2, at 13025–26. See also Proposed Rule 610T(c).

³³⁶ Proposed Rule 610T(d) and (e). See also Proposing Release, *supra* note 2, at 13029, 13032. Primary listing exchanges will also be required to prepare and publicly post updated Pilot Securities Exchange Lists and Pilot Securities Change Lists for the duration of the Pilot Period and through the post-Pilot Period. *Id.* at 13027–28. The pre-Pilot data is intended to establish a baseline against which to assess the effects of the Pilot, while the post-Pilot Period is intended to help assess any post-Pilot effects following the conclusion of the Pilot.

³³⁷ See FIF Letter, at 7, 9; Healthy Markets Letter I, at 19.

³³⁸ See IEX Letter I, at 4; FIA Letter, at 4.

³³⁹ See e.g., SIFMA Letter, at 3; Issuer Network Letter I, at 4; State Street Letter, at 4; Cboe Letter I, at 28.

³⁴⁰ See Citi Letter, at 4; TD Ameritrade Letter, at 1, 5; Morgan Stanley Letter, at 4; Cboe Letter I, at 28–29; Vanguard Letter, at 3; STANY Letter, at 4; Angel Letter II, at 3.

³⁴¹ See Schwab Letter, at 2; Cboe Letter I, at 29.

³⁴² See TD Ameritrade Letter, at 5. See also Morgan Stanley Letter, at 4; SIFMA Letter, at 3.

³³³ See Babelfish Letter, at 3; Healthy Markets Letter I, at 19; Cboe Letter I, at 19.

³³⁴ See, e.g., Citi Letter, at 5.

stoppage.”³⁴³ Other commenters emphasized the need for the Commission to closely monitor the impact of the Pilot on retail investors in particular.³⁴⁴ For example, one commenter argued that if the Pilot data suggests “clear harm to the retail investor in . . . relevant execution quality metrics” like “quoted spread, depth of liquidity, intraday stock volatility, and opportunities for price improvement on impacted securities,” then the Pilot “should be immediately suspended.”³⁴⁵ Another commenter urged the Commission to closely monitor the Pilot’s effect on thinly-traded stocks and establish “predetermined means for discontinuing the Pilot in the event that the reviewed data shows undue harm to market or execution quality.”³⁴⁶ However, one commenter noted that the Commission is not obligated to “cease the [P]ilot if the costs to liquidity prove significant.”³⁴⁷

The Commission acknowledges the concerns raised by commenters regarding the potential for unintended and unanticipated consequences to the equities markets that the Pilot may have. The Commission intends to carefully monitor for any such effects during the Pilot Period. However, the Commission does not believe that it is necessary to add a “kill switch” to Rule 610T because the Commission already has broad exemptive authority that obviates the need for a separate kill switch. For example, if at any time the Commission believes that the protection of investors may be compromised by the Pilot, the Commission has broad authority under Section 36 of the Exchange Act to modify or terminate the Pilot early.³⁴⁸

5. Inclusion of a Phase-In Period

The Commission did not propose a phase-in period for the Pilot. Three commenters recommended a phase-in period without elaborating on its

³⁴³ See Vanguard Letter, at 3. See also Angel Letter II, at 3 (noting that the Pilot could be suspended quickly if “there is abundant evidence one way or the other about the results,” such as “a dramatic increase in market quality for one particular treatment group,” in which case “that particular group’s treatment could become the new rule,” or “if the pilot produces fast and unequivocal results showing harm to one particular treatment group, that treatment should be halted”).

³⁴⁴ See Schwab Letter, at 2; Citi Letter, at 4.

³⁴⁵ See Schwab Letter, at 2.

³⁴⁶ See STANY Letter, at 4.

³⁴⁷ Verret Letter I, at 5.

³⁴⁸ See 15 U.S.C. 78mm (setting forth the Commission’s authority, by rule, regulation or order, to conditionally or unconditionally exempt persons, transactions or securities (or classes thereof) from any Exchange Act provision, rule or regulation if such exemption is necessary or appropriate in the public interest and is consistent with the protection of investors).

purpose, though they referenced the EMSAC’s recommendation for an initial three-month phase-in period involving 10 stocks.³⁴⁹ A different commenter did not believe that the EMSAC’s three-month phase-in period was necessary.³⁵⁰

The Commission has considered these comments and believes a phase-in approach is not necessary and unnecessarily would add to the length of the Pilot. Although such an approach would allow the markets and market participants to implement the required fee changes in a staged manner and provide an opportunity to address unforeseen implementation issues, the Commission continues to believe that, because exchange fees can become immediately effective upon their filing with the Commission, the markets and market participants are accustomed to dealing with frequent exchange fee changes in which fees can change on all stocks at once, or only for a subset of stocks or a subset of trading mechanisms. Accordingly, exchanges and market participants should be capable of accommodating the terms of the proposed Pilot with the advance notice contemplated by the Pilot. Further, although exchanges would be required to collect and report certain data, the proposed Pilot would not necessitate changes to exchange trading systems, and therefore, the Commission continues to believe a phased implementation schedule is not necessary to test the types of changes contemplated by the Pilot.

E. Data

The Commission proposed that certain data be collected and made publicly available in order to facilitate the Commission’s and researchers’ ability to assess the impact of the Pilot, as well as to promote transparency about the Pilot Securities and to provide basic information about equities exchange fees and changes to those fees during the Pilot.³⁵¹ The Commission is adopting the Pilot Securities Lists, the Exchange Transaction Fee Summary, and the order routing datasets subject to the modifications described below.

1. Pilot Securities Exchange Lists and Pilot Securities Change Lists

As proposed, the Commission would publish, approximately one month

³⁴⁹ See State Street Letter, at 4; TD Ameritrade Letter, at 4; STANY Letter, at 3. See also Recommendation for an Access Fee Pilot (July 8, 2016), available at <https://www.sec.gov/spotlight/emsac/recommendation-access-fee-pilot.pdf> (“EMSAC Pilot Recommendation”).

³⁵⁰ See AJO Letter, at 2.

³⁵¹ See Proposing Release, *supra* note 2, at 13026.

before the start of the Pilot Period, the initial *List of Pilot Securities*, which identifies the securities in the Pilot and their designated Test Group (or the Control Group).³⁵² Thereafter, each primary listing exchange³⁵³ would publish a freely and publicly available daily *Pilot Securities Exchange List* of the Pilot Securities that are primarily listed on its exchange and also publish a *Pilot Securities Change List* of the cumulative changes to that list, and keep both lists available on their websites for five years.³⁵⁴

The Commission received one comment that was supportive of the proposed requirements for disseminating and updating the Pilot Securities lists, including the pipe-delimited ASCII file format and the five year retention period.³⁵⁵ This commenter also had “no objections to the proposed posting requirements, providing there is adequate data security and controlled access.”³⁵⁶ The Commission is not adopting any new requirements for data security with respect to the Pilot Securities lists because that data is not private or otherwise sensitive in nature and because the exchanges already are subject to Regulation SCI governing access to their systems that support trading.³⁵⁷

For the reasons stated in the Proposing Release, the Commission is adopting as proposed the requirements in Rule 610T(b) for the primary listing exchanges to publicly post on their websites downloadable files containing the Pilot Securities Exchange Lists and the Pilot Securities Change Lists.³⁵⁸ The Commission is adding one additional

³⁵² See Proposed Rule 610T(b)(1). See also Proposing Release, *supra* note 2, at 13026. When the Commission publishes this list, the pre-Pilot Period will have been in place for approximately five months.

³⁵³ See Proposed Rule 610T(b)(1)(iii) (defining “primary listing exchange” for purposes of Rule 610T).

³⁵⁴ See Proposing Release, *supra* note 2, at 13027–28. The Commission notes that the proposed language in Rule 610T(b)(3)(i) has been modified slightly. As proposed, Rule 610T(b)(3)(i) contained the phrase “throughout the duration of the Pilot, including the post-Pilot Period.” As adopted, the phrase “throughout the end of the post-Pilot Period” is being substituted for the phrase “throughout the duration of the Pilot, including the post-Pilot Period” to simplify the rule text without substantively changing the applicability of the posting requirement.

³⁵⁵ See FIF Letter, at 5.

³⁵⁶ *Id.*

³⁵⁷ See 17 CFR 242.1001(a)(1). SCI systems include all computer, network, electronic, technical, automated or similar systems of, or operated by or on behalf of, an SCI entity that directly support activities such as trading and order routing, among other things. 17 CFR 242.1000.

³⁵⁸ See Proposing Release, *supra* note 2, 13026–28.

field, “stratum code,” to both lists.³⁵⁹ As discussed in the Proposal and above, the Commission will stratify Pilot Securities as it assigns them to the Test Groups and Control Group to ensure that each group has a similar composition, which facilitates comparison across groups.³⁶⁰ As it does so, the Commission will assign a stratum code to each Pilot Security that identifies that security’s liquidity strata. The code is a static value and, as such, will remain constant throughout the Pilot. The Commission will include this stratum code on the initial List of Pilot Securities that it disseminates. To link each Pilot Security and its stratum code, the Commission is requiring the primary listing exchanges to include this data element on each Pilot Securities Exchange List and Pilot Securities Change List. Including this field on each list will clearly identify each Pilot Security’s liquidity stratum, thereby allowing researchers to control for the fact that within some liquidity strata, the ratio of Test Group stocks to Control Group stocks is lower than it is for others, which should facilitate analysis of the Pilot’s data.

2. Exchange Transaction Fee Summary

As proposed, each exchange that trades NMS stocks would be required to compile, update monthly, and make freely and publicly available a dataset using an XML schema published on the Commission’s website that contains specified information on its fees and fee changes during the Pilot.³⁶¹

In particular, each exchange would identify, among other things, the “Base” take fee (rebate), the “Base” make rebate (fee), the “Top Tier” take fee (rebate), and the “Top Tier” make rebate (fee), as applicable, as well as the Pilot Group (*i.e.*, 1, 2, or Control) that applies to the

fee being reported.³⁶² Exchanges also would calculate the “average” and “median” per share fees and rebates, which the exchange would compute as the monthly realized average or median per-share fee paid or rebate received by participants on the exchange during the prior calendar month, reported separately for each participant category (registered market makers or other market participants), Test Group, displayed/non-displayed, and top/depth of book.³⁶³

In the Proposing Release, the Commission asked several questions about the Exchange Transaction Fee Summary including questions about the proposed form, content, and posting requirements. Commenters supported requiring the equities exchanges to publicly post the Exchange Transaction Fee Summary as well as the proposed fields included in the summaries.³⁶⁴

Among those questions included in the Proposing Release, the Commission specifically asked commenters to suggest types of information that should be captured on the Exchange Transaction Fee Summary that would be useful to make comparisons across exchanges, and a few commenters offered specific suggestions.³⁶⁵

Specifically, two commenters requested that the Exchange Transaction Fee Summary include the number of pricing tiers used by the exchanges, the number of firms that were in each tier, and information on transaction costs in each tier.³⁶⁶ Similarly, another commenter suggested that the Exchange Transaction Fee Summary provide context on the Base and Top Tier fees by including the number of member firms, by participant type, that qualified for the Base and Top Tier fees and rebates reported on the Exchange Transaction Fee Summary.³⁶⁷

While the Commission appreciates these suggestions, it believes that adding more granular details about specific pricing tiers, which can vary greatly by exchange, would overcomplicate the fee summaries such that it would be difficult to standardize the information, thereby rendering the data less useful to researchers when comparing exchanges for purposes of the Pilot.³⁶⁸ Further, with respect to the number of members

qualifying for the Base and Top Tier fees and rebates, the Commission believes that the information that exchanges will report on average and median realized fees and rebates should be sufficient for purposes of analyzing the Pilot’s results, including any changes in order routing. We believe that the disclosure of the number of members qualifying for the Base and Top Tier fees and rebates would also require other disclosures (including, *e.g.*, such member’s trade volume at each tier) in order to provide context to the information. Providing all of these additional data points would increase the costs and complexity of the Pilot. The Commission however, does not believe that the incremental benefit of this information justifies additional costs and complexities. Accordingly, the Commission will not be requiring the exchanges to include additional information on their pricing tiers.

As part of its request for comment in the Proposal on what additional information would be helpful to include in the Exchange Transaction Fee Summary, the Commission specifically asked whether other measures beyond average and median fees should be selected.³⁶⁹ In response, one commenter recommended that in addition to requiring the average and median per share fees and rebates, the Commission also require the “mode” per share fee and rebate (*i.e.*, the most frequently paid fee and rebate by each exchange’s members), because the commenter believed it would “enable a more accurate comparison of the fees and rebates most often applied by each exchange.”³⁷⁰ The Commission appreciates this suggestion, but continues to believe that for purposes of this Pilot, the proposed information on mean and median realized fees and rebates will be sufficient for purposes of analyzing the results of the Pilot, including any changes in order routing.

Lastly, a few commenters requested that the Exchange Transaction Fee Summary information be hosted at a central location rather than posted on the exchanges’ individual websites.³⁷¹ While the Commission recognizes that it could be more convenient if the information were made available in one central location, because the data must be made available unencumbered and in a standardized XML schema format, the Commission believes that any person would readily be able to obtain and combine the summaries posted by each equities exchange with minimal effort.

³⁵⁹ The Commission is also modifying the name of the field specified in proposed Rule 610T(b)(2)(ii)(E). The Commission proposed the field be named “Test Group.” As adopted, the field will be named “Pilot Group” to provide additional clarity.

³⁶⁰ See Proposing Release, *supra* note 2, 13019, 13051.

³⁶¹ The Commission notes that the proposed language in Rule 610T(e) has been modified slightly. As proposed, Rule 610T(e) contained the phrase “each national securities exchange that trades NMS stocks. . . .” As adopted, the clause “that facilitates trading in NMS stocks” is being substituted for the phrase “that trades NMS stocks” to clarify that exchanges facilitate trading by their members in NMS stocks. In addition, the Commission notes that, as proposed, Rule 610T(e) contained a parenthetical which explained that data requirements set forth in subsection (e) were “applicable to securities having a price greater than \$1.” As adopted, that parenthetical has been modified slightly to clarify that the requirements of subsection (e) apply to “securities having a price equal to or greater than \$1.”

³⁶² See Proposed Rule 610T(e). See also Proposing Release, *supra* note 2, at 13029–30.

³⁶³ See Proposing Release, *supra* note 2, at 13030. See also Rule 610T(e).

³⁶⁴ See, *e.g.*, SIFMA Letter, at 6; Better Markets Letter, at 7; Spatt Letter, at 4–5; and IEX Letter I, at 9.

³⁶⁵ See Proposing Release, *supra* note 2, at 13031.

³⁶⁶ See CFA Letter, at 5; Healthy Markets Letter I, at 22.

³⁶⁷ See IEX Letter I, at 9.

³⁶⁸ See Proposing Release, *supra* note 2, at 13030.

³⁶⁹ See Proposing Release, *supra* note 2, at 13031.

³⁷⁰ See RBC Letter I, at 5.

³⁷¹ See Better Markets Letter, at 7; CFA Letter, at 5; Healthy Markets Letter I, at 23.

Because of this, the Commission is not adopting a requirement on exchanges to consolidate this material and make it available in a central location.

3. Order Routing Data

To facilitate an examination of the impact of the Pilot on order routing behavior, execution quality, and market quality, the Commission proposed to require throughout the Pilot (including during the pre-Pilot Period and the post-Pilot Period) that each equities exchange prepare and publicly post a monthly downloadable file containing sets of anonymized order routing data in accordance with the specifications proposed in Rule 610T(d).³⁷² Specifically, Rule 610T(d) would require exchanges to provide the order routing information in two datasets—one for liquidity-providing orders and one for liquidity-taking orders, both aggregated by day, security, and broker-dealer.³⁷³ The Commission further proposed that equities exchanges would be required to anonymize the identity of individual broker-dealers before making the order routing datasets publicly available, using an anonymization key provided by the Commission.³⁷⁴

A number of commenters supported the proposed requirements regarding the order routing datasets, expressing the belief that these requirements would provide researchers with useful data that would facilitate an analysis of the impact of transaction fees and rebates on order routing, execution quality, and market quality.³⁷⁵ Several commenters believed the data would enable the Commission to make data-driven decisions on potential future equity market structure policy initiatives.³⁷⁶ Others specifically supported the website posting requirement to make the data freely and publicly available.³⁷⁷

³⁷² See Proposing Release, *supra* note 2, at 13031.

³⁷³ Proposed Rule 610T(d)(1)–(2). The Commission notes that the proposed language in Rule 610T(d) has been modified slightly. As proposed, Rule 610T(d) contained the phrase “each national securities exchange that trades NMS stocks. . . .” As adopted, the clause “that facilitates trading in NMS stocks” is being substituted for the phrase “that trades NMS stocks” to clarify that exchanges facilitate trading by their members in NMS stocks.

³⁷⁴ See Proposing Release, *supra* note 2, at 13032.

³⁷⁵ See, e.g., Barnard Letter, at 1; CII Letter, at 2–3; Better Markets Letter, at 7; Invesco Letter, at 1–2; Wellington Letter, at 1; CFA Letter, at 5; Clearpool Letter, at 6; ICI Letter I, at 5; RBC Letter I, at 5; Joint Pension Plan Letter, at 2; Oppenheimer Letter, at 2; IEX Letter I, at 10; Capital Group Letter, at 4; Healthy Markets Letter I, at 24; Angel Letter, at 1; Verret Letter I, at 1, 7; Spatt Letter, at 3.

³⁷⁶ See, e.g., Clark-Joseph Letter, at 1; Nuveen Letter, at 2; NYSTRS Letter, at 1; RBC Letter I, at 2; Invesco Letter, at 2; CFA Letter, at 1; State Street Letter, at 2; AJO Letter, at 1; Vanguard Letter, at 2.

³⁷⁷ See, e.g., AJO Letter, at 3–4; ICI Letter I, at 5; CFA Letter, at 5.

In addition, other comments addressed matters such as: Separating held and not-held orders in the datasets, separating principal from agency orders in the datasets, and not collecting “parent order” routing information.³⁷⁸ Other commenters expressed concern that not collecting similar data from non-exchange venues would decrease the utility of the data and provide the Commission with an incomplete picture of the Pilot’s impact.³⁷⁹ Other commenters were critical of the proposed order routing data requirements because they believed, despite the anonymization and aggregation requirements, that publicly available data could be reverse engineered to reveal commercially-sensitive information about individual broker-dealers.³⁸⁰ These concerns are discussed further, below.

a. Held and Not-Held Orders

The Commission proposed to require exchanges to separate out held and not-held orders in the order routing datasets and requested comment on whether orders should be separated out in that manner and whether there are certain shared characteristics of such orders that would be beneficial to assess when analyzing the Pilot data.³⁸¹ In response, several commenters stated that exchanges currently do not capture whether orders are held or not held.³⁸² Two commenters added that capturing that information would impose additional costs on market participants who would need to update their systems to include this information in the order messages they send to exchanges, as well as impose additional costs on exchanges to capture and report whether an order is held or not held.³⁸³

The Commission has considered these comments and has determined not to require the exchanges to separate held and not-held orders in the order routing datasets. In proposing to require capture of held and not-held orders, the Commission sought to include a data field that is readily available to and currently captured by exchanges and that would provide insight into the capacity in which a broker-dealer is handling orders. In turn, that information could be useful to assess the broker-dealer’s routing of those orders. For example, orders that are “held to the market” may be routed

differently than orders that are “not held” and for which the broker-dealer exercises more discretion in their execution. By separating out these orders, researchers would have access to an additional metric that potentially could be helpful in analyzing the Pilot data and parsing the results.

As commenters have indicated, however, broker-dealers do not transmit this information to exchanges and exchanges thus do not capture it. The Commission does not wish to impose new data collection requirements with respect to this Pilot data field, and therefore is not adopting this element. However, as detailed below, the Commission is adopting a new requirement for exchanges to instead separate out orders based on their order capacity (e.g., principal, riskless principal, and agency), which information currently is transmitted to exchanges by broker-dealers.³⁸⁴

b. Principal Order Flow and Order Capacity

In response to the Commission’s question in the Proposing Release about what data are necessary to facilitate an analysis of the potential conflicts of interest associated with transaction fees and rebates,³⁸⁵ several commenters requested that the order routing datasets exclude orders marked as principal or riskless principal because the potential conflicts of interest posed by exchange transaction fees and rebates pose a potential harm primarily when broker-dealers are routing orders for customers in an agency capacity and may be unduly influenced by exchange fees and rebates to the detriment of obtaining the best execution for the customer’s order.³⁸⁶ To the extent a broker-dealer is routing its own proprietary order and is unduly influenced by exchange fees and rebates, then, at worst, it would only be harming itself. In other words, as noted by one commenter, “a broker may route principal orders to maximize rebates and minimize access fees which would not be considered a conflict of interest.”³⁸⁷

Without separating out orders by their order capacity, one commenter argued that the order routing datasets could generate “misleading results” because the trades of various market participants could be aggregated at the same broker

³⁸⁴ See, e.g., FIX Tag 528 (Order Capacity) under FIX 4.4 and Fix Tag 47 (Rule80A) under TIF 4.2, available at <http://btobits.com/fixopaedia/index.html>.

³⁸⁵ See Proposing Release, *supra* note 2, at 13033.

³⁸⁶ See FIA Letter, at 3; SIFMA Letter, at 8; Citadel Letter, at 3; Citi Letter, at 5–6.

³⁸⁷ SIFMA Letter, at 8. See also Cboe Letter I, at 3 fn. 8.

³⁷⁸ See *infra* notes 382, 386, and 395–397.

³⁷⁹ See *supra* notes 41–46.

³⁸⁰ See *infra* note 404.

³⁸¹ See Proposing Release, *supra* note 2, at 13031, 13033.

³⁸² See FIA Letter, at 3 fn. 8; FIF Letter, at 6; Citadel Letter, at 3 fn. 5; IEX Letter I, at 10.

³⁸³ See FIA Letter, at 3 fn. 8; IEX Letter I, at 10.

due to “direct market access arrangements,” and these orders would be indistinguishable from customer orders routed by that broker.³⁸⁸ In this way, agency orders (which are subject to conflicts of interest concerns that are relevant to the Pilot) could be mixed in with principal orders (which are not subject to conflicts of interest concerns that are relevant to the Pilot) and the inability to distinguish them could cloud the results. Accordingly, one commenter recommended separating principal and agency orders in the order routing datasets, while continuing to include both types of order flow.³⁸⁹ The commenter believed that specifically identifying the extent to which orders are principal orders or agency orders “would further facilitate the analysis of order flow and a better understanding of the efficacy of the [P]ilot.”³⁹⁰

After careful consideration of these comments, the Commission has determined to require exchanges to separate out orders by order capacity (e.g., principal, riskless principal, and agency). Requiring exchanges to separately aggregate orders according to their order capacity will allow researchers to more precisely parse the data as recommended by several commenters, particularly when analyzing the potential conflicts of interest in broker-dealer routing presented by exchange fee-and-rebate pricing models. For example, researchers will be able to separate out and exclude principal orders when studying conflicts of interest, as conflicts of interest do not present the potential for harmful impact with respect to such orders as they do for agency orders where the broker-dealer is routing for others. In addition, researchers will be able to include orders of any order capacity when studying other questions, such as intermediation, queue length, and time to execution, as such issues are relevant to orders of any capacity.

Further, the Commission believes that principal orders should be included in the order routing datasets, as the Pilot is designed to assess more than just conflicts of interest between brokers and their customers in order routing. It also is designed to observe the impact of exogenous shocks to transaction fees and rebates on execution quality and market quality broadly. Accordingly, the Pilot will provide the opportunity to obtain useful data on matters such as

intermediation, queue length, and time to execution; the impact of fees and rebates on liquidity adding and liquidity removing activity; the relationship between payment of rebates on making activity (or taking activity on an inverted exchange) and fee levels for taking activity (or making activity on an inverted exchange); and the impact of fees and rebates on order routing behavior generally. Consideration of these issues directly implicates principal order flow and, as such, the Commission believes it is critical for the aggregated volume statistics included in the order routing datasets to include principal orders.

c. Order Designation

In response to questions in the Proposing Release on specific measures and data that would facilitate an analysis of the effects that changes to transaction fees and rebates have on order routing behavior, execution quality, and market quality, several commenters recommended that the Commission analyze the impacts of fees and rebates on various aspects of the execution quality of investors' limit orders.³⁹¹ Further, on the impact that prohibiting rebates may have on quoted spreads and displayed liquidity, commenters also disagreed about the willingness and ability for investors, other than those that are motivated by rebate capture, to post liquidity in order to capture the quoted spread.³⁹² In addition, in attempting to utilize transaction data to analyze the impact of reduced or eliminated rebates, one commenter recommended that the dataset exclude orders that presently are not eligible for rebates, such as those designated for participation in opening and closing auctions.³⁹³

While analyzing the impact of reduced or eliminated rebates is one potential analysis for which the Pilot's data may be useful, the Pilot's purpose is broader in scope. As such, the Commission continues to believe that it is appropriate for the order routing datasets to capture all liquidity-providing and liquidity-taking orders. However, in response to the commenters' recommendations discussed above and in an effort to ensure that the order routing data be as useful as possible and facilitate an analysis of the impacts of the Pilot, the

Commission has determined to further refine the order routing dataset by requiring exchanges to report separately the volume statistics by “order designation,” which will require exchanges to separate out post-only orders as well as auction orders.

Separating the volume statistics in this manner will allow isolation of the cumulative number of post-only orders, which are limit orders that include instructions to never remove liquidity, and may be more reflective of a rebate-sensitive market participant. With the data further refined in this manner, the Commission believes the data will be more useful in analyzing the impacts of the Pilot both in comparing the pre-Pilot data to the Pilot data and in comparing the data across the Test Groups and Control Group during the Pilot. In particular, the further refinement will facilitate assessment of the impact of the Pilot on the willingness of investors to passively post orders and their ability to obtain queue priority (i.e., represent the best price in the exchange's limit order book) and capture the quoted spread when doing so (i.e., buy on the bid and sell on the offer).³⁹⁴

Furthermore, with respect to auction orders, which are orders specifically designated for execution in either an opening or closing auction, instead of separating out auction orders, exchanges may instead elect to simply exclude them from the order routing datasets, as an alternative means of complying with the order designation requirement. The Commission has determined to allow the exchanges to choose between these two approaches so that they may choose the option that is the least burdensome. If exchanges choose to include auction order data in the order routing datasets, they will need to comply with the requirement by separating orders by order designation, so that these orders may be separately identified and accounted for in any analyses of the Pilot's data.

The ability to isolate auction orders recognizes the uniqueness of the auction process and will facilitate separation of that data in order to study the Pilot's impact on trading during the regular market session without potentially biasing the results by including auction activity, for which different trading rules, order types, and fees apply.

³⁹¹ See, e.g., Fidelity Letter, at 8; ICI Letter I, at 5; SIFMA Letter, at 5–6; IEX Letter I, at 2. See also Proposing Release, *supra* note 2, at 13033.

³⁹² See *supra* notes 224–225 and accompanying text.

³⁹³ See Mulson Letter I.

³⁹⁴ See *supra* Section II.C.10.

³⁸⁸ See FIA Letter, at 3 fn. 9.

³⁸⁹ See Clearpool Letter, at 6.

³⁹⁰ *Id.*

d. Broker Routing Data

Several commenters addressed the utility of obtaining order routing data from broker-dealers that route customer orders in assessing the potential conflicts of interest related to transaction fees and rebates.³⁹⁵ Several of these commenters explained that obtaining data from broker-dealers (in addition to or in place of obtaining such data from exchanges) would facilitate an analysis of the impact of transaction fees and rebates on order routing behavior and potential conflicts of interest from the perspective of customers, as the brokers would have information that can be used to assess the execution quality of a “parent order” and would provide information on the broader universe of potential routing destinations, including non-exchange trading venues.³⁹⁶ One commenter added that investors needed to conduct their own analyses of their orders to understand the impact of the Pilot on their brokers.³⁹⁷

The Commission is not requiring data collection from broker-dealers or non-exchange trading venues. The order routing datasets will include aggregated data from exchanges (as opposed to individual order level data from broker-dealers) representing the sum totals of the “child” orders that are processed by an exchange. While the Pilot will not capture the entire lifecycle of a “parent” order from its inception, the Commission believes that its approach will minimize the implementation costs on market participants while ensuring that the Commission and researchers have useful data on child orders to observe the impacts of introducing exogenous shocks to exchange transaction fees and rebates. The order routing data provided by the exchanges represents the information that would be directly correlated to these exogenous shocks. Data that is available elsewhere³⁹⁸ will provide the ability to understand any observed changes in order flows or market share to non-exchange venues during the Pilot.

Further, the Commission agrees with the commenters that noted that market participants need to conduct their own analyses of their own order flow. If market participants conduct their own analyses, including parent order-level

analyses, and wish to provide that information to the Commission and the public, the Commission would be able to consider the information in assessing the Pilot’s ultimate impact on order routing behavior, execution quality, and market quality. The Commission encourages market participants to conduct analyses and make the results of their analyses public. The Commission also encourages any interested party that prepares an analysis of the Pilot to submit it to the Commission for posting on the Commission’s website.³⁹⁹

e. Directed Orders

Two commenters recommended that the order routing datasets identify whether orders are directed or non-directed.⁴⁰⁰ One of these commenters believed that directed orders do not feature “the same level of discretion and conflicts of interest that are the primary focus of the” Pilot.⁴⁰¹ After careful consideration of these comments the Commission has determined not to require the order routing datasets to identify directed orders. The Commission recognizes that researchers may be interested in isolating orders directed by customers to specific exchanges because these orders may not be subject to the same potential conflicts of interest that may be present when a broker chooses where to route a customer order. However, separating out directed orders in the datasets (which report *aggregated* data and not order-by-order data) would require exchanges and broker-dealers to incur additional costs in preparing the Pilot’s order routing data. Further, the Pilot is designed to assess more than just conflicts of interest between brokers and their customers in order routing, and separate identification of directed and non-directed orders is not germane to the other questions the Pilot is designed to explore. Accordingly, the Commission believes that the additional implementation costs that adding such a requirement would impose are not justified by any benefits that may accrue from identifying, on an aggregated basis, directed orders in the order routing data.

f. Utilizing the Consolidated Audit Trail

Two commenters recommended that, instead of requiring separate order routing datasets, the Commission instead use data that the equities exchanges will report to the

Consolidated Audit Trail (“CAT”).⁴⁰² In the Proposing Release, the Commission stated that if the equities exchanges are reporting to the CAT at the time the Pilot commences, they would be able to compile the order routing datasets by utilizing the data they collect pursuant to the CAT national market system plan.⁴⁰³ However, there have been delays in the development and building of the CAT, and the reporting required by the first phase of the CAT NMS Plan has been delayed. Although the exchanges and FINRA have recently begun to report certain data to the CAT central repository, they continue to work to fully implement the first phase of the CAT NMS Plan, including linkages between reported events and regulators’ query functionality. The Commission believes that it is important to proceed with the Pilot and not delay the Pilot until the exchanges have begun full reporting to the CAT and the CAT operates in a manner that would facilitate the data analysis contemplated by the Pilot.

g. Anonymization and Public Availability

Several commenters expressed concerns about having the exchanges publicly post the order routing datasets, despite the requirement that the exchanges anonymize the identities of broker-dealers before making the datasets publicly available. These commenters believed that the order routing data could potentially be “reversed engineered” such that market participants might be able to ascertain the identities of individual broker-dealers in some circumstances.⁴⁰⁴ In contrast, one commenter acknowledged that ensuring confidentiality is “critical” and was “pleased to see that the SEC has recognized this in proposing anonymizing certain of the proposed data to protect confidential information.”⁴⁰⁵

Of the commenters concerned about the potential for reverse engineering, one of these commenters provided an example of how the information could

³⁹⁵ See, e.g., Healthy Markets Letter I, at 24–25; Pragma Letter, at 3; NYSE Letter I, at 9–10; NYSE Letter II, at 12–13; Viable Mkts Letter, at 2; Babelfish Letter, at 3.

³⁹⁶ See e.g., Healthy Markets Letter I, at 24–25; Pragma Letter, at 3; NYSE Letter I, at 9–10; NYSE Letter II, at 12; Viable Mkts Letter, at 2.

³⁹⁷ See Babelfish Letter, at 3.

³⁹⁸ See FINRA OTC Transparency Data, available at <https://otctransparency.finra.org/>.

³⁹⁹ See *supra* note 302 and accompanying text.

⁴⁰⁰ See Healthy Markets Letter I, at 23–24; Clearpool Letter, at 6.

⁴⁰¹ Healthy Markets Letter I, at 23.

⁴⁰² See Citadel Letter, at 3; TD Ameritrade Letter, at 6. In response to the Commission’s solicitation of comment in the Proposing Release on whether the CAT repository, if it were operational, would provide sufficient data to evaluate the Pilot, one commenter stated that it believed the data reported from the CAT would provide the necessary information with respect to order routing data. See FIF Letter, at 2.

⁴⁰³ See Proposing Release, *supra* note 2, at 13031 n. 172 and accompanying text.

⁴⁰⁴ See, e.g., FIA Letter, at 3; Virtu Letter, at 7–8; SIFMA Letter, at 6; FIF Letter, at 2; Citadel Letter, at 4; Citi Letter, at 6; TD Ameritrade Letter, at 5; STANY Letter, at 5; IEX Letter I, at 10; Credit Suisse Commentary, at 6; Morgan Stanley Letter, at 4.

⁴⁰⁵ See Clearpool Letter, at 6–7.

be reverse engineered if “a market participant could direct a large order in a particular symbol to a specific broker-dealer, and then identify the presence of that order” in the order routing datasets.⁴⁰⁶ This commenter added that market participants may also be able to compare the order routing datasets with reports published pursuant to 17 CFR 242.605 (Rule 605 of Regulation NMS) to determine the identity of broker-dealers.⁴⁰⁷ Once a broker-dealer’s identity is likely known, this commenter believed that competitors could use the order routing datasets to discern that broker’s “(a) market share and activity in a given security, (b) overall routing practices, and (c) relative aggressiveness or passiveness in specific securities.”⁴⁰⁸ This commenter also believed that strategies used by institutional investors that are customers of broker-dealers “may also be susceptible to reverse-engineering.”⁴⁰⁹ Another commenter added that it believed “market participants and others will be able to identify certain broker-dealers routing strategies by comparing the Pilot data to publicly available 17 CFR 242.606 (Rule 606) disclosures, or by other means,” although it did not specify those other means.⁴¹⁰

Several of the commenters that expressed concern about the public availability of the order routing data, despite the proposed anonymization requirements, recommended approaches to address their concerns. Some of these commenters stated that the Commission should receive order routing data at the broker-dealer level, but that the public should only have access to data that is further aggregated, such that the data would include statistics for firms of similar types or business models, or simply aggregate all orders received by the exchange.⁴¹¹ However, in contrast, two commenters noted that the order routing data aggregated by broker would be important to analyses undertaken by researchers and therefore should be made more broadly available.⁴¹² Two other commenters suggested that if the order routing data aggregated by broker would be helpful for researchers, the Commission should provide that data to researchers only if they sign a non-

disclosure agreement.⁴¹³ In addition, three commenters recommended that if order routing datasets are to be made publicly available on exchange websites, they should be subject to a 120 day delay instead of a 30 day delay.⁴¹⁴

The Commission appreciates commenters’ concerns about the need to safeguard the confidentiality of the order routing datasets. The Commission agrees that if market participants were able to identify specific broker-dealers in the datasets, there is the potential that the data could be reverse engineered to reveal proprietary information about trading attributable to specific broker-dealers. The Commission has revised its approach to eliminate the public availability of the order routing datasets to help address these concerns, while still furthering the goals of the Pilot. More specifically, to address commenters’ concerns with the public availability of the data and the exchanges’ role in preparing it for dissemination, the Commission is not adopting the requirement for the exchanges to anonymize⁴¹⁵ and publicly post the order routing data.

The Commission, however, believes it is important for the Commission itself to have access to the order routing dataset, so the Commission can consider the effects of rebates and transaction-based fees on order routing behavior, execution quality, and market quality. Accordingly, given the potential for reverse engineering, the Exchanges will be required to provide order routing data directly to the Commission.

While the Commission anticipated benefits from market participants, researchers, and others in conducting independent analysis of the Pilot and its impacts, the Commission has carefully balanced the concerns about possible reverse engineering of the order routing data against these benefits. The Commission believes that it can assess the effects of the transaction-fee and rebate models on order routing behavior and thereby achieve this goal of the Pilot without requiring public disclosure of order routing data attributable to a specific broker-dealer.

The Commission is not adopting the requirement for exchanges to make public in an anonymized form the order

routing data, but the exchanges will instead identify individual broker-dealers by MPID or CRD number in the order routing data they send to the Commission. The Commission recognizes that order routing data attributable to a specific broker-dealer is particularly sensitive and is non-public information.⁴¹⁶ The Commission, however, intends to make public analyses, results, and studies using the order routing data. In determining whether and how to make public this or any other information, the Commission will be sensitive to the concerns articulated by commenters and will consider steps such as aggregating or anonymizing order routing data.

Specifically, the Commission is adopting a requirement for each exchange to prepare and transmit directly to the Commission, in pipe-delimited ASCII format, no later than the last day of each month, a file containing sets of order routing data.⁴¹⁷ While the Commission is not requiring the exchanges to anonymize the data and thus will no longer provide exchanges with the Broker-Dealer Anonymization Key, the Commission is requiring each exchange to provide its order routing data by broker-dealers’ CRD number and MPIDs in order to provide aggregated broker-dealer level data to the Commission to facilitate its analysis of the data.⁴¹⁸

The Commission believes that the suggested alternative to further aggregate the datasets, for example, to combine the data of several firms together or combine all firms together, would seriously compromise the ability of researchers to investigate the potential conflicts of interest in routing because researchers would not be able to see an individual broker-dealer’s orders across all exchanges and thereby would not be able to assess how any particular broker-dealer may have been influenced by fees and rebates at

⁴¹⁶ The Commission will deem broker-dealer identifying order routing data as being subject to a confidential treatment request under 17 CFR 200.83 without the need to submit a request. The Freedom of Information Act provides at least two potentially pertinent exemptions under which the Commission has authority to withhold certain information. See 5 U.S.C. 552(b)(4) and (8).

⁴¹⁷ See Proposing Release, *supra* note 2, at 13033 (asking whether commenters think exchanges should be required to report the datasets directly to the Commission). Further, in its Proposal, the Commission noted that it considers the order routing data to be “regulatory” information and proposed to prohibit exchanges from accessing or using the information for commercial purposes. See *id.* at 13032. The Commission is adopting as proposed the prohibition on exchange personnel accessing the data for commercial purposes, as exchanges will have access to the information.

⁴¹⁸ See *id.* at 13032. See also Rule 610T(d)(1)(iv) and (d)(2)(iv).

⁴⁰⁶ Citadel Letter, at 4.

⁴⁰⁷ See *id.*

⁴⁰⁸ *Id.*

⁴⁰⁹ *Id.*

⁴¹⁰ See TD Ameritrade Letter, at 5.

⁴¹¹ See, e.g., Citadel Letter, at 4; Credit Suisse Commentary, at 6; IEX Letter I, at 10; Morgan Stanley Letter, at 4; STANY Letter, at 5; SIFMA Letter, at 6–7; TD Ameritrade Letter, at 5; FIF Letter, at 7.

⁴¹² See Lipson Letter, at 1; Spatt Letter, at 3.

⁴¹³ See Citadel Letter, at 5; Citi Letter, at 6.

⁴¹⁴ See SIFMA Letter, at 7; STANY Letter, at 5; Fidelity Letter, at 11.

⁴¹⁵ Several commenters expressed concerns that the equities exchanges would have access to the Broker Dealer Anonymization Key. See, e.g., Virtu Letter, at 8; SIFMA Letter, at 7; FIF Letter, at 2; STANY Letter, at 5; IEX Letter I, at 10; Morgan Stanley Letter, at 4. As adopted, the exchanges would not have access to the Broker Dealer Anonymization Key, which addresses the commenters’ concerns.

different exchanges.⁴¹⁹ Because broker-dealer level data already is consolidated (*i.e.*, the data would not separate out individual customer activity), adding another level of consolidation by grouping broker-dealers together would cloud insight into the potential conflicts of interest question, rendering the data potentially useless for the purpose of studying conflicts of interest. Accordingly, the Commission continues to believe that it needs access to the order routing data in its proposed form, without further aggregation of the data.⁴²⁰

F. Implementation

The Commission proposed to publish a notice setting forth the start and end dates of the pre-Pilot, Pilot, and post-Pilot Periods.⁴²¹ If applicable, the Commission also would publish a notice if it determines to suspend the one-year sunset of the Pilot Period.⁴²² As discussed in the Proposing Release, the start date of the pre-Pilot Period would be one month from the date the Commission issues the notice, and the end date of the pre-Pilot Period would be six months from the pre-Pilot Period's start date. Thus, the Pilot, which is to start at the conclusion of the pre-Pilot Period, would begin seven months from the date the Commission issues the notice. The post-Pilot Period would commence at the conclusion of the Pilot and would end six months from the post-Pilot Period's start date. The Commission proposed to publish the initial notice setting forth the start date for each of the Pilot's three periods, and do so with a one-month minimum advance notice in order to allow the equities exchanges to finalize their preparations for the Pilot's pre-Pilot Period, as well as provide at least a seven-month advance notice to market participants of the start date on which

the Pilot's conditions would go into effect.⁴²³

One commenter agreed that a one-month period between the Commission's notice and the start of the pre-Pilot Period would be "sufficient provided there are no changes to the Pilot securities lists and assigned test/control groups."⁴²⁴ This commenter also agreed that the proposed seven-month period following the Commission's notice would be "sufficient to prepare for the Pilot."⁴²⁵ However, this commenter requested that "any technical specification materials required to support implementation of the Pilot be reviewed with the industry and finalized in an expeditious manner, six months prior to the launch of the pre-Pilot data gathering phase," which the commenter believed would "allow[] necessary time for industry firms to properly scope necessary development work and assign respective resources."⁴²⁶ Another commenter, however, did not believe that a one month period prior to the start of the pre-Pilot period would be sufficient for the industry to prepare and instead estimated that "the implementation of the pre-Pilot processing alone [would] take between three to four months."⁴²⁷ As discussed and addressed above, a few commenters recommended that the Pilot begin with a limited phase-in period with a small number of securities.⁴²⁸

After careful consideration of the comments received, the Commission continues to believe that the proposed implementation approach should provide adequate notice and time for those impacted by the Pilot to prepare for its requirements. The Pilot will begin with a six-month pre-Pilot period during which exchanges will not need to revise their fees to comply with the Pilot. At the conclusion of the pre-Pilot Period, exchanges will be required to revise any of their fees, which will apply to the Pilot Securities, that currently exceed the terms of the Pilot's Test Groups. While the Exchange Act allows exchanges to file their fees for immediate effectiveness, exchanges may choose to preview their Pilot-related fee changes to their membership to provide them with additional time to adjust their order routing systems in response to those changes.⁴²⁹ The Commission

does not anticipate that technical specification materials will be required to support implementation of the Pilot by broker-dealers because the Pilot solely concerns exchange fees which exchanges commonly adjust with little or no advance notice though immediately effective fee filings with the Commission. Therefore, broker-dealers currently are accustomed to accommodating the types of fee changes that would be required to comply with the requirements of the Pilot.

Further, the Commission believes that publishing the start date for each of the Pilot's three periods in advance, with at least one month's advance notice, will provide the exchanges with time to prepare the three types of data required by the Pilot. First, because the Commission will determine the initial List of Pilot Securities, the exchanges will only need to perform the ministerial task of separating out their listed issuers and creating the Pilot Securities Exchange Lists and Pilot Securities Change Lists. Second, the Exchange Transaction Fee Summaries will require each exchange to summarize its own fees, for which it is solely responsible, in the specified XML format. For the initial Exchange Transaction Fee Summary, which would be posted prior to the start of trading on the first day of the pre-Pilot Period, exchanges would not need to include information that is calculated on a look-back basis, because the look-back period for that report would predate the pre-Pilot Period. Accordingly, preparation of the initial Exchange Transaction Fee Summary report should be streamlined.⁴³⁰ Finally, the order routing datasets, because they also are prepared on a look-back basis, will not need to be prepared until the end of the second month of the pre-Pilot Period (as it will contain data for the first month of the pre-Pilot period).⁴³¹ Accordingly, the Commission continues to believe that the proposed time frames set forth in Rule 610T(c)(4) are sufficient to allow the equities exchanges and market participants to prepare for the requirements of the pre-Pilot Period, the Pilot Period, and the post-Pilot Period.

Groups and the Control Group if exchanges maintain different fee and rebate levels across the treatment groups, they will have seven months before the start of the Pilot Period to update their execution algorithms, including to accommodate the prohibition on rebates and Linked Pricing in the no-rebate Test Group.

⁴³⁰ The fields in the Exchange Transaction Fee Summary that are calculated based on a look-back period to the prior month are: Rule 610T(e)(9) (month and year of the average and median figures); (12) average take/make; and (13) median take/make.

⁴³¹ See Proposed Rule 610T(d).

⁴¹⁹ See, e.g., CFA Letter, at 5 (believing that "breaking the data out at the broker-dealer level will permit a closer examination of how different broker-dealers may change their order routing behavior in response to changes in fees and rebates at each exchange."); Lipson Letter, at 1; Spatt Letter, at 3; Better Markets Letter, at 7; Healthy Markets Letter I, at 24 fn. 87.

⁴²⁰ The Commission notes that the proposed language in Rule 610T(d)(1)(vi)(F), (d)(1)(xii)(H), and (d)(2)(vi)(F) has been modified slightly. As proposed, Rule 610T(d)(1)(vi)(F) and Rule 610T(d)(2)(vi)(F) both noted that the order size code at the largest share bucket was "> 10,000." As adopted, the largest share bucket order size code will be reflected as "≥ 10,000 share bucket." In addition, as proposed, Rule 610T(d)(1)(xii)(H) set forth a time frame of "> 30 minutes of order receipt." As adopted, that time frame will be clarified to state that the time frame is "≥30 minutes of order receipt."

⁴²¹ See Proposing Release, *supra* note 2, at 13033.

⁴²² See *id.*

⁴²³ See *id.* at 13033–34.

⁴²⁴ See FIF Letter, at 7–8.

⁴²⁵ See *id.* at 8.

⁴²⁶ See FIF Letter, at 8.

⁴²⁷ See Cboe Letter I, at 21.

⁴²⁸ See *supra* notes 349–350 and accompanying text.

⁴²⁹ Although broker-dealers will need to account for different fee and rebate levels across two Test

No comments were received regarding the required notice to suspend the automatic sunset provision. Accordingly, the Commission adopts this aspect of the Pilot for the reasons outlined in the Proposing Release.

G. The Commission's Authority To Conduct the Pilot

The Commission is adopting the Pilot in furtherance of its statutory responsibilities. In 1975, Congress directed the Commission, through enactment of Section 11A of the Exchange Act, to use its authority under the Exchange Act to facilitate the establishment of a national market system to link together the multiple individual markets that trade securities. Congress intended the Commission to take advantage of opportunities created by new data processing and communications technologies to preserve and strengthen the securities markets. Congress also directed the Commission to exercise this authority "to carry out" certain "objectives," which include assuring: "economically efficient execution of securities transactions"; "fair competition among brokers and dealers, among exchange markets, and between exchange markets and markets other than exchange markets"; the "availability . . . of information with respect to quotations for and transactions in securities"; and "an opportunity . . . for investors' orders to be executed without the participation of a dealer."⁴³² In addition, the Exchange Act elsewhere requires that the rules of national securities exchanges (i) "provide for the equitable allocation of reasonable dues, fees, and other charges among its members and issuers and other persons using its facilities," (ii) not be designed to "permit unfair discrimination between customers, issuers, brokers, or dealers," and (iii) not "impose any burden on competition not necessary or appropriate in furtherance of the purposes of [the Act]."⁴³³

⁴³² 15 U.S.C. 78k-1(a)(1)(C), (a)(2); *see also id.* sec. 78k-1(c)(1) (stating that self-regulatory organizations shall not make use of the mails or any means or instrumentality of interstate commerce to collect, process, distribute, publish, or prepare for distribution or publication any information with respect to quotations to assist, participate in, or coordinate the distribution or publication of such information, or to effect any transaction in, or to induce or attempt to induce the purchase or sale of, any such security in contravention of such rules and regulations as the Commission shall prescribe to "assure the . . . fairness and usefulness of the form and content of such information").

⁴³³ 15 U.S.C. 78f(b)(4), (b)(5), (b)(8). The Commission also has authority to adopt the Pilot pursuant to Exchange Act Sections 17(a) [15 U.S.C. 78q(a)] (requiring each exchange to make and keep" for prescribed periods such records, furnish such

Through these provisions Congress conferred on the Commission "broad authority to oversee the SROs' . . . operation . . ." of the national market system."⁴³⁴ And it is pursuant to this authority that the Commission originally adopted Rule 610(c). The Pilot reflects the Commission's efforts to evaluate, in light of changing market conditions, whether the existing transaction-based fee and rebate structure continues to further the statutory goals. In that sense, the Pilot follows as an appropriate progression from Rule 610, and it represents an important step in the Commission's continuing obligation to implement Congress's objectives for the national market system.

The Commission disagrees with the suggestion by one commenter that the Pilot is inconsistent with Exchange Act Section 19(b)(3)(A), which sets out part of the process by which proposed rule changes by self-regulatory organizations may become effective.⁴³⁵ Contrary to the commenter's suggestion, nothing in Section 19 interferes with the Commission's authority described elsewhere in the Exchange Act. Indeed, Section 19 itself makes clear that the Commission retains ultimate authority over the rules of registered exchanges, providing that "[n]o proposed rule change [by a self-regulatory organization] shall take effect unless approved by the Commission or otherwise permitted in accordance with [Section 19(b)]"⁴³⁶ and making clear that the Commission retains authority to suspend and institute proceedings to approve or disapprove even those exchange rules that are permitted to take effect upon filing with the Commission.⁴³⁷ Moreover, Section 19 explicitly permits the Commission to summarily implement or suspend any such proposed rule changes if, in the Commission's view, doing so would serve the public interest, protect investors, or assist in maintaining fair and orderly markets.⁴³⁸ And it makes clear that the Commission retains

copies thereof, and make and disseminate such reports as the Commission, by rule, "prescribes as necessary or appropriate in the public interest, for the protection of investors, or otherwise in furtherance of the purposes of [the Act]" and 23(a) [15 U.S.C. 78w(a)] (granting the Commission the power to make such rules and regulations as may be "necessary or appropriate to implement the provisions of this chapter" for which the Commission is responsible or for the execution of the functions vested in the Commission by the Act).

⁴³⁴ City of Providence, Rhode Island v. BATS Global Mkts., Inc., 878 F.3d 36, 41 (2d Cir. 2017).

⁴³⁵ *See* Cboe Letter I, at 10–11. *See* 15 U.S.C. 78s(b)(3)(A).

⁴³⁶ 15 U.S.C. 78s(b)(1).

⁴³⁷ *Id.* Sec. 78s(b)(3).

⁴³⁸ *Id.* Sec. 78s(b)(3)(B), (C).

authority to amend exchanges' rules on its own initiative.⁴³⁹

Commenters also disagreed about whether the Pilot complied with the Commission's statutory obligations under the Administrative Procedure Act⁴⁴⁰ ("APA") and whether the Pilot is consistent with the Exchange Act.⁴⁴¹ For example, working from the premise that the APA requires the Commission to "'examine[] the relevant data and articulate[] a satisfactory explanation for its action including a rational connection between the facts found and the choices made,'" ⁴⁴² one commenter believed that the Commission "lacks the administrative record," "evidence" and "analysis" that would be "needed to justify such drastic government intrusion into free markets."⁴⁴³ Another commenter, however, disputed that notion and observed that the Commission had developed the Pilot, in part, by relying on "empirical literature" that "is directly on point and speaks to the potential distortionary effects that the pilot program is designed to study" and that "certainly provides strong empirical support for further analysis by way of data generated through a pilot study."⁴⁴⁴ The responding commenter also found it significant that the Commission was "presently in the midst of a formal notice and comment process . . . which was informed by years of discussion at, and a proposal from, the [EMSAC]" and that the Commission "had chosen to act via a pilot program rather than a proposal for a long-term rule."⁴⁴⁵ The commenter therefore believed the

⁴³⁹ *Id.* Sec. 78s(c).

⁴⁴⁰ 5 U.S.C. 500, *et seq.*

⁴⁴¹ A few commenters suggested that the Pilot "would not withstand judicial scrutiny" because certain aspects of the Pilot were "arbitrary and capricious and not in accordance with law." *See, e.g.,* Nasdaq Letter I, at 3. Specifically, these commenters challenged the sufficiency of the Commission's economic analysis, the exclusion of non-exchange trading centers from the Pilot, the inclusion of ETPs in the Pilot, the ability of the Pilot to provide the Commission with usable data, and the Commission's decision to pursue a Pilot instead of other market structure initiatives. *See, e.g.,* Nasdaq Letter I, at 1–4, 8–9, 11; Cboe Letter I, at 12; NYSE Letter, at 2–3, 7. These specific concerns are addressed in Section IV (discussing the Commission's economic analysis), Section II.A.4 (discussing the exclusion of non-exchange trading centers from the Pilot), Section II.B.3 (discussing the inclusion of ETPs in the Pilot), Section II.E (discussing the ability of the Pilot to provide the Commission with usable data), notes 307–319 *supra* (discussing the Commission's decision to pursue a Pilot in conjunction with other market structure initiatives).

⁴⁴² Nasdaq Letter I, at 11 (quoting Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 43 (1983)).

⁴⁴³ *Id.* at 11–12.

⁴⁴⁴ Verret Letter I, at 5–6.

⁴⁴⁵ *Id.* at 6.

Commission had fulfilled its statutory obligations in “determin[ing] that, given existing evidence suggesting the distortive effect of practices in the market tied to rebates or access fees, a pilot program will provide sufficient information to inform potential future rulemaking.”⁴⁴⁶

The Commission agrees and notes that it has carefully examined available data on this issue, engaged in a lengthy and deliberative process, and taken into account the recommendations of two independent advisory bodies (EMSAC and the Investor Advisory Committee). The Commission developed the Pilot through a thorough review of the empirical literature, which was cited and discussed in the Proposing Release, as well as submitted as comments in response to this proposal.⁴⁴⁷ Moreover, as discussed in the Proposal, the EMSAC conducted a thorough process to consider, and ultimately formally recommend, that a pilot be conducted.⁴⁴⁸ The EMSAC reflected a broad and diverse set of perspectives. In addition, EMSAC heard testimony from experts during its open meetings (which included as panelists senior executives from exchanges) regarding exchange fee models, the appropriateness of a transaction fee pilot, and the shape that such a pilot should take.⁴⁴⁹ In addition to EMSAC, the independent Investor Advisory Committee also submitted a recommendation in support of the Pilot.⁴⁵⁰

After considering all of the available information, the Commission has identified a fundamental disagreement among exchanges, market participants, academics, and industry experts regarding the impact of such fees and rebates on the markets.⁴⁵¹ This disagreement is further exacerbated by the lack of data to evaluate these competing claims. The Commission believes that the Pilot is necessary to study the impact of exchange fees and rebates to determine whether a regulatory response is needed to mitigate the potential distortions that current exchange pricing models introduce to order routing behavior, market quality, and execution quality.

Some commenters argued that the Pilot’s imposition of new fee caps

constituted “impermissible government rate-making.”⁴⁵² For example, one exchange commenter stated that “[g]overnment-imposed price controls” “reduce choices for market participants,” “distort competition between over-the-counter venues and exchanges,” and are “costly to administer and lacking in an incentive to be efficient,” such that “they are only indicated where they overcome severe market imperfection such as monopoly ownership of a critical resource.”⁴⁵³ As discussed above, another commenter asserted that the Exchange Act “plainly contemplates that *exchanges*, rather than the SEC, will make an initial determination as to the price of a particular product or service,” and indicating that “fee setting is the province of each exchange, subject to the competitive forces that naturally control fees” and “subject to oversight only in particular situations.”⁴⁵⁴

Commenters expanded on this argument by stating that the Commission had not sufficiently “evaluate[d] whether there is any evidence that the Commission’s objectives in adopting the cap on access fees . . . are not being met.”⁴⁵⁵ One

⁴⁵² Nasdaq Letter I, at 2. See also Cboe Letter I, at 1.

⁴⁵³ Nasdaq Letter I, at 5, 11–12. See also Cboe Letter I, at 11; Mexco Letter, at 1. One commenter agreed that “price controls on access fees indicate something is broken in market structure,” but observed that “there has been no serious economic analysis, let alone a cost-benefit analysis, of what the optimal fee cap (if any) should be” and that the Pilot would “provide solid evidence that can be used to determine the optimal fee cap.” Angel Letter I, at 1–2; Angel Letter II, at 2.

⁴⁵⁴ Cboe Letter I, at 10 (citing 15 U.S.C. 78s(b)(3)(A)(ii), which provides that “a proposed rule change shall take effect upon filing with the Commission if designated by the self-regulatory organization as . . . establishing or changing a due, fee, or other charge imposed by the self-regulatory organization on any person, whether or not the person is a member of the self-regulatory organization”). This commenter also noted that “every single exchange transaction fee in place today was filed with, and processed by, the Commission” and that any fees that were inconsistent with the Exchange Act “could have been suspended or abrogated by the Commission if that were deemed necessary.” *Id.* at 6.

⁴⁵⁵ NYSE Letter I, at 11. This commenter identified the relevant “objectives” of Rule 610(c) as preventing the exchanges from “undermining Regulation NMS’s price protection and linkage requirements.” *Id.* Another commenter similarly characterized the “justification for the fee cap under Rule 610(c)” as “the existence of sustained market power created by the requirement of best execution and the prohibition against trading through,” which would permit exchanges to “charge high access fees thereby undermining Regulation NMS’s price protection and linkage requirements.” This commenter believed that the Commission had wrongfully assumed “that the market power presumably wielded by equities exchanges is so great that they may charge excessive fees now and in the future” unless “artificial government price constraints” are imposed. Nasdaq Letter I, at 12–13,

commenter, for example, found it “concerning that the fee caps in the proposed Pilot do absolutely nothing to further the justification of the original cap and, unlike the original access fee cap, are set at levels that completely undercut existing rates.”⁴⁵⁶ Exchange commenters further contended that the Pilot imposes “completely new limitations on exchanges’ business” that were “unrelated to Regulation NMS’s Access Fee Cap,” because the Pilot would “expand[] the cap on fees that exchanges may charge for execution not only against a protected quote, but for execution against any quote on an exchange, including depth-of-book and non-displayed orders,” as well as “limit . . . the rebates that an exchange pays” and “pricing that is linked to providing or removing liquidity on an exchange.”⁴⁵⁷

The Pilot has two Test Groups, one of which does not cap fees at all, but rather leaves in place the current Rule 610(c) fee cap and simply prohibits exchanges from *paying* rebates or offering Linked Pricing. The other Test Group does impose a lower fee cap for a small portion of NMS stocks (730 out of over 8,000 NMS stocks) for a limited period of time, but is doing so to study the effects of exchange fee-and-rebate pricing models and to gather data to assess the impact on the markets and market participants of a revised and lowered cap compared to the current cap. Further, the Commission selected an amount for that cap that was recommended by commenters, including the Investor Advisory Committee.

As explained above, the existing fee cap was designed, in part, to prevent trading centers from charging unreasonably high fees to market participants required to honor their quotations by the Order Protection Rule.⁴⁵⁸ Because “[a]ccess fees tend to be highest when markets use them to fund substantial rebates to liquidity providers, rather than merely to compensate for agency services,” the Commission was concerned that “the published quotations of [outlier]

12 n.38. The third commenter stated that the “original fee cap rationale” was to “address predatory outlier pricing.” Cboe Letter I, at 14.

⁴⁵⁶ Cboe Letter I, at 14.

⁴⁵⁷ NYSE Letter I, at 12. See also Cboe Letter I, at 10 (stating that it was a “conflict[] with the purposes of the Exchange Act and [a] depart[ure] from Commission precedent” to “cap fees for transactions that do not implicate intermarket price protection” and “ban[] linked pricing,” which has been “utilized by exchanges with SEC consent for years”).

⁴⁵⁸ See Securities Exchange Act Release No. 51808 (June 9, 2005), 70 FR 37496, 37545 (June 29, 2005) (File No. S7–10–04).

⁴⁴⁶ *Id.* at 5.

⁴⁴⁷ See, e.g., Swan Letter; IEX Letter I; NYSE Letter I.

⁴⁴⁸ See Proposing Release, *supra* note 2, at 13009 n.6, 13012–14.

⁴⁴⁹ See *id.* at 13009–14.

⁴⁵⁰ See IAC Recommendation.

⁴⁵¹ See, e.g., Section II.A.2. *supra* for a discussion of comments regarding the impact of current pricing models on market quality, execution quality, and order routing.

markets would not reliably indicate the true price that is actually available to investors or that would be realized by liquidity providers.”⁴⁵⁹ The Commission explained that the fee cap helped assure the fairness and usefulness of quotation information; limit the extent to which the true price for those who access quotations can vary from the displayed price; permit broker-dealers to route orders in a manner consistent with the operation of a national market system; and protect limit orders and promote best-priced quotations.⁴⁶⁰ Accordingly, the Commission imposed a \$0.0030 fee cap, which it believed reflected a competitive rate that was consistent with current business practices at the time (*i.e.*, in 2005).⁴⁶¹

In establishing the Rule 610(c) fee cap, the Commission did not, however, cede its responsibility to ensure that markets continue to function in a fair, transparent, and efficient manner; nor did it state that the \$0.0030 fee cap could not be revisited if market conditions changed. The Pilot is designed to determine, among other things, whether such a change has occurred. Despite assertions by one commenter that “powerful competitive forces are clearly present that discourage exchanges from exercising unabated pricing power,”⁴⁶² a \$0.0030 fee is still consistently charged by many exchanges, raising concerns among other commenters that the fee cap is stuck at a non-competitive and, perhaps, an artificially high rate.⁴⁶³ Several commenters have also indicated that current pricing models have resulted in the kind of distortive pricing that Rule 610(c) was designed to prevent.⁴⁶⁴

⁴⁵⁹ *Id.*

⁴⁶⁰ *Id.*

⁴⁶¹ *Id.*

⁴⁶² Nasdaq Letter I, at 13.

⁴⁶³ *See, e.g.*, BlackRock Letter, at 1 (“[T]he existing access fee cap is outdated and permits market forces to drive fees and rebates to excessive levels relative to the current magnitude of commissions and bid-ask spreads.”); Goldman Sachs Letter, at 2 (identifying a “well-developed, general consensus amongst market participants that a \$0.0030 per share Fee Cap is an outdated benchmark for execution costs in today’s trading environment . . . and far from representative of true prices in the marketplace”); Citi Letter, at 1–2 (stating that “today’s 30-mil cap on access fees that the exchanges can charge to access liquidity on their venues represents a more significant percentage of the economics of each trade”).

⁴⁶⁴ *See, e.g.*, ICI Letter I, at 2 (“Transaction fees and rebates also undermine market transparency because the prices displayed by exchanges—and provided on trade reports—do not include fee or rebate information and therefore do not fully reflect net trade prices.”); Goldman Sachs Letter, at 3 (stating that “displayed prices do not reflect the actual economic costs because exchange fees and rebates are not reflected in those prices”); Oppenheimer Letter, at 2 (“[T]o the extent that

Testing lower fee levels, and a no-rebate fee regime,⁴⁶⁵ will help the Commission to determine whether further regulatory action is needed to achieve the objectives of Rule 610(c) as well as the Commission’s statutory mandate to oversee the equities markets.

The Commission’s position is echoed by other commenters that found the “suggest[ion] that the Commission lacks the authority to implement the Pilot, or that testing a rebate ban or alternative access fee caps would constitute an impermissible form of price control . . . meritless”⁴⁶⁶ or “entirely inaccurate.”⁴⁶⁷ One commenter, for example, noted that the Exchange Act “provides very broad authority for the Commission to regulate all aspects of exchange operation, including fee schedules”⁴⁶⁸ This commenter further observed that “it makes no sense to attack the Commission’s proposal as an impermissible form of ‘rate setting’ when the markets have been operating with exchange fee limits for more than 10 years.”⁴⁶⁹ Moreover, this commenter asserted that “exchange criticisms” regarding “price control[s]” are “contradicted by their acceptance of th[e] existing price regulation” in Rule 610(c), which “may better serve their interests than the alternative caps and rebate prohibition included in the Pilot.”⁴⁷⁰

transaction fees and rebates obfuscate the actual price bid or offered for a security, the ‘maker-taker’ pricing model has the potential to undermine price transparency”).

⁴⁶⁵ In response to commenters who complained that the Pilot’s fee cap Test Group applies to fees to provide liquidity, instead of being limited to fees to remove liquidity as is the case for Rule 610(c), and therefore it is “unrelated” to the existing fee regime and the Rule 610(c) construct, the Commission notes that when it adopted the Rule 610(c) fee cap it expressly noted that it would “monitor the operation of these rules to assess whether in practice . . . broader coverage of the rule is necessary.” *See* NMS Adopting Release, *supra* note 10, at 37546.

⁴⁶⁶ IEX Letter I, at 6.

⁴⁶⁷ Verret Letter I, at 2. *See also* IAC Recommendation, at 1 (“[T]he purpose of the Pilot is not to consider imposing price controls, but instead to consider requiring fees (of whatever size) to be structured so as to minimize complexity and agency costs.”).

⁴⁶⁸ IEX Letter I, at 6–7 (“The fact that the SEC has not previously chosen to use its authority to prohibit rebates, or test their elimination through a pilot, does not mean it lacks authority. . . .”); *see also* Verret Letter I, at 3.

⁴⁶⁹ IEX Letter II, at 9. *See also* Verret Letter I, at 2 (stating that “one might properly describe the Reg NMS regime as itself a decade-long experiment in price controls”).

⁴⁷⁰ IEX Letter I, at 7; IEX Letter II, at 9 (“NYSE seems to be saying, ‘We are fine with the current fee regulation, because we have been able to operate very profitably under it, but it would be illegal to even test different fee restrictions unless you impose them on ATSS.’”); *See also, e.g.*, Verret Letter I, at 2 (“Exchanges appear comfortable when price controls on the liquidity taking side benefit

A few other commenters believed that the Commission had not sufficiently identified or discussed the statutory authority to conduct the Pilot.⁴⁷¹ One commenter stated that the Proposing Release did not contain an “explanation as to how those specific statutory sections [cited by the Commission], either individually or collectively, provide the Commission with the authority to carry out the Proposal’s broad rate-setting requirements” or a “discussion of the Commission’s statutory authority at all”⁴⁷² This commenter asserted that the Commission “cannot simply skip this analysis or assume it has unrestricted authority to conduct pilots on the basis that the Proposal is intended to be temporary.”⁴⁷³

The Commission notes that it followed its standard practice in the Proposing Release to identify the statutory authority under which it promulgated its Proposal. The Commission has complied with its statutory obligations in promulgating the Pilot and has clear statutory authority to adopt the Pilot, which the Commission believes furthers the purposes of the Exchange Act.⁴⁷⁴

III. Paperwork Reduction Act

Certain provisions that the Commission is adopting today contain “collection of information requirements” within the meaning of the Paperwork Reduction Act of 1995 (“PRA”).⁴⁷⁵ The Commission published

their business models, but challenge the Commission’s authority to implement what they describe as price controls when their own business models are negatively impacted.”); Larry Harris Letter, at 6 (noting that “exchange holding companies have a strong interest in maintaining the current system” and that the “SEC may reasonably consider these interests when evaluating comments submitted by the exchanges); Themis Trading Letter II, at 3 (stating that the Commission should not be “distracted. . . by conflicted stock exchanges desperately fearful that their business models might come crashing down”).

⁴⁷¹ *See, e.g.*, Cboe Letter I, at 9.

⁴⁷² NYSE Letter I, at 12.

⁴⁷³ *Id.* *See also* Cboe Letter I, at 11. For example, the commenter noted that the Commission had “provided no analysis or discussion demonstrating its reasoned decision-making of how the specific fee structures to be mandated in the Proposal would be equitably allocated or reasonable” under Section 6 of the Exchange Act. NYSE Letter I, at 12. *See also* 15 U.S.C. 78f(b)(4) (requiring the rules of an exchange to “provide for the equitable allocation of reasonable dues, fees, and other charges among its members and issuers and other persons using its facilities”).

⁴⁷⁴ If any of the provisions of these amendments, or the application thereof to any person or circumstance, is held to be invalid, such invalidity shall not affect other provisions or application of such provisions to other persons or circumstances that can be given effect without the invalid provision or application.

⁴⁷⁵ 44 U.S.C. 3501 *et seq.*

a notice requesting comment on the collection of information requirements in the Proposing Release⁴⁷⁶ and submitted relevant information to the Office of Management and Budget (“OMB”) for review in accordance with the PRA and its implementing regulations.⁴⁷⁷ The title of the new collection of information for Rule 610T is “Transaction Fee Pilot Data.” Compliance with these collections of information requirements is mandatory. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the agency displays a currently valid control number. We have applied for an OMB Control Number for this collection of information.

The Commission requested comment on the collection of information requirements in the Proposing Release. The Commission received two comment letters on the estimates for the collection of information requirements included in the Proposing Release, which are discussed below.⁴⁷⁸

A. Summary of Collection of Information

The Pilot requires the equities exchanges to prepare four sets of data that constitute a collection of information within the meaning of the PRA. First, pursuant to Rule 610T(b), the primary listing exchanges will be

required to prepare and publicly post two sets of data on the Pilot Securities listed on their markets—the Pilot Securities Exchange Lists and the Pilot Securities Change Lists.⁴⁷⁹ In addition, pursuant to Rule 610T(d), all equities exchanges will be required to provide to the Commission monthly order routing datasets.⁴⁸⁰ Lastly, pursuant to Rule 610T(e), all equities exchanges will be required to prepare and publicly post the Exchange Transaction Fee Summaries, which are monthly summaries of information concerning fees assessed and rebates paid to market participants transacting on the exchange.⁴⁸¹

B. Proposed Use of Information

The data collected during the Pilot, including the Pilot Securities Exchange Lists, Pilot Securities Change Lists, Exchange Transaction Fee Summaries, and order routing datasets, will allow researchers and market participants to have ready access to information that will facilitate the study of the impact of an exogenous shock to transaction fees and rebates on order routing behavior, execution quality, and market quality. In turn, this information should facilitate a data-driven evaluation of future policy choices.

In addition, by publishing and maintaining a Pilot Securities Exchange List and a Pilot Securities Change List,

each primary listing exchange would help ensure that the Commission, market participants, researchers, and the public have up-to-date information on corporate changes to listed issuers that impact the list of Pilot Securities, as well as changes to the composition of any of the Test Groups during the Pilot.

C. Respondents

The respondents to this collection of information will be the equities exchanges, which are registered national securities exchanges that trade NMS stocks. Specifically, Rule 610T(b), which covers the Pilot Securities Exchange Lists and Pilot Securities Change Lists, will apply to the six primary listing exchanges for NMS stocks. Rule 610T(d), which requires datasets on order routing, will apply to all thirteen equities exchanges that are currently registered with the Commission. Rule 610T(e), which requires datasets on fees (rebates) and fee (rebate) changes, will apply to all thirteen equities exchanges currently registered with the Commission.

D. Total Initial and Annual Reporting and Recordkeeping Burdens

The burdens associated with the Pilot are described fully below, but the below table briefly summarizes the relevant burdens set forth in the Proposing Release and in this release.

Category	Release	Annual burdens (hours/exchange)	One-time burdens (hours/exchange)
Pilot Securities Exchange Lists	Proposing Release	N/A	8
	Adopting Release	N/A	44
Pilot Securities Change Lists	Proposing Release	126	12
	Adopting Release	126	12
Exchange Transaction Fee Summaries	Proposing Release	64	86
	Adopting Release	64	86
Order Routing Datasets	Proposing Release	112	80
	Adopting Release	124	80

1. Pilot Securities Exchange Lists and Pilot Securities Change Lists

Upon publication of the initial List of Pilot Securities by the Commission, the primary listing exchanges would be required to determine which Pilot Securities are listed on their market and compile and publicly post downloadable files containing a list of those securities, including all data fields specified in Rule 610T(b)(2)(i) on their

websites in pipe-delimited ASCII format. The Commission preliminarily estimated that each primary listing exchange would incur, on average, a one-time burden of approximately 8 burden hours per primary listing exchange to compile and publicly post its initial Pilot Securities Exchange List.⁴⁸² One commenter stated that it “anticipates it could take as many as 44 hours” to compile the initial Pilot

Securities Exchange List.⁴⁸³ The commenter stated that its estimates of the costs associated with the Pilot are based on its “prior experience implementing the Tick Size Pilot, and other similar initiatives . . .”⁴⁸⁴ In light of this comment, the Commission is increasing its estimate. While, unlike for the Tick Size Pilot, the Commission will prepare the Initial List of Pilot Securities and assign them to their

⁴⁷⁶ See Proposing Release, *supra* note 2, at 13038–39.

⁴⁷⁷ 44 U.S.C. 3507; 5 CFR 1320.11.

⁴⁷⁸ See NYSE Letter I, at 15; Cboe Letter I, at 21.

⁴⁷⁹ See *supra* Section I.I.E.0.

⁴⁸⁰ See *supra* Section I.I.E.3.

⁴⁸¹ See *supra* Section I.I.E.0.

⁴⁸² See Proposing Release, *supra* note 2, at 13036. The Commission based this estimate on a full-time Compliance Manager and Programmer Analyst each spending approximately 4 hours, for a combined

total of approximately 8 hours, to compile and publicly post to an exchange’s website a downloadable file containing the initial Pilot Securities Exchange List. See *id.* at 13036 n.186.

⁴⁸³ See NYSE Letter I, at 15.

⁴⁸⁴ See *id.*

respective treatment groups, and therefore the exchanges will only need to separate out their listed securities into a separate list, the Commission nevertheless will increase its estimate as the commenter suggested. Accordingly, the Commission estimates that each primary listing exchange would incur, on average, a one-time burden of approximately 44 burden hours per primary listing exchange to compile and publicly post their initial Pilot Securities Exchange List.⁴⁸⁵ Accordingly, the Commission believes that the aggregate one-time burden associated with the initial Pilot Securities Exchange Lists would be 264 burden hours.⁴⁸⁶

After posting its initial Pilot Securities Exchange List, each equities exchange will be required to keep current that list to reflect any changes, and to also prepare and publicly post on its website until the end of the post-Pilot Period the Pilot Securities Change List prior to the beginning of trading each trading day. The Commission preliminarily estimated that each primary listing market would incur a one-time burden of approximately 12 burden hours of internal legal, compliance, and information technology operations to develop appropriate systems to track and compile changes relevant to Pilot Securities listed on its market.⁴⁸⁷ The Commission also preliminarily estimated that, once the primary listing exchanges have established these systems, on average, each primary listing exchange would incur 0.5 burden hours daily, or 126 burden hours annually to compile any changes related to Pilot Securities, such as name changes or mergers, and to publicly post the updated Pilot Securities Exchange Lists and Pilot Securities Change Lists on its website prior to the start of each trading day.⁴⁸⁸

One exchange commenter stated that “the Commission predicts it that would

take only 12.5 hours to develop and maintain systems to comply” with the requirements to update prior to the start of each trading day the Pilot Securities Exchange Lists and Pilot Securities Change Lists.⁴⁸⁹ Based on “its prior experience implementing the Tick Size Pilot, and other similar initiatives,” this commenter further stated that it believed “it could take as many as 300.5 hours to develop and maintain those systems.”⁴⁹⁰ While the commenter did not elaborate on how it computed its estimate or whether it represents an aggregate burden estimate or an annualized estimate, the commenter appears to have misunderstood the burden estimates contained in the Proposing Release because the Commission’s estimate greatly exceeded 12.5 hours. Specifically, the Commission’s preliminary estimates included a one-time burden of 8 hours for primary listing exchanges to compile and publicly post the initial Pilot Securities Exchange List, a one-time burden of 12 hours for primary listing exchanges to develop appropriate systems to track and compile changes to Pilot Securities, and an ongoing burden of 126 hours annually to compile any such changes and publicly post the updated Pilot Securities Exchange Lists and Pilot Securities Change Lists, for an aggregate burden estimate of 335 hours per exchange for the entire Pilot.⁴⁹¹ Assuming that the commenter’s estimate of 300.5 hours is meant to be an aggregate burden estimate, the Commission notes that its revised aggregate burden estimate of 371 hours exceeds the commenter’s estimate.

The Commission’s estimates are averages that take into account the diverse set of six primary listing exchanges and the expected burdens that they would collectively experience as a result of the Pilot. Moreover, the Commission expects that the primary listing exchanges will be able to leverage their experience and resources from the recent Tick Size Pilot to meet the requirements of the Pilot. As noted above, unlike for the Tick Size Pilot, the Commission will set the initial List of Pilot Securities and the primary listing

exchanges only need to keep those lists up to date if their listed issuers experience any relevant change. Accordingly, the burdens on the primary listing exchanges with respect to the lists of Pilot Securities should be less than those incurred during the Tick Size Pilot.⁴⁹²

For those reasons, the Commission continues to believe its estimate of the aggregate one-time burden for primary listing exchanges to develop appropriate systems to track and compile changes relevant to Pilot Securities listed on their markets will be approximately 12 burden hours for each primary listing exchange, or 72 total burden hours, and the average, aggregate annual burden to update and publicly post the lists of Pilot Securities will be approximately 126 burdens hours for each primary listing exchange, or 756 total burden hours for all 6 exchanges.⁴⁹³

2. Exchange Transaction Fee Summaries

The Commission is requiring that each equities exchange publicly post on its websites the Exchange Transaction Fee Summary each month, using an XML schema published on the Commission’s website. The Commission believes that all the data necessary to complete the summary are currently maintained by the equities exchanges. However, the equities exchanges will be required to compute the monthly realized average and median per share fees and rebates, each by participant type, that qualified for the Base and Top Tier fees and rebates, using fee and volume information that the equities exchanges maintain.

The Commission preliminarily estimated that each equities exchange would incur a one-time burden of approximately 80 burden hours of internal legal, compliance, information technology, and business operations to develop appropriate systems for tracking fee changes, computing the monthly averages, and formatting the data and posting it on its website.⁴⁹⁴ One commenter objected generally to the Commission’s burden estimates, but

⁴⁸⁵ The Commission continues to believe that this will require the services a full-time Compliance Manager and Programmer Analyst. The Commission estimates that each Compliance Manager and Programmer Analyst will each spend approximately 22 hours, for a combined total of approximately 44 hours, to compile and publicly post to an exchange’s website a downloadable file containing the initial Pilot Securities Exchange List.

⁴⁸⁶ 44 burden hours per primary listing exchange × 6 primary listing exchanges = 264 burden hours.

⁴⁸⁷ The Commission derived the total estimated burdens from the following estimates: (Attorney at 4 hours) + (Compliance Manager at 4 hours) + (Programmer Analyst at 4 hours) = 12 burden hours. See Proposing Release, *supra* note 2, at 13036.

⁴⁸⁸ The Commission based this estimate on a full-time Compliance Manager and Programmer Analyst together spending approximately 30 minutes per trading day updating and posting the required lists (approximately 252 trading days × 30 minutes per trading day = 7,560 minutes (126 hours)). See *id.*

⁴⁸⁹ NYSE Letter I, at 15.

⁴⁹⁰ *Id.* See also Cboe Letter I, at 21 (stating that the “implementation and ongoing costs of the Pilot will be significantly larger in terms of burden hours and expenditures than the Commission estimates,” but providing no specific analysis or alternative estimates).

⁴⁹¹ See Proposing Release, *supra* note 2, at 13036. The Commission notes that it has revised its aggregate burden estimate upwards to 371 hours for each exchange to address commenter concerns that the estimated burden associated with compiling and publicly posting the initial Pilot Securities Exchange List was too low.

⁴⁹² See Proposing Release, *supra* note 2, at 13027 n.153 and accompanying text; note 740 *infra*.

⁴⁹³ 126 burden hours per primary listing exchange × 6 primary listing exchanges = 756 burden hours.

⁴⁹⁴ See Proposing Release, *supra* note 2, at 13037. The Commission preliminarily estimated that an equities exchange would assign responsibilities for review and potential modification of its systems and technology to an Attorney, a Compliance Manager, a Programmer Analyst and a Senior Business Analyst. The Commission estimated the burden of reviewing and potentially modifying its systems and technology to be as follows: (Attorney at 20 hours) + (Compliance Manager at 20 hours) + (Programmer Analyst at 20 hours) + (Business Analyst at 20 hours) = 80 burden hours per equities exchange. See *id.* at 13037 n.194.

did not provide its own estimates of specific burden hours or costs.⁴⁹⁵ The Commission continues to estimate that each equities exchange will incur a one-time burden of approximately 80 burden hours of internal legal, compliance, information technology, and business operations to develop appropriate systems for tracking fee changes, computing the monthly averages, and formatting the data and posting it on its website.⁴⁹⁶ Accordingly, the one-time initial aggregate burden for all equities exchanges necessary for the development and implementation of the systems needed to capture the transaction fee information and post it on their websites in the specified format in compliance with Rule 610T(e) will be 1,040 hours.⁴⁹⁷

The Commission also preliminarily estimated that, on average, an equities exchange would incur an ongoing burden of approximately 40 burden hours per year, approximately half the estimated burden to develop appropriate systems, to monitor and, if necessary, update its systems used for compiling, formatting and publicly posting the Exchange Transaction Fee Summaries.⁴⁹⁸ One commenter objected generally to the Commission's burden estimates, but did not specifically explain whether or how this burden estimate was incorrect.⁴⁹⁹ The Commission continues to estimate that the annual ongoing burdens associated with monitoring and, if necessary, updating these systems would be approximately half the burdens of initially developing the systems. Accordingly, the Commission continues to estimate that an equities exchange will incur an ongoing burden of approximately 40 burden hours per year to monitor, and if necessary, update its systems used for compiling, formatting and publicly posting the Exchange

Transaction Fee Summaries.⁵⁰⁰ The average aggregate, ongoing, annual burden for all equities exchanges to monitor their systems will be 520 hours.⁵⁰¹

The equities exchanges will be required to format, calculate certain figures, and post their initial Exchange Transaction Fee Summary at the outset of the pre-Pilot Period. As this would be the first time an equities exchange would be required to produce and post on its website such a summary, the Commission preliminarily estimated that it would require approximately 4 burden hours for each equities exchange to complete the initial Exchange Transaction Fee Summary and perform the necessary calculations.⁵⁰² In addition, each equities exchange will be required to make its summary publicly available on its website using an XML schema to be published on the Commission's website. As the Commission preliminarily believed that the equities exchanges had experience applying the XML format to market data,⁵⁰³ the Commission estimated that initially each equities exchange would incur a burden of 2 burden hours specific to the initial Exchange Transaction Fee Summary to ensure that it has properly implemented the XML schema.⁵⁰⁴ One commenter objected generally to the Commission's burden estimates, but did not specifically explain whether or how this burden estimate was incorrect.⁵⁰⁵ The Commission continues to estimate that each equities exchange will require approximately 4 burden hours to complete the initial Exchange Transaction Fee Summary,⁵⁰⁶ for an aggregate, initial burden of 52 hours to complete its initial Exchange

Transaction Fee Summary.⁵⁰⁷ The Commission also continues to estimate that each equities exchange will incur an initial burden of approximately 2 burdens hours for an aggregate, initial burden of 26 hours to post that dataset publicly on its website using an XML schema to be published on the Commission's website. The total aggregate, initial burden to complete the initial Exchange Transaction Fee Summary will therefore be 78 burden hours.⁵⁰⁸

Each equities exchange will be required to update the Exchange Transaction Fee Summary on a monthly basis to account for changes from the prior month, if any, and to report monthly fee and rebate information. The Commission preliminarily believed that such updates would require fewer burden hours than the initial Exchange Transaction Fee Summary, as the equities exchanges would have experience calculating necessary data and formatting the reports as required by the Rule.⁵⁰⁹ Accordingly, the Commission preliminarily estimated that it would require approximately 2 burden hours each month, or 24 burden hours on an annualized basis, for each equities exchange to update the Exchange Transaction Fee Summary.⁵¹⁰ This estimate contemplated the impact of publicly posting the summary using the XML schema to be published on the Commission's website. One commenter objected generally to the Commission's burden estimates, but did not specifically explain whether or how this burden estimate was incorrect.⁵¹¹ The Commission continues to estimate that it will require approximately 2 burden hours each month, or 24 burden hours on an annualized basis, for each equities exchange to update the Exchange Transaction Fee Summary.⁵¹² As such, the equities exchanges will incur an aggregate, annual burden of 312 burden hours to update and publicly post on

⁴⁹⁵ Cboe Letter I, at 21 (stating that the "implementation and ongoing costs of the Pilot will be significantly larger in terms of burden hours and expenditures than the Commission estimates," but providing no specific analysis or alternative estimates). *But cf.* Better Markets Letter, at 2 ("All of the data-fields are thoughtfully proposed, and the cost of producing them is minimal and certainly acceptable given the enormity of the benefits." The commenter did not provide specific burden hour or cost estimates.).

⁴⁹⁶ (Attorney at 20 hours) + (Compliance Manager at 20 hours) + (Programmer Analyst at 20 hours) + (Business Analyst at 20 hours) = 80 burden hours per equities exchange.

⁴⁹⁷ 80 burden hours per equities exchange × 13 equities exchanges = 1,040 burden hours.

⁴⁹⁸ *See* Proposing Release, *supra* note 2, at 13037. (Attorney at 10 hours) + (Compliance Manager at 10 hours) + (Programmer Analyst at 10 hours) + (Senior Business Analyst at 10 hours) = 40 burden hours.

⁴⁹⁹ *See* note 495 *supra*.

⁵⁰⁰ (Attorney at 10.5 hours) + (Compliance Manager at 10.5 hours) + (Programmer Analyst at 11 hours) + (Senior Business Analyst at 10.5 hours) = 40 burden hours.

⁵⁰¹ 40 burden hours per equities exchange × 13 equities exchanges = 520 burden hours.

⁵⁰² *See* Proposing Release, *supra* note 2, at 13037. The Commission derived the total estimated burden from the following estimates: (Compliance Manager at 2 hours) + (Senior Business Analyst at 2 hours) = 4 burden hours per equities exchange. *See id.* at 13037 n.198.

⁵⁰³ *See id.* at 13037 n.199 and accompanying text.

⁵⁰⁴ *See id.* at 13037. The Commission derived the total estimated burden from the following estimates, which reflect the Commission's preliminary belief that the equities exchanges have experience posting information in an XML format on publicly-available websites: (Compliance Manager at 1 hour) + (Programmer Analyst at 1 hour) = 2 burden hours per equities exchange. *See id.* at fn. 200.

⁵⁰⁵ *See* note 495 *supra*.

⁵⁰⁶ (Compliance Manager at 2 hours) + (Senior Business Analyst at 2 hours) = 4 burden hours per equities exchange.

⁵⁰⁷ 4 burden hours per equities exchange × 13 equities exchanges = 52 burden hours.

⁵⁰⁸ 2 burden hours per equities exchange × 13 equities exchanges = 26 burden hours.

⁵⁰⁹ *See* Proposing Release, *supra* note 2, at 13037.

⁵¹⁰ *See id.* The Commission derived the total estimated burden from the following estimates: (Compliance Manager at 1 hour) + (Programmer Analyst at 1 hour) = 2 burden hours per equities exchange per month. 2 burden hours per equities exchange per month × 12 months per year = 24 burden hours per equities exchange per year. *See id.* at 13037 n.203.

⁵¹¹ *See* note 495 *supra*.

⁵¹² (Compliance Manager at 1 hours) + (Programmer Analyst at 1 hours) = 2 burden hours per equities exchange per month. 2 burden hours per equities exchange per month × 12 months per year = 24 burden hours per equities exchange per year.

their websites the Exchange Transaction Fee Summaries.⁵¹³

3. Order Routing Datasets

The Commission preliminarily estimated that, on average, there would be no paperwork burden to the equities exchanges to capture the order routing data required pursuant to Rule 610T(d) to be included in the order routing datasets, as the Commission expected that the equities exchanges would collect the required data to create the order routing datasets by leveraging existing systems and technology already in place for the collection and reporting of data.⁵¹⁴ The Commission believes this continues to be true with the changes to the order routing datasets, which also involve data elements currently captured by existing systems.

The Commission preliminarily believed, however, that the equities exchanges would incur an initial one-time burden of 80 burden hours per equities exchange to ensure that their systems and technology are able to accommodate the proposed requirements to aggregate, anonymize, and publicly post the order routing information.⁵¹⁵ While the exchanges will still need to aggregate the data, they no longer will need to anonymize and publicly post it and instead will transmit the information to the Commission. The Commission continues to believe that each equities exchange would incur an initial one-time burden of 80 burden hours to ensure that its systems and technology are able to accommodate the requirements to aggregate and provide to the Commission the order routing information. Accordingly, the Commission estimates that the aggregate one-time initial burden for ensuring an exchange's systems and technology are able to aggregate and provide to the Commission the required order routing data in compliance with Rule 610T(d) will be 1,040 burden hours.⁵¹⁶

⁵¹³ 2 burden hours per equities exchange × 13 equities exchanges × 12 monthly updates = 312 burden hours per year.

⁵¹⁴ See *Proposing Release*, *supra* note 2, at 13038.

⁵¹⁵ See *id.* The Commission preliminarily estimated that an equities exchange will assign responsibilities for review and potential modification of its systems and technology to an Attorney, a Compliance Manager, a Programmer Analyst and a Senior Business Analyst. The Commission estimated the burden of reviewing and potentially modifying its systems and technology to be as follows: (Attorney at 20 hours) + (Compliance Manager at 20 hours) + (Programmer Analyst at 20 hours) + (Senior Business Analyst at 20 hours) = 80 burden hours per equities exchange. See *id.* at 13038 n.207.

⁵¹⁶ 80 burden hours per equities exchange × 13 equities exchanges = 1,040 burden hours.

The Commission also preliminarily estimated that, on average, it would take an equities exchange approximately 40 burden hours per year to ensure that the systems and technology are up to date so as to facilitate compliance with the Rule.⁵¹⁷ The Commission continues to estimate that, on average, it would take an equities exchange approximately 40 burden hours per year to ensure that the systems and technology are up to date so as to facilitate compliance with the Rule. Therefore, the Commission estimates that the aggregate annual burden to maintain the systems necessary to aggregate and provide to the Commission the required order routing information is approximately 520 burden hours per year.⁵¹⁸

Each equities exchange would incur an ongoing burden associated with creating and formatting the order routing datasets each month. The Commission noted that the equities exchanges have experience with creating similar datasets in accordance with their obligations under Rule 605 of Regulation NMS.⁵¹⁹ The Commission preliminarily believed that each equities exchange would incur burdens similar to those associated with preparing Rule 605 reports.⁵²⁰ Accordingly, the Commission preliminarily believed that each equities exchange would incur a burden of six burden hours per month, or 72 burden hours per year, to prepare and publicly post on its website the order routing datasets.⁵²¹ While the order routing datasets will not be publicly posted but will instead be provided to the Commission, the Commission is requiring the equities exchanges to separate out post-only orders and auction-only orders (or exclude auction-only orders if they so choose). The Commission estimates that separating out these orders will require approximately 1 additional burden hour per month. As such, the Commission

⁵¹⁷ See *Proposing Release*, *supra* note 2, at 13038. The Commission derived the total estimated burdens from the following estimates, which reflected the Commission's preliminary view that annual ongoing burdens would be approximately half the burdens of initially ensuring an exchange has the appropriate systems to capture the required information in the required format: (Attorney at 10 hours) + (Compliance Analyst at 10 hours) + (Programmer Analyst at 10 hours) + (Business Analyst at 10 hours) = 40 burden hours per equities exchange. See *id.* at 13038 n.209.

⁵¹⁸ 40 burden hours per equities exchange × 13 equities exchanges = 520 burden hours.

⁵¹⁹ See *Proposing Release*, *supra* note 2, at 13038.

⁵²⁰ See *id.* See also FR Doc. 2016-08552, 81 FR 22143 (April 14, 2016) ("Request to OMB for Extension of Rule 605 of Regulation NMS").

⁵²¹ Compliance Manager at 3 hours + Programmer Analyst at 4 hours = 7 burden hours per month, per equities exchange. 7 burden hours per month × 12 months = 84 burden hours per year, per equities exchange.

estimates that each equities exchange will incur a burden of approximately seven burden hours per month, or 84 burden hours per year, to prepare and provide to the Commission the order routing datasets. Therefore, the aggregate, annual burden to prepare and provide to the Commission order routing datasets in accordance with Rule 610T(d) will be approximately 1,092 burden hours.⁵²²

One exchange commenter stated that "the Commission allocates 160 hours associated with producing order routing data," but estimated that it "would actually require over 400 hours," based on "its prior experience implementing the Tick Size Pilot, and other similar initiatives" ⁵²³ While the commenter did not elaborate on how it computed its estimate or whether it represents an aggregate burden estimate or an annualized estimate, the commenter appears to have misunderstood the burden estimates contained in the *Proposing Release* because the Commission's estimate exceeds the 160 hours cited by the commenter. Specifically, the Commission's preliminary estimate included a one-time burden of 80 hours and an ongoing burden of 112 hours annually,⁵²⁴ for an aggregate burden estimate of 416 hours per exchange for the entire Pilot.⁵²⁵ Second, the commenter does not explain how it calculated its estimate of "over 400 hours," break down the costs included in this estimate, or specify whether this number is an aggregate burden estimate or an annualized estimate. Assuming that the commenter's estimate of over 400 hours is meant to be an aggregate burden estimate, the Commission notes that its revised aggregate burden estimate of 452 hours is substantially similar. The Commission notes that exchanges will no longer be required to publicly post this data, but will instead transmit the datasets directly to the Commission. Moreover, the Commission expects that the exchanges will be able to leverage their experience and

⁵²² 84 burden hours per year × 13 equities exchanges = 1,092 burden hours.

⁵²³ NYSE Letter I, at 15. See also Cboe Letter I, at 21 (stating that the "implementation and ongoing costs of the Pilot will be significantly larger in terms of burden hours and expenditures than the Commission estimates," but providing no specific analysis or alternative estimates).

⁵²⁴ The Commission notes that it has revised this estimate upwards to 124 burden hours annually.

⁵²⁵ See *Proposing Release*, *supra* note 2, at 13038. The Commission notes that it has revised this estimate upwards to 452 burden hours per exchange for the entire Pilot.

resources from the Tick Size Pilot to meet the requirements of the Pilot.⁵²⁶

For those reasons, the Commission believes its estimate of the one-time burden for exchanges to develop and implement appropriate systems to aggregate the order routing data will be, on average, 80 burden hours for each exchange, and the ongoing annual burden to update these systems and to gather and to transmit the relevant data to the Commission will be, on average, 124 burden hours for each exchange.

E. Collection of Information Is Mandatory

All of the collections of information pursuant to Rule 610T would be mandatory.

F. Confidentiality of Responses to Collection of Information

The Commission believes that the broker-dealer specific order routing data should be protected from disclosure subject to the provisions of applicable law.⁵²⁷ The Commission will deem broker-dealer identifying order routing data as being subject to a confidential treatment request under 17 CFR 200.83 without the need to submit a request. The Pilot Securities Exchange List, Pilot Securities Change List, and the Exchange Transaction Fee Summary would not be confidential. Rather, each would be publicly posted by the exchanges.

G. Retention Period for Recordkeeping Requirements

National securities exchanges would be required to retain records and information pursuant to 17 CFR 240.17a-1 (Rule 17a-1 under the Exchange Act).⁵²⁸

IV. Economic Analysis

As discussed above, the Pilot is designed to produce information on the impact of transaction fee-and-rebate pricing models on order routing decisions by broker-dealers, as well as their impact on execution and market quality.⁵²⁹ In recent years, a number of

academics and market participants have expressed concern that the structure of exchange transaction-based fee pricing may lead, for example, to potential conflicts of interest between broker-dealers and their customers when brokers-dealers route customer orders to trading centers offering rebates so that the broker-dealer can capture the rebates, even when these venues do not offer high execution quality.⁵³⁰ However, as discussed in more detail below, the Commission cannot determine from existing empirical evidence the impact, if any, of exchange transaction fee models on order routing decisions by broker-dealers or on market and execution quality.⁵³¹ Specifically, determining whether a causal relationship between exchanges' transaction fee-and-rebate pricing models and broker-dealers' behavior is complicated because, for example, such pricing models and order routing decisions could be jointly determined and order routing decisions could influence fees just as fees could influence order routing decisions. Currently available data do not permit researchers to isolate these factors and thus identify the existence or direction of such a causal relationship, which in turn impedes researchers' ability to determine the extent to which conflicts may exist and any potential negative impacts may manifest.⁵³²

volatility in prices. See, e.g., Henrik Bessembinder, Trade Execution Costs and Market Quality after Decimalization, 38 J. Fin. & Quantitative Analysis 747-77 (2003), <https://doi.org/10.2307/4126742>; <https://doi.org/10.2307/4126742>; Maureen O'Hara & Mao Ye, Is Market Fragmentation Harming Market Quality? 100 J. Fin. Econ. 459-74 (2011), <https://doi.org/10.1016/j.jfineco.2011.02.006>.

⁵³⁰ See, e.g., James Angel, Lawrence Harris & Chester Spatt, *Equity Trading in the 21st Century*, 1 Q. J. Fin. (2011), <https://doi.org/10.1142/S2010139211000067> (hereinafter "Angel, Harris, & Spatt"); Robert H. Battalio, Shane A. Corwin, & Robert H. Jennings, Can Brokers Have It All? On the Relation Between Make-Take Fees and Limit Order Execution Quality, 71 J. Fin. 2193-237 (2016), <http://onlinelibrary.wiley.com/doi/10.1111/jofi.12422/full> (hereinafter "Battalio Equity Market Study"); Larry Harris, Maker-Taker Pricing Effects on Market Quotations 24-25 (USC Marshall Sch. Bus., Draft No. 0.91, 2013), <http://bschool.huji.ac.il/.upload/hujibusiness/Maker-taker.pdf> (hereinafter "Harris").

⁵³¹ For commenters concurring with this assessment, see, e.g., Barnard Letter, at 1 (stating the Pilot "should provide credible analyses of the effects—both positive and negative—of exchange fees and rebates on the quality and efficiency of trading."); Better Markets Letter at 2 (stating that the Commission "lacks sufficient data to outlaw rebates" and believed that the Pilot "should fill this data and knowledge gap.");

⁵³² Many commenters expressed support for the Pilot and the utility of the information that may be gained from it. See AJO Letter, at 1, CII Letter, at 3, NYSTRS Letter, at 1, ICI Letter I, at 1-2, MFS Letter, at 1, Nuveen Letter, at 2, Clark-Joseph Letter, at 1, RBC Letter I, at 2, Invesco Letter, at 2, CFA

Because of the existing lack of empirical evidence regarding the potential conflicts of interest and potential effects of exchange fee models, additional information would assist the Commission in making future regulatory decisions. To remedy the insufficiency of existing empirical evidence, the Commission is adopting the Pilot to generate data that is otherwise unavailable to study fees and rebates that exchanges assess to broker-dealers and observe the impacts of those fees and rebates on the markets and market participants. Specifically, the Commission expects that the data collected is likely to shed light on the extent, if any, to which broker-dealers route orders in ways that benefit the broker-dealer but may not be optimal for customers, and the extent to which exchange pricing models create distortions that may have adverse impacts. The data obtained from the Pilot will inform future regulatory initiatives to the ultimate benefit of investors.⁵³³ In addition, the Pilot will provide information about other potential economic effects of reducing access fee caps or prohibiting rebates and Linked Pricing. For example, the Pilot could offer information on whether prohibiting rebates and Linked Pricing alters broker-dealer behavior in a manner that affects market quality, such as by impacting quoted spreads across NMS stocks.⁵³⁴

The Pilot is uniquely capable of generating empirical evidence that is currently lacking because it is designed to provide an exogenous shock to transaction fee-and-rebate pricing models across all exchanges simultaneously and facilitate the collection of representative data across a broad range of securities.⁵³⁵ An exogenous shock to a system occurs when an element of the system is changed from without the system. (*i.e.*, the change or shock is not under the control or influence of those within the system) but can induce endogenous (*i.e.*, within the system) responses. In the Pilot's context, the exogenous shock

Letter, at 1, State Street Letter, at 2, Wellington Letter, at 1, Joint Pension Plan Letter, at 2, Oppenheimer Letter, at 2, Angel Letter I, at 1, Vanguard Letter, at 2, Verret Letter I, at 1, T. Rowe Price Letter, at 1.

⁵³³ See, e.g., Babelfish Letter, at 3; Clearpool Letter, at 2; T. Rowe Price Letter, at 1, 3, and Clark-Joseph Letter, at 1.

⁵³⁴ See *infra* Section V.C.1.a.ii, for further discussion of the benefits of studying other economic effects of transaction fees and rebates.

⁵³⁵ See *infra* Section V., for discussion of existing studies related to these topics and their limitations. See also *supra* Section II.B (discussing the Nasdaq study, which examined a change in the access fees and rebates charged by Nasdaq for 14 stocks over a four-month period).

⁵²⁶ See Section C.2.a.iii. *infra*. See also, e.g., Better Markets Letter, at 2.

⁵²⁷ See, e.g., 5 U.S.C. 552 *et seq.*; 15 U.S.C. 78x (governing the public availability of information obtained by the Commission).

⁵²⁸ 17 CFR 240.17a-1.

⁵²⁹ Execution quality generally refers to how favorably customer orders are executed. Execution quality measures are similar to liquidity measures and tend to include transaction costs, the speed of execution, the probability that the trade will be executed, and the price impact of the trade. See NMS Adopting Release, *supra* note 10, at 37513-15, 37537-38. Market quality encompasses execution quality but also relates more generally to how well the markets function. Market quality measures include liquidity, price discovery, and

takes the form of a reduction of the maximum permissible transaction fees and a prohibition on rebates and Linked Pricing on all U.S. equities exchanges. This shock will allow researchers to explore how changes to fees and rebates could lead to changes in broker-dealer order routing and market and execution quality for a broad sample of NMS securities.⁵³⁶ Specifically, the reduction in fees or the elimination of rebates and Linked Pricing, as required in specific Test Groups of the Pilot, may reduce the magnitude or eliminate the potential conflict of interest between broker-dealers and their clients and the potential distortions introduced by exchange transaction-based fees and rebates. These effects would, in turn, be reflected in measurable changes to the order routing and execution quality of stocks in the Pilot's Test Groups.

The terms of the Pilot are discussed in Section II above. Exchanges will continue to be permitted to have varying fees within each Test Group, and will be permitted to change their fees at their discretion, subject to the proposed rule change filing requirements of Section 19 of the Exchange Act, during the Pilot for securities within each Test Group, so long as they comply with the conditions applicable to that Test Group.

In the absence of the Pilot, the Commission believes it is unlikely that exchanges would collectively undertake a similar pilot and voluntarily coordinate the exogenous shock to fees and rebates across a broad set of securities, broker-dealers, and exchanges that would be required to analyze the effects of changes to fees and rebates.⁵³⁷ By imposing the same modifications to fees and rebates on all U.S. equities exchanges, the Pilot will allow researchers to obtain data that will permit them to examine the impact of changes to fees and rebates on the order routing decisions of broker-dealers. If all exchanges were not subject to the pilot terms, the pilot data would be limited because broker-dealers could redirect their order flow to the non-participating exchanges. Accordingly, the Commission believes that the Pilot will enable the collection of valuable data that would otherwise be unavailable.

The Commission is mindful of the costs imposed by, and the benefits obtained from, the rules it promulgates. Whenever the Commission engages in

rulemaking and is required to consider or determine whether an action is necessary or appropriate in the public interest, Section 3(f) of the Exchange Act requires the Commission to consider whether the action would promote efficiency, competition, and capital formation, in addition to the protection of investors.⁵³⁸ Further, when making rules under the Exchange Act, Section 23(a)(2) of the Exchange Act requires the Commission to consider the impact such rules would have on competition.⁵³⁹ Section 23(a)(2) of the Exchange Act also prohibits the Commission from adopting any rule that would impose a burden on competition not necessary or appropriate in furtherance of the purposes of the Exchange Act.⁵⁴⁰

A few commenters challenged the sufficiency of the economic analysis contained in the Proposal. For example, one commenter argued the proposal was "arbitrary and capricious" because the Commission failed to consider the economic consequences of its proposal and only partially framed the costs and benefits of the Proposal, ignoring important and significant factors and costs.⁵⁴¹ Similarly, another commenter believed that the "cost-benefit analysis contain[ed] numerous flaws that are inconsistent with the Commission's obligation to provide a 'reasoned basis' for its regulations," namely that the Commission had "substantially underestimated the costs of the Proposal" and "fail[ed] to identify any countervailing market benefit that justifies imposing . . . harms on . . . exchanges and issuers."⁵⁴² Another commenter thought the Commission understated the potential costs of the Pilot while overstating the benefits.⁵⁴³ For example, some commenters noted that they anticipated the Pilot would result in wider spreads, increased transaction costs, and increased broker commissions, all of which would result in added costs to investors.⁵⁴⁴ Several commenters thought the Commission failed to consider or underestimated the

implementation costs of the Pilot,⁵⁴⁵ while other commenters challenged these assertions and instead believed the Pilot would impose minimal costs on exchanges and broker-dealers, particularly in light of the existing processes and technology that currently support immediately effective fee changes from the exchanges.⁵⁴⁶ Finally, other commenters felt that the economic analysis failed to adequately account for the projected costs to particular categories of market participant.⁵⁴⁷

Other commenters supported the Commission's analysis. For example, one commenter argued that "differing estimates of costs is not a sufficient basis alone to challenge Commission action."⁵⁴⁸ This commenter argued that the commenters "tend to ignore the benefit side of cost-benefit analysis" and believed that "the most significant benefit of the pilot is its potential to inform subsequent rulemaking," such that the "mere presence of uncertainty in the Commission's estimates of potential costs and benefits does not by itself open the pilot program to challenge."⁵⁴⁹ While acknowledging the potential for "liquidity effects," this commenter further noted that the Commission "is merely held to make a reasonable estimate of those costs before adopting a pilot program," not to "make a perfect estimate" or "cease the pilot if the costs to liquidity prove significant."⁵⁵⁰

The economic analysis provided in the Proposing Release thoroughly described the potential economic effects of the Transaction Fee Pilot, including the benefits, costs, and alternatives and

⁵⁴⁵ See STANY Letter, at 2; Cboe Letter I, at 21; Nasdaq Letter I, at 10; FIA Letter, at 3; Citi Letter, at 5.

⁵⁴⁶ See, e.g., Vanguard Letter, at 3; Better Markets Letter, at 2; Healthy Markets Letter I, at 34; Angel Letter II, at 3.

⁵⁴⁷ See, e.g., Cboe Letter, at 7 n.14 and 20 (noting failure to adequately address lost revenue to exchanges); NYSE Letter I, at 3; NYSE Letter I, at 3 and 13 (addressing impact on small businesses and issuers); Apache Letter, at 2 (noting potential negative cost impacts to issuers engaged in secondary offerings or conducting share repurchasing programs); Nasdaq Letter I, at 8 (noting potential added cost to market makers when pricing arbitrage opportunities because of additional complexity in exchange pricing models under the Pilot).

⁵⁴⁸ Verret Letter I, at 3–4. See also Verret Letter I, at 7 (asserting that "[a]rguments by the Exchanges concerning the pilot proposal's failure to quantify costs are irrelevant, in so far as the proposal properly identifies where they might at present be unquantifiable and particularly where those unquantifiable costs relate to the data the pilot is intended to generate.").

⁵⁴⁹ Verret Letter I, at 3–4. See also IEX Letter III, at 8, 10 (arguing that these commenters ignore "the full range of benefits that investors could realize if rebates were banned entirely").

⁵⁵⁰ Verret Letter I, at 4–5.

⁵³⁸ See 15 U.S.C. 77b(b); 15 U.S.C. 78c(f).

⁵³⁹ See 15 U.S.C. 78w(a)(2).

⁵⁴⁰ *Id.*

⁵⁴¹ See Nasdaq Letter I, at 3, 11.

⁵⁴² NYSE Letter I, at 3, 12. See also, e.g., Level Brands Letter, at 1; Johnson Letter, at 1; Sensient Letter; Tredegar Letter, at 1; Halliburton Letter, at 1.

⁵⁴³ See ASA Letter, at 5. See also T.D. Ameritrade Letter, at 3 (estimating costs of widening spreads to its clients at \$24,000,000).

⁵⁴⁴ NYSE Letter I, at 13. See also TD Ameritrade Letter, at 3 (estimating costs of widening spreads to its clients at \$24,000,000 annually) and Energizer Letter, at 1.

⁵³⁶ See, e.g., CII Letter, at 3, NYSTRS Letter, at 1, RBC Letter I, at 2, Joint Pension Plan Letter, at 2, Oppenheimer Letter, at 2.

⁵³⁷ See, e.g., Clearpool Letter, at 2. As discussed above, Nasdaq conducted its own fee experiment, but other exchanges did not conduct similar experiments simultaneous with Nasdaq.

the potential effect on efficiency, competition, and capital formation.

Like the Proposing Release, where possible, the Commission has quantified below the likely economic effects of the Pilot; however, as explained further below, the Commission is unable to quantify all of the economic effects because it lacks the information necessary to provide reasonable estimates. In some cases, quantification depends heavily on factors outside of the control of the Commission, which makes it difficult to predict how market participants would act under the conditions of the Pilot. For example, because of the flexibility that market participants have with respect to the choice of trading center for execution of transactions and because those choices can be influenced by factors outside of the scope of the Pilot, such as volume discounts, the Commission cannot quantify, ahead of the Pilot, the economic impact of any changes in order routing decisions by broker-dealers that may result from the Pilot. Nevertheless, as described more fully below, the Commission provides both a qualitative assessment of the potential effects and a quantified estimate of the potential aggregate initial and aggregate ongoing costs, where feasible.

A. Background and Market Failures

The Commission's Proposal provided a review of transaction-based fee models, including a discussion of the history and mechanics of transaction-based pricing and an overview of the concerns about potential conflicts of interest between broker-dealers and their customers attributed to access fees and rebates assessed by exchanges as well as the potential distortions that exchange fee models can introduce into market structure.⁵⁵¹

The Commission considered whether competition within the broker-dealer industry, as well as competition among the equities exchanges, is sufficient to alleviate potential conflicts of interest presented by exchange fees and rebates and also the potential distortions such fee-and-rebate models may introduce. The Commission believes that competition between broker-dealers may not be capable of addressing these potential conflicts and distortions for three reasons: asymmetric information, switching costs, and a lack of collective action, each of which is discussed below. Further, competition between broker-dealers is not readily capable of independently resolving the other potential concerns presented by exchange fee models, such as excessive

intermediation, fragmentation, complexity, and cross-subsidization because those issues are within the exclusive control of the exchanges. The limitations of competition among the equities exchanges is discussed in detail below.

1. Market Failure at the Broker-Dealer Level

The Commission considered whether competition could alleviate potential conflicts of interest between investors and broker-dealers, as investors choose broker-dealers to place orders on their behalf.⁵⁵² To the extent that investors are able to identify broker-dealers that do not act on potential conflicts of interest in a manner inconsistent with the interests of their customers, investors could discourage broker-dealers from acting on such conflicts of interest and avoid doing business with those broker-dealers that do not offer such assurances. However, several commenters opined that competition and deference to market forces alone would not be sufficient to challenge the "deeply rooted conflicts of interest" that they believe are present in today's market structure.⁵⁵³ For example, one commenter noted that many institutional clients are tied to large broker/dealers because of the multitude of services that their brokers provide, so they cannot simply "fire their brokers" if they are unhappy with their routing decisions.⁵⁵⁴ Further, the Commission does not believe that competition among broker-dealers alone will be sufficient to address potential conflicts of interest in order routing decisions because of three conditions that are present in today's markets: asymmetric information, switching costs, and a lack of collective action.

First, asymmetric information between broker-dealers and their customers limits the ability of customers to identify broker-dealers that do not act on potential conflicts of interest.⁵⁵⁵ For example, customers do not generally have access to information about broker-dealers' individual sources of

revenue.⁵⁵⁶ As discussed below in more detail, although disclosures required pursuant to Rule 606 provide information about material conflicts of interest related to payment for order flow, these disclosures do not provide information on the effect of transaction fee-and-rebate pricing models on order routing decisions. Moreover, while under Rule 606, a customer may request certain information about how her broker routed certain orders on her behalf, a customer cannot necessarily use this information to compare how these orders would have been treated by broker-dealers other than her own. Further while recent amendments to Rule 606 would provide customers with limited information about transaction fees paid and transaction rebates received by the broker, the disclosure would not provide data to enable the customer to assess the impact of exchange transaction fees and rebates on market quality and execution quality.

Second, even if investors had sufficient information to conclude they would be better served by a different broker-dealer, investors may face costs in switching broker-dealers.⁵⁵⁷ If these switching costs are high relative to the costs that investors anticipate may arise from potential conflicts of interest, investors may not switch broker-dealers even if it appears that their broker-dealer may have acted on conflicts of interest.

The presence of switching costs also may exacerbate a collective action problem among investors.⁵⁵⁸ Investors could provide incentives to broker-dealers to eliminate potential conflicts of interest by threatening to move accounts away from broker-dealers known to act on conflicts of interest. The collective action problem arises because, although each customer individually bears a cost to switch accounts, the benefits of a successful threat are available to all customers whether they would switch or not. If the

⁵⁵⁶ While consolidated revenues may be available from Form 10-K filings for broker-dealers that are public reporting companies, broker-dealers do not report revenues attributable to specific sources, such as rebates from a particular exchange or payments for order flow from a particular venue. For instance, revenues derived from commissions and fees are often just reported in aggregate as "Commissions and Fees." Therefore, even though aggregate revenues for some broker-dealers are publicly available, customers do not have access to the information on individual sources of revenue that could reveal potential conflicts of interest.

⁵⁵⁷ These switching costs may be monetary, but may also have a time and effort component.

⁵⁵⁸ Collective action occurs when a number of individuals or entities work together to achieve a common objective, such as investors acting to reduce the potential conflicts of interest in order routing decisions by broker-dealers.

⁵⁵² See Section *infra* IV.B.2.a.

⁵⁵³ See, e.g., Better Market Letter at 1 (stating "[p]ayments by the exchanges that incentivize and induce routing decisions by broker-dealers at the expense of best execution and market quality is one of the most entrenched and insidious market practices today, and requires forceful and independent intervention by the SEC."). See also Themis Trading Letter at 4–5; Larry Harris Letter at 9; Clearpool at 2.

⁵⁵⁴ See Themis Trading Letter I, at 5.

⁵⁵⁵ See Larry Harris Letter, at 3 (noting that most brokerage customers do not know about potential broker agency problems and so do not know that their brokers may not be representing their orders as best they might).

⁵⁵¹ See Proposing Release, *supra* note 2.

switching costs are high relative to the proportion of customer defections necessary to threaten a broker-dealer, customers are unlikely to generate enough of a threat to alter broker-dealers' behavior.

2. Market Failure at the Exchange Level

Several commenters considered whether existing market forces, including competition among the equities exchanges, are sufficient to address the potential distortions caused by exchange pricing models. Some commenters felt that "some regulatory solution," like the Pilot, "may be necessary to force market participants, particularly exchanges, to change the manner in which they conduct business" because competitive pressures on exchanges may serve as a barrier to market-led reforms in this area.⁵⁵⁹ Further, one commenter noted that "market forces cause the exchanges to choose maker-taker and inverted fee models to the detriment of the public interest" and therefore regulatory action is necessary to address market distortions caused by the maker-taker and taker-maker fee models.⁵⁶⁰

Further, the Commission notes that one market conducted a limited unilateral access fee experiment in 2015 to test the impact of reductions to its fees and rebates on 14 securities traded on its market.⁵⁶¹ Several commenters noted the limited utility of that study given its narrow scope and applicability to one market.⁵⁶² The fact that no other

exchange joined in the 2015 access fee experiment, or independently undertook a similar study thereafter, supports the view that it is unlikely that competition among the exchanges alone would compel the exchanges to study, let alone address, potential distortions that may result from their fee and rebate models.

B. Baseline

We compare the economic effects of the rule, including benefits, costs, and effects on efficiency, competition, and capital formation, to a baseline that consists of the existing regulatory framework and market structure. As explained above, by temporarily altering the fee and rebate structure for certain NMS stocks (including ETPs), the Pilot is designed to produce information on order routing behavior that would not otherwise be available. The baseline, therefore, includes the existing information available to the Commission in the absence of a pilot, which the Commission could use to inform future regulatory action.⁵⁶³ The baseline also sets out the exchanges' current practices with respect to fees and rebates and the regulations governing those fees and rebates.

1. Current Information Baseline

While the theoretical studies referenced in the Proposing Release suggest that transaction-based fee models create potential issues for investors,⁵⁶⁴ limited empirical evidence exists to date about the extent that potential conflicts of interest arise from maker-taker and taker-maker pricing models and how exchange transaction-based fees and rebates impact market and execution quality and affect the integrity and structure of the U.S. equity markets.⁵⁶⁵ Consequently, the relation

highly-liquid securities."); Larry Harris Letter, at 9 (noting that Nasdaq's "experimental fee reduction did not occur at all trading venues that traded the subject securities," demonstrating that "regulatory action is necessary to establish a common pricing standard because market forces alone will not do it").

⁵⁶³ See *supra* Section IV.E.1 for the discussion of the alternative that the Commission proceed with rulemaking initiatives without first conducting the Pilot. That alternative differs from the baseline presented here because it directly presumes regulatory changes whereas the baseline for the Economic Analysis does not presume regulatory changes resulting from the Pilot.

⁵⁶⁴ See, e.g., Proposing Release *supra* note 6 at Section IV.A. and C.

⁵⁶⁵ Several commenters supported the Pilot as a necessary step to produce data to inform the heavily contested debate surrounding the impact of exchange fees and rebates on order routing, market quality, and execution quality. See, e.g., Barnard Letter, at 1 ("historically there are many views on this topic, but a paucity of credible data from which to draw conclusions"); Wellington Letter, at 1, and Clark-Joseph Letter, at 1.

between transaction-based pricing and conflicts of interest is not well understood.⁵⁶⁶ Additionally, commenters are divided as to how to interpret existing knowledge. One Commenter stated that we had "much to learn"⁵⁶⁷ while other commenters felt that there was sufficient existing knowledge to move directly to rule making without a Pilot.⁵⁶⁸

Below, we discuss the existing information currently available to the Commission or the public that concerns the relationship between transaction-based fee-and-rebate pricing models and order routing decisions and we describe the limitations of this information for use in policy discussions regarding transaction-based fees and rebates and the potential conflicts of interest and potential distortions that may accompany them. We then discuss the potential to produce additional information regarding the impact of exchange fees and rebates absent the Pilot.

While a number of studies attempt to document the relation between transaction-based fees, order routing decisions, and execution quality, these studies and available data sources are limited in ways that are likely to reduce the strength of conclusions that relate to the impact of transaction-based fees and rebates on order routing decisions and the existence or magnitude of potential conflicts of interest between broker-dealers and their customers. This section details these limitations.

a. Limitations of Existing Studies

Multiple commenters submitted empirical evidence that they argued was consistent with conflicts of interest. For example, one Commenter cited evidence that trade execution algorithms that are fee sensitive tend to have lower execution quality than algorithms that are not fee sensitive.⁵⁶⁹ Another Commenter cited existing academic, industry, and government sources suggesting the existence of conflicts of interest, or of the investing public's perception that there exist conflicts of interest.⁵⁷⁰ Another commenter suggested evidence existed that routing decisions were not always in the best interest of investors by arguing that adverse selection differs by exchange, and that this difference can be observed using TAQ data.⁵⁷¹ Another commenter presented their study arguing that

⁵⁶⁶ See Nuveen Letter, at 2

⁵⁶⁷ See e.g., Spatt Letter, at 3

⁵⁶⁸ See e.g., Larry Harris Letter, at 10

⁵⁶⁹ See Babelfish Letter, at 2-3

⁵⁷⁰ See CFA Letter, at 2

⁵⁷¹ See Healthy Markets Letter I, at 2, 6

⁵⁵⁹ Clearpool Letter, at 2. See also T. Rowe Price Letter, at 1 ("enthusiastically agree[ing] with the Commission that a pilot is necessary to gather data," in part because "exchanges have little incentive to reduce the fee cap on their own"). See also Larry Harris Letter, at 9 (noting that "regulatory action is necessary to establish a common pricing standard because market forces alone will not do it"). Larry Harris Letter, at 6 (noting that "exchange holding companies have a strong interest in maintaining the current system" and that the "SEC may reasonably consider these interests when evaluating comments submitted by the exchanges"); Themis Trading Letter II, at 3 (stating that the Commission should not be "distracted . . . by conflicted stock exchanges desperately fearful that their business models might come crashing down").

⁵⁶⁰ See Larry Harris Letter, at 9. See also Themis Trading Letter I, at 5 (noting that several exchanges oppose the pilot because they are motivated by their "own profit incentives and not what is best for the market").

⁵⁶¹ See Proposing Release, *supra* note 2, at 13011-12. See also Section IV.B.1.a.ii, *infra* discussing the Nasdaq Experiment in greater detail.

⁵⁶² See, e.g., Themis Trading Letter I, at 3 (stating that a "more comprehensive multilateral market-wide approach would be needed to yield usable data that could be used to test how lower access fees, and a lack of rebates, would impact market quality and marketplace behavior" (emphasis omitted)); IEX Letter III, at 6 ("Nasdaq's experiment and its outcomes aren't a perfect proxy for what is likely to happen in the Transaction Fee Pilot. That experiment was done unilaterally and only in

longer queues lead to increased transaction costs, and connected longer queues with the practice of paying rebates.⁵⁷² Another Commenter referenced a study suggesting that trading costs vary across exchanges.⁵⁷³

Although the above listed commenters all felt that the evidence did suggest that fees and rebates led to conflicts of interest, other commenters did not come to the same conclusion. One commenter felt that there was “no evidence that fee practices are harming investors or interfering with fair competition” and consequently felt that a Pilot was not justified.⁵⁷⁴ The studies and analysis presented by Commenters and the studies discussed below have significant limitations with regard to establishing causal links between fees and rebates and order routing decisions. These limitations fall primarily into two categories: (1) The results of the studies may not be representative, and (2) the results of the studies cannot make a causal connection needed to inform on potential conflicts of interest.

When a study’s results are representative, the results can be applied across a broadly defined group. Drawing broad inferences from limited samples could be problematic because the results might be specific to specific securities, broker-dealers, or trading venues. In the context of regulatory decision-making, representative results should inform on the potential effects over the scope of the market covered by the decision. When results are not representative of the full scope of a regulatory decision, that regulatory decision may have an unpredictable effect over the part not represented by the results. For example, if the results of a study cover only certain types of issuers, the results may not apply to all types of issuers and therefore, any regulatory changes based on such studies may have unanticipated effects on the types of issuers not included in the study.

In addition to limitations in how representative results may be, existing studies cannot test for causal relationships between transaction fees and order routing decisions, even around fee revisions. Because transaction-based fees and order routing decisions could be jointly determined, researchers cannot readily disentangle the direction of causality, and therefore cannot determine the extent that potential conflicts exist. The identification of causal relations

between fees and order routing decisions becomes increasingly complex because exchanges frequently modify their fees.⁵⁷⁵ In practice, researchers attempt to identify and measure causal relations in two ways: (1) Exogenous shocks and (2) econometric techniques, such as an instrumental variables approach.⁵⁷⁶

The Commission disagrees with one commenter who felt that sufficient data existed to move forward with regulation prohibiting rebates because “the theory is well-accepted, and no prior evidence contradicts it.”⁵⁷⁷ In the absence of causal data, regulators can use theory—and their best judgment based on their expertise—to guide their decision making. However, in this case, for the reasons discussed throughout this release, the Commission believes that empirically assessing the various theories, causal impacts, and effects of the transaction fee-and rebate pricing model is appropriate.

i. Battalio Equity Market Study

According to the Battalio Equity Market Study, broker-dealers appear to trade execution quality of customer orders, as measured by the likelihood of and time to execution (and not price), for the rebates obtained by providing liquidity to maker-taker venues.⁵⁷⁸ By routing orders to exchanges that pay high rebates, broker-dealers may engage in rebate capture at the expense of client execution.⁵⁷⁹ Using data obtained from mandatory Rule 606 disclosures over a two-month window,⁵⁸⁰ the Battalio

⁵⁷⁵ Over the last five years, the exchanges, on average, have made 34 revisions, or approximately 6.7 revisions per year, to their transaction-based fees and rebates. See *infra* Section IV.B.2.b.

⁵⁷⁶ The method of instrumental variables is used to estimate causal relationships when controlled experiments or exogenous shocks are not feasible. An “instrument” changes the explanatory variable but has no independent effect on the dependent variable, allowing a researcher to uncover the causal effect of the explanatory variables on the dependent variable of interest.

⁵⁷⁷ See Harris Letter, at 10.

⁵⁷⁸ The Battalio Equity Market Study’s abstract of the paper states: “We identify retail brokers that seemingly route orders to maximize order flow payments by selling market orders and sending limit order to venues paying large liquidity rebates. . . . [W]e document a negative relation between limit order execution quality and rebate/fee level. This finding suggests that order routing designed to maximize liquidity rebates does not maximize limit order execution quality. . . .” See Battalio Equity Market Study, *supra* note 5307, at 2193.

⁵⁷⁹ See Battalio Equity Market Study, *supra* note 5307. See also *supra* Section IV.A.2, for an overview of the potential conflicts of interest that emerge.

⁵⁸⁰ Rule 606 requires broker-dealers to provide quarterly reports that provide an overview of their routing practices. See Securities Exchange Act Release No. 51808 (November 27, 2000), 65 FR 75414, (December 1, 2000) (hereinafter “Disclosure

Equity Market Study also identified that four of the ten broker-dealers included in the analysis route limit orders exclusively to market makers or to exchanges that offered the largest liquidity rebates (and charged the highest access fees). A number of tests in the Battalio Equity Market Study also show that low-fee venues provide better execution quality for limit orders, as measured by the likelihood of an order fill, the speed of execution, and realized spreads, relative to high-fee venues, suggesting that order routing decisions to high rebate venues are likely to be suboptimal from a customer’s perspective, and may be indicative of potential conflicts of interest.

Although the Battalio study provides evidence suggestive of conflicts of interest, the study has a number of limitations which render the Commission unable to use this study to robustly determine that rebates cause costly conflicts of interest for broker-dealers. First, the Battalio Equity Market Study uses order level data from a single broker-dealer to determine the relation between maker-taker fees and limit order execution quality.⁵⁸¹ Analysis based on observation of a single broker-dealer may not provide representative results because the relation between transaction-based fees and potential conflicts of interest may not be generalizable to other broker-dealers. For example, over 400 broker-dealers maintain membership with at least one U.S. equities exchange.⁵⁸² If the single broker-dealer examined in the Battalio Equity Market Study has significantly different order routing behavior than the average broker-dealer that routes orders to exchanges, the information obtained from examining the relation between transaction-based fees and order routing decisions of that broker-dealer would not be representative of the entire market and therefore would provide an incomplete representation of potential conflicts of interest.

The Battalio Equity Market Study also relies on a sample of Rule 606 order routing reports obtained directly from the reporting entities’ websites from a limited sample of ten well-known national retail brokers from a single quarterly reporting cycle (October and

of Order Execution and Routing Practices”). See also *supra* note 310 and accompanying text and *infra* Section IV.B.1.b.i, “Rule 606 Data.”

⁵⁸¹ The Battalio Equity Market Study, however, does not specify whether the limit orders are marketable or non-marketable limit orders, as Rule 606 disclosures do not segment these orders. See Battalio Equity Market Study, *supra* note 530.

⁵⁸² Estimates based on data from Form 1 of the X-17A-5 filings. As of December 31, 2017, 3,860 broker-dealers that filed form X-17A-5. See *infra* Section IV.B.2.a.

⁵⁷² See IEX Letter IV, at 9

⁵⁷³ See AGF Letter, at 1

⁵⁷⁴ See CBOE Letter I, at 5 See also Nasdaq Letter I, at II-12

November 2012). As discussed above, approximately 400 broker-dealers are members of at least one national securities exchange. The ten retail brokers analyzed in the Battalio Equity Market Study make up approximately 2.1% of the broker-dealers with exchange memberships, and less than 0.3% of broker-dealers overall. Although these are well-known retail brokers, due to the lack of representativeness of the sample (*e.g.*, the majority of the broker-dealers represented in the Battalio Equity Market Study are online broker-dealers), these broker-dealers may be more (or less) likely than the average broker-dealer to route customer orders in ways that benefit themselves at the expense of their customers. The findings in the Battalio Equity Market Study, therefore, may not be representative of a broader sample of broker-dealers. Moreover, the Commission is unable to determine if the Battalio Equity Market Study's analyses of the Rule 606 disclosure data has statistical power because the authors did not provide any statistical analyses beyond the percentage of market or limit orders routed to a particular exchange.

In sum, the absence of an exogenous shock to access fee caps or rebates outside the control of exchanges leaves the authors unable to definitively determine the causes of broker-dealers' order routing decisions. Consequently, the authors are unable to disentangle whether fees and rebates drive broker-dealer order routing decisions or order routing decisions determine fees and rebates chosen by exchanges.

ii. The Nasdaq Experiment

Nasdaq independently conducted an experiment, whereby it lowered access fees and rebates for a sample of 14 stocks over a period of four months in 2015, providing an exogenous shock to the transaction-based pricing model on the exchange. The Nasdaq experiment lowered both the access fees charged and the liquidity rebates paid on the securities included in their study.⁵⁸³ Nasdaq produced two reports on the experiment⁵⁸⁴ and an academic study

⁵⁸³ The Nasdaq study lowered access fees to \$0.0005 and rebates to \$0.0004 simultaneously for a set of 14 securities, half of which identified Nasdaq as the primary listing exchange, the other half which identified the NYSE as the primary listing exchange. Nasdaq released two reports *see infra* note 584 (examining the changes to a number of metrics related to market quality).

⁵⁸⁴ The first report provided by Nasdaq can be found on their webpage <http://qnasdaqomx.com/AccessFeeExperiment> ("Nasdaq's first report", or the "first Nasdaq report"). The second report provided by Nasdaq can be found at <http://people.stern.nyu.edu/jhasbrou/SternMicroMtg/>

examining the experiment was submitted as a comment.⁵⁸⁵ Both Nasdaq's first study report and the Swan study indicate that when Nasdaq lowered fees and rebates they lost market share in the stocks with lower fees and rebates. According to analysis in the Swan study, the market share that Nasdaq lost appeared to migrate to other make-take venues with higher fees and rebates. Additionally, both Nasdaq's analysis as well as the Swan study find that the experiment led to a decrease in the fraction of time that Nasdaq quoted at the NBBO. The Swan study also estimated a variety of additional tests to measure the impact of the experiment on various aspects of market quality. The results of these tests are mixed. The Swan study found that the Nasdaq experiment improved market quality on Nasdaq in terms of improved fill rates and fill times as well as narrower cum-fee effective spreads and cum-fee realized spreads.⁵⁸⁶

While cum-rebate effective spreads, fill rates and fill times improve on the Nasdaq during the experiment, the Swan study finds that the experiment diminished market quality in terms of quoted spreads and raw realized spreads which both increase during the experiment.⁵⁸⁷ Additionally, the Swan study shows that some measures of market quality were unchanged by the Nasdaq experiment, namely, the Swan study finds no change in raw effective spread.⁵⁸⁸ In Nasdaq's second report on the experiment they examine various market quality measures and find no impact on effective spread, relative effective spread, quoted spread, relative quoted spread, displayed dollar depth at

SternMicroMtg2015/Supplemental/ ("Nasdaq's second report", or the "Second Nasdaq report").

⁵⁸⁵ See Swan Letter which submitted the paper: Yiping Lin, Peter Swan, & Frederick Harris, *Why Maker-Taker Fees Improve Exchange Quality: Theory and Natural Experiment Evidence*, Working Paper, (2018), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3034901 (hereinafter "Swan study"); Nasdaq's Second Report, at 1.

⁵⁸⁶ Cum fee indicates that the computation of spreads included the fee or rebate charged. It is a measure of the total cost of transacting.

⁵⁸⁷ The effective spread is the cost to transact and is defined as two times the absolute difference between the price of a trade and the prevailing midpoint at the time of trade. The effective spread can be decomposed into two components, the realized spread and price impact of the trade. The price impact is generally viewed as the portion of the effective spread that compensates market makers for adverse selection losses. The realized spread is the portion of the spread that market makers "realize" after adverse selection costs are taken into account. Raw realized spreads are realized spreads that do not take into account the all-in cost of trading, *i.e.*, they exclude rebates from the calculations

⁵⁸⁸ Raw effective spreads are effective spreads that do not take into account the all-in cost of trading, *i.e.*, they exclude fees from the calculations.

the NBBO, time between quote updates on the consolidated tape, and time between price changes in the NBBO on the consolidated tape.

In examining the impact of the experiment on price efficiency, the Swan study finds mixed evidence that prices quoted on Nasdaq become less efficient during the experiment. First, the Swan study finds that global price impact declines during the experiment. Price impact is commonly employed as a measure of the informativeness of trades. The Swan study explains the decline in price impact with a theoretical model which suggests that rebates subsidize market makers for the adverse selection costs that they bear—thereby allowing them the ability to bear additional adverse selection which induces informed traders to trade more aggressively in the presence of rebates. Consequently, their model predicts that informed trades will congregate on exchanges with high rebates.

Additionally, the Swan study finds using variance ratios that price efficiency declines on Nasdaq during the experiment. However when using autocorrelation of trades as a measure of price efficiency, the tests indicate a decrease in autocorrelation—suggesting more efficient stock prices on Nasdaq.⁵⁸⁹ Additional analysis on price efficiency comes from Nasdaq's second report which explores the impact of their experiment on market wide price efficiency and finds no change in price impact, autocorrelation of trades, or variance ratios.

The Swan study also empirically examines how the Nasdaq experiment impacted the trading behavior of high frequency traders ("HFTs") and non-HFTs and finds that as a result of the experiment HFTs added liquidity less often and took liquidity more often while non-HFTs did the opposite. Nasdaq also examined trading behavior and found that there was a shift in the composition of the top five liquidity providers for the securities that occurred as a result of the experiment. The top five liquidity providers prior to the start of the pilot significantly reduced their liquidity provision from 44.5% of the liquidity provided pre-pilot to 28.7% in the pilot period. However, the top five liquidity providers from the pilot period had a significant increase in their liquidity provision from 29.7% pre-pilot to 41.5% in the pilot period.

⁵⁸⁹ The interpretation of the price efficiency results is difficult because it is unclear what price efficiency on one exchange means in the absence of the other exchanges. Usually price efficiency is measured across all exchanges trading a given security.

While Nasdaq believes that the results from their study do not support the need for a pilot,⁵⁹⁰ the Commission disagrees because the Nasdaq experiment and the subsequent analysis suffers from the following limitations. First, the Nasdaq experiment may not be representative of the broader market. Nasdaq selected 14 stocks to be part of the analysis, which represent 0.3% of all NMS stocks. The sample is unlikely to be representative of the universe of NMS securities for two reasons: (1) The sample included a small number of stocks (and no ETPs),⁵⁹¹ and (2) less than one-third of these stocks were small or mid-capitalization at the time of the analysis, although most had market capitalizations close to \$3 billion immediately prior to the study.⁵⁹² The small number of stocks makes interpretation of the results more difficult because a change to such a small number of stocks may not be significant enough for traders to alter their behavior.⁵⁹³

Additionally, the Commission is not able to make inference about the effect of a market wide change to fees and rebates from the Nasdaq experiment because, as noted by multiple commenters, the effects of the experiment apply to a single exchange: Nasdaq.⁵⁹⁴ As the other equities exchanges did not have similar changes to transaction-based fees and rebates, any inferences drawn from the Nasdaq study may not be valid under different circumstances in which all equities exchanges were subject to consistent revisions to transaction-based fees.⁵⁹⁵

Lastly, none of the analysis of the Nasdaq study analyzes the impact of potential conflicts of interest on order routing decisions. Further, even if the Nasdaq study had analyzed a causal relationship between transaction-based fees and rebates and potential conflicts

of interest, the limited representativeness of the Nasdaq sample would limit the generality of the study.

iii. Options Market Studies

Three studies have examined exogenous shifts between maker-taker and payment for order flow pricing models on U.S. options exchanges.⁵⁹⁶ These studies found that the movement from a payment for order flow model to a maker-taker model led to a decrease in execution costs for option classes affected by the shift, improved quoted spreads, and altered broker-dealer order routing behavior to account for the fees.⁵⁹⁷ However, the change to a payment for order flow model from a maker-taker model yielded better execution quality, but a reduction in the number of orders and order volume.⁵⁹⁸ With respect to the transition between forms of pricing models that occurred on the option exchanges, discussed above, the key limitation is the comparison of maker-taker pricing models with payment for order flow pricing models. For example, studies that explore these regime shifts between maker-taker to payment for order flow models are not comparing situations in which one regime could theoretically have lower conflicts of interest than the other. Each of these models is likely to create potential conflicts of interest that could affect how broker-dealers route their customer orders,⁵⁹⁹ although evidence does not suggest that one form of pricing model is more or less prone

to conflicts than another. Moreover, the change from one form of pricing model to another could introduce new conflicts of interest or impacts on market and execution quality that did not previously exist. Therefore, the Commission believes that exchange-driven transitions between maker-taker and payment for order flow pricing models are not likely to provide information about potential conflicts of interest and impacts on market and execution quality driven by the maker-taker and taker-maker models or to inform the Commission about future regulatory decisions regarding transaction-based fee models. Additionally, these studies lack causality. Specifically the decision to invert an exchange from a taker/maker to a maker/taker exchange, which these studies are based on, is an endogenous decision, and therefore these studies lack the ability to make causal inference further hindering the Commission's ability to draw inference from these studies.

b. Limitations of Existing and Anticipated Data

Some Commenters suggested that existing data sources could be employed in lieu of a Pilot to study the Commission's objectives.⁶⁰⁰ Another Commenter argued that enhancing existing data would be sufficient.⁶⁰¹ To this end, the Commission considered whether a number of existing data sources could be used independently or in combination to relate transaction-based fees to order routing and execution quality. This section discusses these data sources. For instance, in the Battalio Equity Market Study and the Nasdaq study discussed above, the authors employed some combination of Rule 606 data, proprietary broker-dealer data, the Trade and Quote (TAQ) database,⁶⁰² and proprietary exchange data. In addition, while not employed in previous studies, CAT data, OATS data, Rule 605 data, Form ATS-N data, and exchanges' Form 19b-4 fee filings and fee schedules available from each exchange's website, could provide insights into the relation between transaction-based fees, order routing, and execution quality, and fees

⁵⁹⁰ See Nasdaq Letter I, at 10.

⁵⁹¹ Only common stocks were included in the Nasdaq study, while the proposed Pilot will include NMS stocks, which includes common stocks as well as ETPs.

⁵⁹² Market capitalizations are computed from CRSP shares outstanding and stock price, as of December 31, 2014. See also Themis Trading Letter I, at 2; NorthWestern Letter, at 1 and IEX Letter III, at 6.

⁵⁹³ Nasdaq acknowledges this limitation in their second report analyzing the experiment. See *supra* note 584. See also Themis Trading Letter I, at 2 and IEX Letter III, at 6 for commenters expressing similar concerns about the representativeness of Nasdaq's sample.

⁵⁹⁴ See Swan Letter, at 3; Themis Trading Letter I, at 2; Credit Suisse Commentary, at 2, Larry Harris Letter, at 9, and IEX Letter III, at 6.

⁵⁹⁵ This point was acknowledged in Nasdaq's second report. See *supra* note 584. This point was also brought up by multiple commenters. See Swan Letter, at 3; Credit Suisse Commentary, at 2; and Larry Harris Letter, at 9.

⁵⁹⁶ See Amber Anand, Jian Hua, & Tim McCormick, *Make-Take Structure and Market Quality: Evidence from the U.S. Options Markets*, 62 *Mgmt. Sci.* 3085, 3217–90 (2016), <https://pubsonline.informs.org/doi/abs/10.1287/mnsc.2015.2274> (hereinafter "Anand, Hua, & McCormick"); Robert Battalio, Todd Griffith, & Robert Van Ness, *Make-Take Fees versus Order Flow Inducements: Evidence from the NASDAQ OMX PHLX Exchange*, 12th Ann. Mid-Atlantic Res. Conf. in Fin. (2017), <http://www1.villanova.edu/content/dam/villanova/VSB/assets/marc/marc2017/SSRN-id2870000.pdf> (hereinafter "Battalio, Griffith, and Van Ness"); Robert Battalio, Andriy Shkilko, & Robert Van Ness, *To Pay or Be Paid? The Impact of Taker Fees and Order Flow Inducements on Trading Costs in U.S. Options Markets*, 51 *J. Fin. & Quantitative Analysis* (Oct. 2016) 1637, 1637–62 <https://www.cambridge.org/core/journals/journal-of-financial-and-quantitative-analysis/article/div-classtitle-to-pay-or-be-paid-the-impact-of-taker-fees-and-order-flow-inducements-on-trading-costs-in-us-options-markets/div/0782CE3E9679C29BB910A66192D27201> (hereinafter "Battalio, Shkilko & Van Ness"). Anand, Hua, & McCormick explores the transition from a payment for order flow model to a maker-taker model on NYSE ARCA, while Battalio, Griffith, and Van Ness as well as Battalio, Shkilko, & Van Ness examine the shift on NASDAQ OMX PHLX ("PHLX") from a maker-taker model to a payment for order flow model.

⁵⁹⁷ *Id.*

⁵⁹⁸ *Id.*

⁵⁹⁹ See Battalio, Shkilko & Van Ness, *supra* note 596, at 1637–62.

⁶⁰⁰ See STANY Letter, at 2; Nasdaq Letter I, at 11–12; NYSE Letter I, at 17; and Nasdaq Letter III, at 1–2.

⁶⁰¹ See Era Letter, at 1. *But cf.* IEX Letter II, at 9.

⁶⁰² Battalio Equity Market Study, *supra* note 530, relies on Rule 606 disclosures to identify order routing for a small sample of broker-dealers, proprietary broker-dealer data from a single smart-order routing system to capture limit order execution quality for this broker-dealer's orders, and the TAQ data to measure execution quality as a function of each venue's taker fee or rebate.

and other arrangements. As noted above, several data sources provide information on order routing and execution quality. While researchers could use these data sources to produce some representative results regarding the relation between transaction-based fees, order routing, and execution quality, the Commission believes that available data has several limitations, which include: Granularity, completeness, periodicity, format, and availability.

i. Rule 606 Data

Rule 606 requires broker-dealers to make publicly available quarterly reports that provide an overview of their routing practices on certain orders in NMS securities. As amended, broker-dealers must provide information for the ten venues to which the largest number of total non-directed orders were routed for execution and for any venue to which five percent or more of non-directed orders were routed for execution. Rule 606 disclosures also require broker-dealers to disclose in a standardized format material aspects of their relationships with trading venues to which they route orders, including a description of, among other things, the payment for order flow and any profit sharing relationships, which, like rebates, could influence the broker-dealer's order routing decision and potentially lead to potential conflicts of interest for broker-dealers when routing orders.⁶⁰³ Researchers and other analysts interested in order routing data can download these forms quarterly directly from broker-dealer websites.

Some commenters believed that the amendments to the Rule 606 data would render the Pilot unnecessary.⁶⁰⁴ Indeed, a few commenters suggested that Rule 606 data, perhaps combined with other existing data, would be sufficient to study conflicts of interest among broker-dealers.⁶⁰⁵ The Commission disagrees that this type of analysis would serve the purposes of the Pilot.⁶⁰⁶ Such an approach would not adequately advance the Pilot's broader purpose to study the effects that exchange transaction fee-and-rebate pricing models may have on order routing behavior, execution quality, and market quality, in addition to conflicts of interest between brokers and their customers that are presented

when exchanges pay rebates.⁶⁰⁷ Further, disclosure alone would not provide an exogenous shock that generates measurable responses capable of providing insight into the effects of fees and rebates on the markets and market participant behavior.

In addition, the quarterly frequency of the public Rule 606 reports by broker-dealers is different from the frequency of changes in fee schedules by exchanges (e.g., as presented in Table 2, over a recent five-year measurement period, the average exchange updated its fees schedule approximately 6.7 times per year).⁶⁰⁸ Further, while the Rule 606 data provides order routing at the broker-dealer level, such information is not granular enough to thoroughly study potential conflicts of interest. Specifically, the 606 data is aggregated at the quarterly level. This frequency will not enable researchers to look at the full picture of how a broker-dealer responds to fees because exchanges on average revise their fee schedules 6.7 times per year. With 13 exchanges this amounts to 87 fee changes per year. Consequently, the fees that exchanges charge in a given quarter relative to the other exchanges will likely change multiple times within a quarter. Consequently, Rule 606 data is limited in how it can be employed to evaluate comprehensively the impact of order flow responding to fees and rebates.

The value of Rule 606 disclosures for identifying possible conflicts of interest resulting from transaction-based fees would be limited for a number of additional reasons. First, each broker-dealer discloses data for only its top ten order routing venues. Second, because broker-dealers disclose data at a quarterly frequency, a five-year sample of Rule 606 data for a single broker-dealer, would include only 20 observations, limiting statistical power.

In sum, the Commission believes that the amended Rule 606 data will provide useful information to complement the Pilot; however it is insufficient by itself to determine the impact of exchange transaction fees and rebates on broker-dealer order routing decisions, or inform the Commission of the impact of exchange pricing on market and execution quality.⁶⁰⁹

⁶⁰⁷ See, e.g., ICI Letter II at 3.

⁶⁰⁸ Not every fee schedule revision pertains to transaction fees or rebates. To focus only on these revisions, each Form 19b-4 fee filing was evaluated to determine that revisions to fees or rebates were pertinent to this baseline.

⁶⁰⁹ Multiple commenters expressed views similar to this and urged the Commission to adopt 606 amendments prior to the adoption of the Pilot. See, e.g., Citadel Letter, at 3; OMERS Letter, at 3; ICI

ii. CAT Data and OATS Data

Once the CAT Phase 1 becomes operational,⁶¹⁰ the Commission and SROs will have information on all exchange routing and exchange executions for all NMS securities. In CAT Phase 1, exchanges would record and report order events on every order they receive for NMS securities. Order events include order receipt, order routes, order modifications, order cancellations, and order executions. Likewise, the Order Audit Trail Systems (OATS) data could inform on order routing decisions.⁶¹¹ The OATS data tracks customer orders from the receipt of the order through execution or cancellation. Information in the OATS data reflects the terms of the order, including the security, price, shares, account type, handling instructions, and side of the market for which the order was placed; where the order was routed for execution; modifications to the order; and execution information, including the capacity in which the firm acted in the trade.

Although the CAT and OATS data could feasibly be used to produce order routing data similar to that required by the Pilot, as indicated by one commenter, without the corresponding "randomized trial," the use of OATS data alone would be insufficient to determine causality in the effect of fees and rebates on order routing decisions because it would not be possible to determine from the data whether fees respond to changes in order routing decisions or whether order routing decisions respond to changes in fees. Consequently, in the absence of an exogenous shock to fees, CAT and OATS data cannot provide the Commission with robust evidence about how access fees impact order routing decisions.⁶¹²

iii. Proprietary Broker-Dealer Data

Proprietary data from broker-dealers or exchanges could also provide information about order routing decisions. Broker-dealer data include information on the orders received and routed by that broker-dealer, including where the broker-dealer routed orders, whether the orders execute, and the price, size, and time of execution. Exchange data include information on the orders received by an exchange, including which members routed orders to the exchange, whether the orders execute, and the price, size, and time of

Letter I, at 5-6; Fidelity Letter, at 2; IEX Letter II, at 9.

⁶¹⁰ See *supra* Section II.E.3.vi.

⁶¹¹ See Nasdaq Letter I, at 4.

⁶¹² See Verret Letter I, at 4.

⁶⁰³ See Section III.B.3 of Amendments to Order Handling Disclosure, *supra* note 310.

⁶⁰⁴ See Choe letter I, at 26; FIA Letter, at 3; STANY Letter, at 2; Nasdaq Letter I, at 1-2, 4; NYSE Letter I, at 18.

⁶⁰⁵ See STANY Letter, at 2; Nasdaq Letter I, at 11-12; ERA Letter, at 1.

⁶⁰⁶ See also IEX Letter I, at 9.

execution. Indeed, several commenters stated that if 606 data were not sufficient to answer the Commission's questions about broker dealer routing decisions, then the Commission could request routing tables and information directly from broker-dealers or request other Transaction Cost Analysis (TCA) data to supplement the 606 data.⁶¹³

While these data would provide potentially more granular data about order routing, as proprietary datasets, there is no standard format that exchanges or broker-dealers use to aggregate this data, which makes cross broker-dealer or cross exchange comparison difficult. Even if a dataset of proprietary data could be produced from data obtained directly from exchanges or broker-dealers, the data would still lack an exogenous shock to fees which is necessary to determine a causal link between order routing decisions and exchange fees.

iv. Rule 605 Data

A few commenters suggested that Rule 605 data used in conjunction with other data such as Rule 606 data, could provide information about broker dealer conflicts of interest.⁶¹⁴ Rule 605 data provides information about execution quality by market center, including exchanges, ATSS, and broker-dealers that execute orders, by requiring standardized reports of statistical information regarding order execution, and was designed to improve the public disclosure of order execution practices by exchanges.⁶¹⁵ These data are available monthly from market center websites or data vendors, and provide information on execution quality statistics such as transaction costs, execution speed, and fill rates reported separately for marketable and non-marketable orders.

While Rule 605 data is available to researchers and may provide information about execution quality, it too has a number of limitations. For example, Rule 605 data provides execution quality information for both marketable and non-marketable orders; however, the methodologies for estimating measures of the speed of execution of non-marketable orders are outdated.⁶¹⁶ For instance, Rule 605 measures realized spreads based on quotations five minutes after the time of

order execution and recent research suggests using quotations that more closely follow a trade, because any temporary price impact of a trade goes away within seconds, not minutes, of the trade.⁶¹⁷ Finally, Rule 605 data is limited in that it covers only held orders and orders of less than 10,000 shares.

v. TAQ Data

Beyond Rule 605 data, researchers could also use the TAQ database as a means of measuring order execution quality or estimating market share to use as a measure for order routing decisions. The TAQ database is publicly available (for a fee) from NYSE and provides access to all trades and top of the book quotes for NMS securities, from which researchers and other analysts can estimate trade-based measures of execution quality such as effective spreads.

While TAQ data are available to academic researchers, TAQ has a number of limitations in its precision in the measurement of order routing and execution quality. An exchange's market share can differ significantly from its share of orders received because exchanges reroute orders they cannot execute at the best prices and some exchanges reroute more orders than others. In addition, TAQ doesn't provide information on the brokers or dealers underlying the trades or quotes, so TAQ cannot tell us about the decisions of individual brokers. While TAQ facilitates the estimation of trade and quote-based measures of execution and market quality, it does not facilitate the estimation of order-based measures of execution quality, which are more precise than trade-based measures. In particular, order-based measures allow for the consideration of order size, which can be different and often larger than trade size. Order-based measures also consider the costs of latency whereas trade-based measures do not. Additionally, since TAQ only provides data on trades it does not provide a means of estimating execution quality for limit orders.

vi. Information From Exchange 19b-4 Filings

Finally, researchers both in and outside of the Commission, who wish to link fees and rebates to various outcomes, can manually create datasets of exchange fees and rebates from the information that exchanges provide on their websites and release in their

Notice of Filing of Proposed Rule Changes, which would capture information contained in exchanges' Form 19b-4 fee filings. The Form 19b-4 fee filings record changes to the existing exchange fee schedules with the Commission. At any point that an exchange chooses to make a change to any aspect of its fees and rebates, the exchange must provide notice to the Commission that it is filing a proposed rule change to amend its existing fee and rebate schedule. Exchanges may file their revisions to fees and rebates for immediate effectiveness upon submitting the Form 19b-4 fee filings with the Commission.

A key limitation to this data, particularly for researchers outside the Commission, is that exchanges use bespoke terminology to classify their fees and rebates. Consequently, identifying comparable fees across exchanges is difficult. For example, identifying the base or top-tier fees across exchanges could be difficult for researchers. As shown in Table 2 below, the average exchange has 24 different access fee categories and 21 different rebate categories. Further, exchanges do not disclose per share average or median fees charged and rebates earned on any report or filing, so such information is unavailable to the public. To add to the impediments to fee data aggregation and comparison, Form 19b-4 fee filings are available only as PDF files downloadable from the Commission's website, thereby increasing the costs of aggregation across exchanges over time by researchers.

Lastly, even if a comprehensive dataset of fee changes were created, it would not be sufficient by itself to study the link between order routing decisions and fees because the dataset can only tell when and how an exchange revised fees, and not why the fee changed or if the fee change affected order routing behavior. In essence the data still lacks the ability to establish a causal connection between fee changes and order routing decisions.

vii. Form ATS-N

Following implementation in January 2019, the public will have more information on ATS conflicts of interest and fees. In particular, in June 2018, the Commission adopted amendments to 17 CFR 242.300 through 242.303 (Regulation ATS) and 17 CFR 240.3a1-1 (Rule 3a1-1 under the Exchange Act).⁶¹⁸ As part of these amendments, NMS Stock ATSS will be required to

⁶¹³ See Nasdaq Letter I, at 11-12 and FIA Letter, at 3.

⁶¹⁴ See STANY Letter, at 2 and Nasdaq Letter I, at 11-12.

⁶¹⁵ See Disclosure of Order Execution and Routing Practices, *supra* note 580, at 75417-25.

⁶¹⁶ See Securities Exchange Act Release No. 61358 (January 14, 2010), 75 FR 3594 (January 21, 2010) (hereinafter "Concept Release").

⁶¹⁷ See, e.g., Jennifer Conrad & Sunil Wahal, The Term Structure of Liquidity Provision (August 8, 2018) (unpublished manuscript) https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2837111.

⁶¹⁸ See Securities Exchange Act Release Nos. 83663 (July 18, 2018), 83 FR 38768 (August 7, 2018).

publicly report on new Form ATS–N information about the manner in which the ATS operates and activities of the broker-dealer operator and its affiliates, as well as potential conflicts of interest within the NMS Stock ATSS. While Form ATS–N will contain high level information on operations and affiliates of the ATS, it will not contain detailed information, such as ATS routing tables. Therefore, it would not contain detailed information on how fees and rebates affect the order routing decisions of the ATS.

Form ATS–N also will require ATSS to provide public disclosures about the different types of fees they charge, along with the ranges of those fees and whether they are bundled with any other services. However this information would not be nearly as granular as the exact fee disclosures that would be required by the Pilot. Nor do they provide as much information as the fee disclosures that exchanges are currently required to disclose. These limitations make it difficult to use the ATS–N data to make causal inference about the impact of fees and rebates on order routing decisions.

c. The Potential To Study the Causal Link Between Fees, Rebates, and Conflicts of Interest Absent a Pilot

Absent a Pilot, the Commission does not believe it would have comprehensive, empirical evidence to study the effects on the market that the Pilot is intended to study. In particular, as indicated above, the Commission does not believe the theoretical evidence on incentives and potential other effects are indicative of broker-dealers actually acting on those incentives. Further, even if the data sources above did not suffer from their limitations, researchers would struggle to identify the causality necessary to robustly link fee and rebate effects on order routing to order execution quality.

Indeed, this link requires two steps: First establishing a causal link between fees and rebates and order routing and then between fee-based order routing and order execution quality. Even with perfect data, any study linking fees and rebates to order routing would suffer from an inability to draw conclusions about causality. While such a study might find a correlation between fees/rebates and order routing decisions, the researchers would be unable to conclude which event was driving which. In particular, since exchanges compete for market share, it is reasonable to expect that exchanges change their fees and rebates in response to changes in order routing decisions by broker dealers. If this is the

case it would be the order routing decisions that drive the exchange fees. The data alone do not allow researchers to distinguish whether order routing determines fees or whether fees determine order routing.

Similarly, existing data, even if it didn't have the limitations above, would not enable researchers to infer the causal impact of fee-based order routing on order execution quality. If fees and execution quality are linked, then exchanges may change their fees in response to changes in execution quality. For example, raising rebates might attract more liquidity providers and induce additional order flow to the exchange. An exchange that is experiencing low execution quality might raise rebates to address this problem. Under these circumstances, an empirical analysis that lacks an exogenous shock to fees/rebates might erroneously conclude that increased rebates cause a conflict of interest because they are correlated with low execution quality and increased order flow. Such a conclusion might lead the Commission to draw incorrect conclusions.

2. Current Market Environment

This section provides an overview of the competitive landscape that could be affected as a result of revisions to the transaction-based fee structure required by the Pilot. Where information is currently available to the Commission, a description of the current practices of exchanges along dimensions that are relevant to the Pilot (*e.g.*, summary information on their current fee schedule or the frequency of fee revisions) are included. The Commission requested that commenters provide additional information to inform the baseline as part of the proposal. Where available, the baseline has been supplemented to reflect additional baseline information that was received from commenters.

a. Market for Trading Services

The market for trading services, which is served by exchanges, ATSS, and other liquidity providers (internalizers and others), relies on competition to supply investors with execution services at efficient prices. These trading venues, which compete to match traders with counterparties, provide platforms for price negotiation and the dissemination of trading information. The market for trading services in NMS stocks currently consists of 13 national equity market exchanges and 34 operational ATSS. Other off-exchange venues include broker-dealer internalizers and

wholesalers, which execute a substantial volume of retail order flow. The remainder of this section discusses the current competitive landscape for exchanges, ATSS, and others relevant to our economic analysis of the Pilot.

Since the adoption of Regulation NMS in 2005, the market for trading services has become more fragmented and competitive. Of the 13 exchanges, seven are maker-taker exchanges and four are taker-maker pricing exchanges, as shown in Table 1; the NYSE American and IEX operate as flat-fee exchanges.⁶¹⁹ Since Regulation NMS was adopted in 2005, the market for trading services has become significantly more competitive as measured by the decline in market share of individual exchanges, discussed in more detail below. The number of U.S. equities exchanges has increased by over 60%, as the number of exchanges increased from eight exchanges in 2005 to 13 exchanges operating today.⁶²⁰ Several studies have suggested that transaction-based fee pricing partially drove the increase in the number of U.S. equities exchanges since 2005.⁶²¹

Execution services are a lucrative business, which encourages new trading centers to enter the market in the hopes of capturing rents associated with order

⁶¹⁹ IEX charges a flat fee of \$0.0009 for trades against non-displayed liquidity on both sides of the market, and charges \$0.0003 for trade execution against displayed liquidity. See IEX, Investors Exchange Fee Schedule (August 1, 2018), <https://iextrading.com/trading/fees> (last visited September 18, 2018). As of March 2018, EDGA is no longer operating as a taker-maker market, but is also operating as a flat-fee venue. See Cboe, Cboe US Equities (2018) <http://markets.cboe.com/us/equities/> (last visited September 18, 2018).

⁶²⁰ While the number of exchanges was eight, there were other non-exchange trading venues in 2005 (*i.e.*, ECNs), which were displayed markets that utilized a standard price-time-priority market model similar to exchanges. Although 13 U.S. equities exchanges currently operate as of March 2018, the majority of these exchanges are part of exchange families. For instance, NYSE, NYSE Arca, NYSE American, and NYSE National, are all part of the NYSE Group, which is wholly owned by the Intercontinental Exchange (ICE), while Nasdaq, Phlx, and BX, are owned by Nasdaq. BATS, BATS–Y, EDGA, and EDGX, which all operated as ATSS in 2005, are all subsidiaries of Cboe Global Market, Inc. IEX became a registered exchange in 2016. Further, NSX (NYSE National) existed as an exchange in 2005, but halted operations in 2016. It was acquired by NYSE/ICE in January 2017 and was re-opened for trading in May 2018. See Intercontinental Exchange, *NYSE Finalizes Acquisition of National Stock Exchange*, Bus. Wire: News (Jan. 31, 2017, 6:28 p.m.) <https://www.businesswire.com/news/home/20170131006474/en/>. Researchers can adequately control for exchanges that are subsidiaries of the same parent when conducting analyses of the effect of changes in transaction-based fees on order routes.

⁶²¹ See, *e.g.*, Angel, Harris, & Spatt, *supra* note 530; Harris, *supra* note 530.

execution.⁶²² As discussed in the proposing release, liquidity externalities, where the more liquid venues attract more interest and therefore more liquidity, could result in a single venue (or very limited number of venues) being the preferred trading

location for any given stock because all traders could optimally route orders to the venue with the highest liquidity for a given stock.⁶²³ But if rebates offered by exchanges are large enough, they provide incentives for market participants to route orders to those

venues, in order to capture the rebates, and possibly despite the liquidity profile or execution quality of those venues. Rebates offered by exchanges, therefore, may “break” the liquidity externality.

TABLE 1—U.S. NATIONAL EQUITIES EXCHANGES

Exchange	Market fee type ⁶²⁴	Exchange in 2005?	Market share ⁶²⁵ (%)
Cboe BZX: https://markets.cboe.com	Maker-Taker		6.14
Cboe BYX: https://markets.cboe.com	Taker-Maker		4.86
Cboe EDGA: https://markets.cboe.com	Taker-Maker		1.26
Cboe EDGX: https://markets.cboe.com	Maker-Taker		5.58
BX: www.nasdaqtrader.com	Taker-Maker	✓	3.00
Phlx (PSX): www.nasdaqtrader.com	Maker-Taker	✓	0.70
Nasdaq: www.nasdaqtrader.com	Maker-Taker	✓	15.76
NYSE Arca: https://www.nyse.com/markets	Maker-Taker	✓	8.87
NYSE American ⁶²⁶ : https://www.nyse.com/markets	Flat Fee	✓	0.32
NYSE: https://www.nyse.com/markets	Maker-Taker	✓	12.16
NYSE National ⁶²⁷ : https://www.nyse.com/markets	Taker-Maker	✓	0.64
CHX: www.chx.com	Maker-Taker	✓	0.57
IEX: www.iextrading.com	Flat-fee		6.14
Total	66.00

Table 1 highlights that the market share of trading volume among exchanges is not very concentrated. Although NYSE and Nasdaq have the largest market share of approximately 12% and 16%, respectively, among the exchanges, as of July 2018, these two exchanges collectively account for less than 30% of the total market share of trading volume for NMS stocks, indicating that the market for trading services has become decentralized, and has become more so over time. For instance, between 2004 and 2013, the NYSE’s market share of NYSE-listed stocks declined from approximately 80% to 20%, while market share of other exchanges and off-exchange trading centers has increased.⁶²⁸ This decentralization provides market

participants with a choice among venues when they route orders, and may also encourage exchanges to compete to attract order flow.

A number of commenters suggested that exchanges compete intensely with each other to attract order flow.⁶²⁹ Transaction-based fees represent one means by which national securities exchanges may compete for order flow, and exchanges may adopt business models that focus on attracting order flow by offering large rebates or charging competitive fees. Exchanges may also develop different business models to attract different types of order flow.⁶³⁰ For example, maker-taker venues may offer large rebates to attract liquidity supplying orders.⁶³¹ They may then rely on this liquidity to attract

marketable orders, to which they charge a high transaction fee in order to both offset the cost of the large rebates and to ensure a profitable transaction pricing model. Alternatively, inverted exchanges offer higher rebates to compete to attract marketable orders. Exchanges may also compete for order flow on other dimensions as well, by offering better execution quality, better technology, and innovations in order types and other trading mechanisms.⁶³²

In addition to competing with other U.S. equities exchanges, exchanges also compete for order flow with off-exchange trading centers, including ATs, internalizers, and others. One way exchanges compete with off-exchange trading venues is through the use of rebates. For example, a number

⁶²² See, e.g., Angel, Harris, & Spatt, *supra* note 530; Harris, *supra* note 530.

⁶²³ See Proposing Release, *supra* note 2, at 13042. See also ICI Letter II at 4.

⁶²⁴ See *supra* notes 3 and 4.

⁶²⁵ Shares are computed based on trading volume in August 2018. Market shares for the exchanges reported do not add up to 100%, because approximately 34% of trading volume is executed off-exchange on over-the-counter venues. These market share figures differ slightly from the ones in footnote 9 of Cboe Letter I, which provided market share for May 2018. While these differences could result from the focus on more recent data, the Commission is not sure if the differences could also be driven by differing methodologies. Nonetheless, the figures in Cboe Letter I are consistent with the conclusions in this release. Also, the off-exchange share differs slightly from the 39% share in Nasdaq Letter I, at 2. Note that the off-exchange share in the Proposing Release was 40%.

⁶²⁶ Since July 2017, NYSE American has not been a purely maker-taker market as only certain types of market participants (electronic Designated

Market Makers) are eligible for rebates. See NYSE American Equities Price List (July 26, 2018), https://www.nyse.com/publicdocs/nyse/markets/nyse-american/NYSE_America_Equities_Price_List.pdf.

⁶²⁷ NYSE acquired NSX in January 2017, and the exchange is now known as NYSE National. The exchange was re-opened for trading in May 2018 as taker-maker exchange.

⁶²⁸ See Angel, Harris, & Spatt, *supra* note 5307, Figures 2.17 and 2.18. Although less evident than for NYSE-listed securities, the effect is similar for the Nasdaq market.

⁶²⁹ See, e.g., CBOE Letter I, at 2; NASDAQ Letter I, at 11–13. One commenter suggested that in the Proposal, the Commission made the assumption that exchange groups had market power without providing evidence to support the assumption. This commenter also argued that no exchange group controls even 25 percent of market share and that competition is robust between and among equities exchanges. See NASDAQ Letter I, at 12–13.

⁶³⁰ One commenter suggested that in the Proposal, the Commission failed to account for the two-sided nature of exchange platforms when

assessing the competitive impact of the Proposal. See NASDAQ Letter II, at 4–5. In the Proposal, the Commission separately discussed the potential impact of the Pilot on the competition for trading volume, see the Proposal, *supra* note 2, at 13068. The Commission also discussed some ways the Pilot could potentially impact marketable and nonmarketable order flow, see the Proposal, *supra* note 2, at 13057. Additionally, in Section IV.D.2.a, the Commission separately discusses the potential effects of the Pilot on marketable and nonmarketable order flow.

⁶³¹ A number of commenters said exchanges use rebates to compete to attract limit orders to supply liquidity. See, e.g. NASDAQ Letter I, at 12; Virtu Letter, at 3; State Street Letter, at 2.

⁶³² One commenter also suggested that exchanges also compete to attract to liquidity using many costly features, including rebates, incentive programs, superior execution systems, regulatory quality, and customer service. See NASDAQ Letter I, at 12.

of commenters argued that one way exchanges compete with off-exchange trading venues is by using liquidity rebates to attract liquidity and narrow the displayed spread, which makes it more expensive for off-exchange trading venues to either match or improve upon the NBBO.⁶³³ Exchange transaction fees may also affect competition between exchanges and off-exchange trading venues. For example, commenters suggested that broker-dealers may opt to route order flow off-exchange in order to avoid higher transaction fees charged by exchanges.⁶³⁴ Off-exchange trading venues may also compete with exchanges to attract order flow by offering more flexibility in how they execute orders. One commenter noted that “market participants choose to send orders to off-exchange venues for reasons other than avoiding fees,” including “investors anonymity, the ability to trade in more granular tick sizes, the flexibility to segment the treatment of different types of clients, the ability to choose trading counterparties, and the ability to accommodate customer errors.”⁶³⁵

Off-exchange trading makes up a substantial fraction of total volume, as approximately 34% of all transaction reports are routed using the NYSE and Nasdaq Trade Reporting Facilities as of August 2018.⁶³⁶ Of that off-exchange NMS share volume, approximately 14% was attributable to ATSs, of which 34 traded NMS securities as of August 2018.⁶³⁷ The remaining 21% of off-exchange share volume is routed to other off-exchange trading centers, such as internalizers.⁶³⁸

In aggregate, broker-dealers and other market participants have a large and varied set of options as to where they

route orders, whether to exchanges or to off-exchange trading centers. Moreover, empirical evidence suggests that traditional exchanges, such as NYSE and Nasdaq, are losing market share to off-exchange trading centers and newer exchanges,⁶³⁹ which may provide different incentives to broker-dealers in order to attract this order flow, including transaction fees and rebates. We discuss the current levels of transaction-based fees in Section IV.B.2.e below.

b. Market for Liquidity Provision

Several commenters discussed the importance of liquidity providers to an exchange’s ability to compete in the market for trading services.⁶⁴⁰ Within the exchange framework, liquidity providers, such as market makers, other proprietary traders, and investors, compete to supply liquidity to liquidity demanders. They compete by posting displayed limit orders on exchanges, or by posting undisplayed limit orders on exchanges or ATSs. Liquidity providers profit by buying at a price lower than the price at which they sell and/or by collecting rebates that are greater than the fees they pay. Hence, an execution is a necessary means of profiting from liquidity provision, whether the liquidity provider seeks to profit from price changes or rebates.

Liquidity providers, and traders more generally, seek to manage their trading profits by managing the tradeoff between the price they get in an execution, the certainty of execution, and any adverse selection resulting from the execution.⁶⁴¹ When a liquidity supplier more aggressively prices their limit order, they increase the chance that their order will execute, but they trade this off against their order executing at a worse price and increased chance of their order being adversely selected if it does execute.

To get an execution, the limit orders need to be at the top of a queue at a given price and venue and placed on a venue able to attract liquidity demanders. Displaying a limit order attracts liquidity demanders to the venue displaying the limit order, and thus improves the probability of execution, but could also increase the risk of being adversely selected, which reduces profits. For example, an algorithm that is skilled at identifying short-term price movements may be programmed to hit displayed limit buy orders at a price following a signal that

the price is about to go down. In such a situation, the liquidity provider is unlikely to quickly sell at a price higher than the recent purchase, and therefore, these situations are costly for the liquidity provider. One way to attempt to reduce adverse selection costs is to not display the limit order. When the order is not displayed, the traders with the price signals may not see it and, as a result, would be less likely to pick it off. On the other hand, an undisplayed limit order also risks not getting executed when an execution would be profitable. For example, an undisplayed limit buy order is less likely to execute than a displayed limit buy order just prior to an increase in the price because marketable sell orders that do not anticipate the price increase are likely to route to venues with competitively priced limit buy orders and would not be able to identify which venues have undisplayed limit buy orders.

Rebates and fees can also affect where liquidity providers choose to supply liquidity. Maker-taker exchanges, which pay rebates to liquidity suppliers, provide them with extra revenue when trades are executed. This could encourage liquidity suppliers to post at more aggressive prices for some securities, subject to the fact that displayed quotes on stock exchanges must be priced in one-cent increments. However, competition among liquidity suppliers to earn rebates could lead to longer queues in an order book, which could decrease the chance that a liquidity supplier’s order executes unless they are at or near the front of the queue. In contrast, inverted exchanges, which charge liquidity suppliers a fee when they supply liquidity and offer a rebate to takers of liquidity, usually have shorter queue lengths and an economic incentive to take liquidity, which increases the chance that a liquidity supplier’s order executes.

c. Market for Broker-Dealer Services

The Commission considered the potential for the Pilot to affect competition among broker-dealers that route institutional and retail orders. These broker-dealers compete in a segment of the market for broker-dealer services. The market for broker-dealer services is highly competitive, with most business concentrated among a small set of large broker-dealers and thousands of small broker-dealers competing in niche or regional segments of the market.⁶⁴² Large broker-dealers

⁶³³ See e.g., FIA Letter, at 3–4; NYSE Letter I, at 6; Grasso Letter, at 4.

⁶³⁴ See e.g., IEX Letter I, at 3; Credit Suisse Commentary, at 2.

⁶³⁵ See NYSE Letter I, at 6.

⁶³⁶ Data on off-exchange market share are available from Cboe http://markets.cboe.com/us/equities/market_share/ (last visited November 8, 2018).

⁶³⁷ The estimates of ATSs that trade NMS stocks and ATS trade volume share was developed using weekly summaries of trade volume collected from ATSs pursuant to FINRA Rule 4552. See also Securities Exchange Act Release No. 76474 (November 18, 2015), 80 FR 80998, 81109 (December 28, 2015) (hereinafter “Regulation of NMS Stock Alternative Trading Systems”). The estimates in this release were calculated in the same manner as in the cited release. See also *OTC (ATS & Non-ATS) Transparency*, FINRA: Reg. Filing & Reporting (2018), <http://www.finra.org/Industry/Compliance/MarketTransparency/ATS/>.

⁶³⁸ Total market share is collected from Cboe http://markets.cboe.com/us/equities/market_share/ (last visited November 8, 2018). ATS weekly market share is collected from FINRA, <https://otctransparency.finra.org> (last visited November 8, 2018).

⁶³⁹ See Angel, Harris, & Spatt, *supra* note 530.

⁶⁴⁰ See, e.g., Cboe Letter I; NYSE Letter I.

⁶⁴¹ See NYSE Letter II at 8 for more concrete factors considered by liquidity providers.

⁶⁴² See Securities Exchange Act Release No. 63241 (November 3, 2010), 75 FR 69791, 69822 (November 15, 2010) (hereinafter “Risk

typically enjoy economies of scale over small broker-dealers and compete with each other to service the smaller broker-dealers, who are both their competitors and their customers.⁶⁴³ As of December 31, 2017, approximately 3,860 broker-dealers filed Form X-17a-5. These firms vary in size, with median assets of approximately \$800,000, average assets of nearly \$1 billion, and total assets across all broker-dealers of approximately \$4 trillion. The twenty largest broker-dealers held approximately 72% of the assets of broker-dealers overall, with total assets of \$2.89 trillion, indicating the high degree of concentration in the industry. Of the 3,860 broker-dealers that filed Form X-17a-5, 397 are members of U.S. equities exchanges. Broker-dealers that are members of equities exchanges had, on average, higher total assets than other broker-dealers, with median assets of \$25.5 million, average assets of \$9.2 billion, and total assets across all broker-dealers that are members of exchanges of \$3.65 trillion.

d. Market for Assets Under Management

Many commenters expressed concern about the impact of the Pilot on the market for assets under management, particularly on exchange-traded products (“ETPs”). Asset management firms compete with each other in a segment of the market for assets under management. They offer different types of investment vehicles, such as mutual funds, close-end funds, and ETPs,⁶⁴⁴ which compete with each other to attract investor funds. Investor funds in an investment vehicle are pooled together and invested in financial assets, with investors sharing any profits or losses incurred by the investment vehicle according to each investor’s interest in the vehicle. Asset management firms generally earn revenue by charging fees based on the value of the assets they manage on behalf of investors in their investment vehicles.⁶⁴⁵

Investment vehicles compete with other investment vehicles that follow

Management Controls for Brokers or Dealers with Market Access”).

⁶⁴³ See *id.* Larger brokers, or those with more order flow, also benefit from the economies of scale that accompany the tiering structure typically provided by exchanges. Accordingly, the brokers with the most liquidity-providing orders may benefit disproportionately from rebates because they generally receive higher rebates within the various tiered pricing models of exchanges.

⁶⁴⁴ Not all ETPs are pooled investment vehicles. For example, exchange traded notes (“ETNs”), which are a subset of ETPs, are unsecured, unsubordinated debt securities that trade in the secondary market on exchanges.

⁶⁴⁵ Investment companies can also earn revenue from other activities such as lending securities.

similar investment strategies to attract investor funds. They often rely on differences in expense ratios, tracking error, and redemption and trading characteristics when competing to attract investor funds.⁶⁴⁶

One subset of investment vehicles are ETPs. ETPs differ from other investment vehicles in their trading and redemption characteristics. ETPs are investment vehicles that issue shares that can be bought or sold throughout the day on securities exchanges in the secondary market at a market-determined price.

ETPs provide investors with a diverse set of investment options. While the first ETPs held portfolios of securities that replicated the component securities of broad-based domestic stock market indexes, some ETPs now track more specialized indexes, including international equity indexes, fixed-income indexes, or indexes focused on particular industry sectors such as telecommunications or healthcare. Some ETPs seek to track highly customized or bespoke indexes, while others seek to provide a level of leveraged or inverse exposure to an index over a fixed period of time. Investors also have the ability to invest in ETPs that do not track a particular index and are actively managed.

A number of commenters noted that ETP issuers face strong competition within similar investment strategies and that small differences in fees and trading characteristics, such as spreads, daily volume, and intraday volatility, may be meaningful to market participants when deciding which ETPs to trade or invest in.⁶⁴⁷

As of September 2018,⁶⁴⁸ there were 2,003 ETPs categorized as exchange traded funds (“ETFs”), 223 ETPs categorized as non-ETF ETPs, and 18 ETPs categorized as ETMFs.⁶⁴⁹ As of

⁶⁴⁶ Actively managed investment vehicles also rely on their historical performance when competing to attract investor funds.

⁶⁴⁷ See, e.g., JPMorgan Letter, at 4; STANY Letter, at 4; Healthy Markets Letter II, at 8; Morgan Stanley Letter, at 3–4.

⁶⁴⁸ The results are based on data collected from Bloomberg and Morningstar as of September 30, 2018 for US-domiciled ETPs.

⁶⁴⁹ ETPs operate under exemptive orders that allow them to register as investment companies under the Investment Company Act. See 15 U.S.C. 80a-3(a)(1). Non-ETF ETPs are other ETPs that are not registered under the Investment Company Act. Some are pooled investment vehicles with shares that trade on a securities exchange, but they are not “investment companies” under Investment Company Act because they do not invest primarily in securities. Such ETPs may invest primarily in assets other than securities, such as futures, currencies, or physical commodities (e.g., precious metals). Others are not pooled investment vehicles. For example, ETNs are senior, unsecured, unsubordinated debt securities that are linked to the performance of a market index and trade on

this date, ETPs had total net assets of \$3.74 trillion. The ten largest ETPs accounted for 28.0% of total ETP net assets and 27.8% of the average dollar trading volume on secondary markets.

As the statistics above indicate, ETFs represent the majority of ETPs, they possess characteristics of both mutual funds, which issue redeemable securities, and closed-end funds, which generally issue shares that trade at market-determined prices on a national securities exchange and are not redeemable.⁶⁵⁰ Similar to mutual funds, ETFs continuously offer their shares for sale. Unlike mutual funds, however, ETFs do not sell or redeem individual shares. Instead, “authorized participants” that have contractual arrangements with the ETF (or its distributor) purchase and redeem ETF shares directly from the ETF in blocks called “creation units.”⁶⁵¹

An authorized participant that purchases a creation unit of ETF shares directly from the ETF deposits with the ETF a “basket” of securities and other assets identified by the ETF that day, and then receives the creation unit of

securities exchanges. See fn. 10 and accompanying text in the ETF Proposal, *infra* note 651, at 37333. ETMFs are exchange traded managed funds. ETMFs also operate under exemptive orders that allow them to register as investment companies under the Investment Company Act, but they have different disclosure requirements than ETFs. See, e.g., Eaton Vance Management, et al., Investment Company Act Rel. Nos. 31333 (Nov. 6, 2014) (notice) and 31361 (Dec. 2, 2014) (order).

⁶⁵⁰ The Investment Company Act defines “redeemable security” as any security that allows the holder to receive his or her proportionate share of the issuer’s current net assets upon presentation to the issuer. See 15 U.S.C. 80a-2(a)(32). While closed-end fund shares are not redeemable, certain closed-end funds may elect to repurchase their shares at periodic intervals pursuant to rule 23c-3 under the Investment Company Act (“interval funds”). Other closed-end funds may repurchase their shares in tender offers pursuant to rule 13e-4 under the Exchange Act.

⁶⁵¹ The Commission’s exemptive orders typically contain a representation by the applicant that an authorized participant will be either: (a) A broker or other participant in the continuous net settlement system of the National Securities Clearing Corporation, a clearing agency registered with the Commission and affiliated with the Depository Trust Company (“DTC”), or (b) a DTC participant, which has executed a participant agreement with the ETF’s distributor and transfer agent with respect to the creation and redemption of creation units. See, e.g., Emerging Global Advisors, LLC, et al., Investment Company Act Release Nos. 30382 (February 13, 2013), 78 FR 11909 (February 20, 2013) (notice) and 30423 (March 12, 2013) (order) and related application. In June 2018, the Commission proposed a new rule under the Investment Company Act of 1940 that would permit ETFs that satisfy certain conditions to operate without obtaining an exemptive order. In connection with the proposed exemptive rule, the Commission proposed to rescind certain exemptive orders that have been granted to ETFs and their sponsors. See Securities Exchange Act Release No. 10515 (June 28, 2018), 83 FR 37332 (July 31, 2018) (“ETF Proposal”).

ETF shares in return for those assets.⁶⁵² The basket is generally representative of the ETF's portfolio⁶⁵³ and, together with a cash balancing amount, equal in value to the aggregate NAV of the ETF shares in the creation unit.⁶⁵⁴ After purchasing a creation unit, the authorized participant may hold the individual ETF shares, or sell some or all of them in secondary market transactions. The redemption process is the reverse of the purchase process: The authorized participant redeems a creation unit of ETF shares for a basket of securities and other assets.⁶⁵⁵ While the Commission currently lacks data on authorized participants, a 2015 survey-based study of fifteen fund sponsors, which together offer two-thirds of all existing ETFs (covering 90% of all ETF assets), finds that the average ETF has 34 authorized participant agreements.⁶⁵⁶ The study further reports that creation and redemption transactions occurred only on between 10% to 20% of trading days and that only 10% of the daily activity in all ETF shares (by volume) are creations or redemptions.⁶⁵⁷

Investors can purchase individual ETF shares in the secondary market at prices that may deviate from the ETF's NAV. As a result, ETF investors may trade shares at prices that do not

necessarily reflect the intrinsic value of the underlying ETF assets.⁶⁵⁸

As discussed in the ETF Proposal,⁶⁵⁹ the combination of the creation and redemption process with secondary market trading in ETF shares provides arbitrage opportunities that are designed to help keep the market price of ETF shares at or close to the NAV per share of the ETF.⁶⁶⁰ For example, if ETF shares are trading on national securities exchanges at a "discount" (a price below the NAV per share of the ETF), an authorized participant can purchase ETF shares in secondary market transactions and, after accumulating enough shares to compose a creation unit, redeem them from the ETF in exchange for the more valuable securities in the ETF's redemption basket.⁶⁶¹ The authorized participant's purchase of an ETF's shares on the secondary market, combined with the sale of the ETF's basket assets, may create upward pressure on the price of the ETF shares, downward pressure on the price of the basket assets, or both, bringing the market price of ETF shares and the value of the ETF's portfolio holdings closer together.⁶⁶²

Alternatively, if ETF shares are trading at a "premium" (*i.e.*, a price above the NAV per share of the ETF), the transactions in the arbitrage process are reversed and, when arbitrage is working effectively, keep the market price of the ETF's shares close to its NAV.⁶⁶³

⁶⁵⁸ It is possible for both the ETF's NAV per share and its market price to deviate from the intrinsic value of the ETF's underlying portfolio. In addition, there may be cases in which the ETF's market price is closer to the intrinsic value of the ETF's portfolio than its NAV per share. *See, e.g.*, Madhavan, A. & Sobczyk, A. (2016) "Price Discovery and Liquidity of Exchange-Traded Funds." *Journal of Investment Management*, Vol 14(2) (available at: <https://www.joim.com/price-dynamics-and-liquidity-of-exchange-traded-funds-2/>).

⁶⁵⁹ *See* the ETF Proposal, *supra* note 651, at 37384.

⁶⁶⁰ ETFs also operate under several conditions designed to facilitate an efficient arbitrage mechanism. For example, ETFs are required to provide some degree of transparency regarding their portfolio holdings by disclosing their holdings prior to the commencement of trading each business day (*i.e.*, portfolio transparency).

⁶⁶¹ This redemption would also cause the ETF's assets under management to decline.

⁶⁶² As part of this arbitrage process, authorized participants are likely to hedge their intraday risk. For example, when ETF shares are trading at a discount to an estimated intraday NAV per share of the ETF, an authorized participant may short the securities composing the ETF's redemption basket. After the authorized participant returns a creation unit of ETF shares to the ETF in exchange for the ETF's baskets, the authorized participant can then use the basket assets to cover its short positions.

⁶⁶³ Market participants also can engage in arbitrage activity without using the creation or redemption processes by buying/shorting shares in the ETF while simultaneously shorting/buying the ETF's underlying assets.

However, authorized participants, other market participants, and arbitrageurs acting in secondary markets may incur costs and be exposed to risk when engaging in arbitrage. The costs include bid-ask spreads and transaction fees associated with the arbitrage trades. In addition, during the time it takes arbitrageurs to execute these trades, they are exposed to the risk that the prices of the basket assets and the ETF shares change. As a consequence, arbitrageurs may decide to wait for any mispricing between the market price of ETF shares and NAV per share to widen until the expected profit from arbitrage is large enough to compensate for any additional costs and risks associated with engaging in the transaction.⁶⁶⁴

A number of commenters noted that, in order to promote liquidity in thinly-traded ETPs, exchanges offer market makers who meet certain quoting requirements enhanced rebates when supplying liquidity in certain less actively traded ETPs.⁶⁶⁵

e. Transaction-Based Fees and Rebates

Exchanges are required to disclose their current fee schedules, which include transaction-based fees and rebates, connectivity fees, membership fees, among others.⁶⁶⁶ When exchanges update their fees, they are required to file Form 19b-4 with the Commission; fee changes are permitted to take effect upon filing under Section 19(b)(3)(A) of the Exchange Act.⁶⁶⁷ Although these fee schedules and Form 19b-4 fee filings contain information about fees beyond transaction-based fees and rebates, in this baseline, the discussion is limited to only transaction-based fees and rebates and any changes thereto.

Table 2 reports the range of minimum and maximum transaction fees and rebates, as well as the number of categories for each (in parentheses below the fee ranges), by exchange, as reported by each exchange on their recent fee schedules.⁶⁶⁸ On average,

⁶⁶⁴ As discussed above, authorized participants can also hedge the intraday risk associated with the arbitrage process. *See supra* note 662.

⁶⁶⁵ *See, e.g.*, Virtu Letter, at 7; Cboe Letter I, at 17-18.

⁶⁶⁶ *See* 17 CFR 240.19b-4(m)(1), which requires each SRO to post and maintain a current and complete version of its rules, including those related to transaction-based fees and rebates, on its website.

⁶⁶⁷ As discussed *supra* Section IV.B.1.b.vi, fee information, such as that included in exchange fee schedules or Form 19b-4 fee filings, does not have standardization or formatting requirements.

⁶⁶⁸ The transaction fee and rebate ranges in Table 2 are collected from recent fee schedules (as of July 31, 2018) available from each individual exchange's website (listed in Table 1). Table 2 provides the date from which these fee schedules were reported.

Continued

U.S. exchanges have 18 access fee categories and 21 rebate categories associated with these fee schedules.⁶⁶⁹ For the maker-taker exchanges, access fees do not exceed the Rule 610(c) cap at \$0.0030, but are as little as zero in some fee categories for some exchanges; taker-maker exchanges, because they are

not restricted in the amount they can charge to non-marketable limit orders, have fees that range as high as \$0.0033. Seven exchanges have some categories of rebates that exceed the maximum access fees charged by exchanges.⁶⁷⁰ Table 2 also provides the number of fee revisions for the exchanges as reported in their Form 19b-4 fee filings

to the Commission in the last five years (August 1, 2013–July 31, 2018). Exchanges, on average, have changed their fee schedules 34 times in the last five years,⁶⁷¹ indicating that the average exchange revises its transaction-based fee schedules about seven times per year (approximately every 7.4 weeks).

TABLE 2—SUMMARY OF TRANSACTION-BASED FEE SCHEDULES FOR U.S. NATIONAL EQUITIES EXCHANGES AS OF JULY 2018

Exchange	Fee model	Number of revisions (5 years)	Date of fee schedule	Fees (# of categories)	Rebates (# of categories)
Cboe BZX	Maker-Taker	54	8/16/2018	\$0.0000–\$0.0033 (29)	(\$0.0010)–(\$0.0032) (18)
Cboe BYX	Taker-Maker	51	8/9/2018	\$0.0000–\$0.0033 (40)	(\$0.0005)–(\$0.0022) (12)
Cboe EDGA	Taker-Maker	41	8/1/2018	\$0.0000–\$0.0032 (48)	(\$0.0004)–(\$0.0027) (14)
Cboe EDGX	Maker-Taker	53	8/16/2018	\$0.0000–\$0.0032 (37)	\$0.000–(\$0.0032) (20)
BX	Taker-Maker	29	7/20/2018	\$0.0005–\$0.0030 (13)	\$0.0000–(\$0.0021) (12)
Phlx (PSX)	Maker-Taker	24	5/21/2018	\$0.0028–\$0.0030 (3)	\$0.00–(\$0.0030) (8)
Nasdaq	Maker-Taker	54	7/25/2018	\$0.0000–\$0.0030 (4)	\$0.0000–(\$0.00325) (36)
NYSE Arca	Maker-Taker	51	8/1/2018	\$0.0005–\$0.0035 (68)	(\$0.0002)–(\$0.0035) (65)
NYSE American	Flat	9	7/26/2018	\$0.0002–\$0.0030 (12)	\$0.0000–(\$0.0045) (4)
NYSE	Maker-Taker	42	8/10/2018	\$0.0003–\$0.0030 (20)	\$0.0000–(\$0.0045) (41)
NYSE National ⁶⁷²	Taker-Maker	11	7/26/2018	\$0.0003–\$0.0025 (16)	(\$0.0002)–(\$0.0020) (2)
CHX	Maker-Taker	8	4/26/2018	\$0.0007–\$0.0040 (5)	(\$0.0009)–(\$0.0020) (2)
IEX	Flat	10	8/1/2018	\$0.0009	\$0.0009

For several of the exchange families, information about revenues and costs attributed to transaction-based fees and rebates is available in aggregate from Form 10-K filings. Using the statements of income from Form 10-K filings for 2017 capturing the net (of rebates) transactions-based fee revenues, the Nasdaq exchanges (Nasdaq, BX, and PSX) earned \$253 million.⁶⁷³ Based on the same measure the NYSE-affiliated exchanges (NYSE, NYSE Arca, NYSE American, and NYSE National) earned \$196 million in transaction-based fees

net of rebates,⁶⁷⁴ while the BATS Global Markets (now, Cboe BZX, Cboe BYX, Cboe EDGA, and Cboe EGDG), for the year ended December 31, 2017, earned \$153 million in transaction-based fees net of rebates.⁶⁷⁵ Neither CHX (which became a NYSE-affiliated exchange in 2018) nor IEX or their affiliates are publicly traded, meaning that these exchanges do not file an annual Form 10-K with the Commission. As a result, public information regarding the revenues or profits associated with

transaction-based fees does not exist for these exchanges.

Information on the net transactions-based revenues for each individual exchange, as opposed to the amounts reported for exchange groups in Form 10-K filings, is not currently publicly available, making it difficult to analyze the fees and rebates for an individual exchange. To estimate the net transactions-based revenues for each individual exchange, Table 3 reports the maximum and median net transaction-based fees based on each exchange's

The ranges in fees are the minimum and maximum fees and rebates reported by each exchange.

⁶⁶⁹ This average does not include the IEX exchange as the fee structure is a flat one. See also, e.g., RBC Letter II (attaching a report titled “Complexity of Exchange Pricing and Corresponding Challenges to Transparency and Routing” in which they identify “1,023 separate pricing ‘paths’—i.e., separate fees or rebates—across these exchanges.”).

⁶⁷⁰ See, e.g., CFA Letter, at 6.

⁶⁷¹ The median number of revisions to fee and rebate schedules by exchanges is 41 over the five-year period.

⁶⁷² NYSE acquired NSX in January 2017, and the exchange is now known as NYSE National. As of May 2018, the exchange re-opened for trading and began submitting new fee schedules periodically.

⁶⁷³ See Nasdaq Form 10-K filings (2017), available at <https://www.sec.gov/Archives/edgar/data/1120193/000112019318000003/ndaq1231201710-k.htm>. Transaction-based revenues for equity securities accounted for approximately 59% of total operating income net of rebates and 25% net of rebates and brokerage, clearing, and exchange fees. The Commission has revised the revenue number for Nasdaq for 2017 revenue per the correction provided in the Nasdaq Letter II.

⁶⁷⁴ See Intercontinental Exchange Form 10-K filings (2017), available at <https://www.sec.gov/Archives/edgar/data/1571949/000157194918000003/ice2017123110k.htm>. For the Intercontinental Exchange, net cash equity transaction-based revenues were approximately 8.2% of operating income for 2016.

⁶⁷⁵ See Cboe Form 10-K filings (2017), available at <https://www.sec.gov/Archives/edgar/data/1374310/000155837018000953/cboe-20171231x10k.htm>. Cboe's acquisition of BATS Global Markets became effective on March 1, 2017. For the year ending December 31, 2017, the net transaction-based revenues were 41% of Cboe operating profits.

most recently reported fee schedule and the share volume of each exchange for July 25, 2018 through August 24, 2018.⁶⁷⁶ As evidenced by the significant differences between the sum of net of

rebate revenues for entities reporting to the same exchange group obtained from Table 3 and the total net of rebate revenues for each exchange family reported on the Form 10-K or 10-Q

filings, this approach does not yield reliable results, highlighting the limitations on the data currently available to researchers.

TABLE 3—ESTIMATES OF ANNUALIZED PER-EXCHANGE NET TRANSACTION-BASED FEE REVENUES FROM TRANSACTION-BASED FEES AND MONTHLY EXCHANGE SHARE VOLUME

[For July 25, 2018–August 24, 2018]

[In millions]

Exchanges	Share volume (millions) ⁶⁷⁷	Annualized midpoint difference	Per share profit (median)	Annualized maximum difference	Per share profit (maximum)
Cboe BZX	9,014	(\$486.75)	(\$0.00450)	\$248.78	\$0.0023
Cboe BYX	7,136	25.69	0.00030	239.76	0.0028
Cboe EDGA	1,853	1.11	0.00005	62.26	0.0028
Cboe EDGX	8,165	(4.90)	(0.00005)	205.77	0.0021
BX	4,389	36.87	0.00070	158.02	0.0030
Phlx (PSX)	1,035	16.15	0.00130	37.27	0.0030
Nasdaq	23,087	(34.63)	(0.00013)	831.14	0.0030
NYSE Arca	13,024	23.44	0.00015	515.75	0.0033
NYSE American	473	(3.69)	(0.00065)	17.03	0.0030
NYSE	17,823	(128.33)	(0.00060)	641.63	0.0030
NYSE National	920	3.31	0.00030	25.40	0.0023
CHX	830	8.96	0.00090	30.87	0.0031
IEX	3,757	N/A	0.00000	N/A	0.0000

C. Analysis of Benefits and Costs of Transaction Fee Pilot

1. Benefits of Transaction Fee Pilot

The Commission expects that the benefits of the Pilot will fall into two categories: (1) More informed policy decisions, including more information about the economic impact of transaction-based fees and rebates, and (2) other benefits that may accrue to market participants for the duration of the Pilot. In this section we discuss each of the categories of benefits as well as potential limitations to the applicability of information to be drawn from the Pilot.

a. Benefits of More Informed Policy Decisions

The Commission expects that the primary benefit of the Pilot will be to inform the Commission and public of the economic impact of exchange transaction-based fees and rebates.⁶⁷⁸ As a result, the Commission will have data

to better inform its regulatory consideration of exchange transaction-based fee-and-rebate pricing models and fee changes, and the potential effects of changes to its regulatory approach concerning the same. In general, more informed regulatory decisions are more likely to result in regulatory approaches that better balance costs and benefits relative to regulatory decisions based on less precise information. In other words, many of the economic benefits derive from subsequent decisions that the Commission can neither predict nor commit to at this time. Indeed, the Commission cannot predict at this time whether the results of the Pilot will suggest any particular policy direction and recognizes that the results could suggest that existing exchange transaction-based fee caps and related rebates may be more beneficial to investors than the policy alternatives examined in the Pilot.

i. Expected Analysis From the Pilot

The Proposing Release discussed the theoretical impact of exchange transaction-based fees and rebates on several potential effects such as conflicts of interest, fragmentation, complexity, liquidity, and off-exchange competition and explained that certain components of the Proposed Pilot would facilitate the study of these effects.⁶⁷⁹ As noted above, the Commission believes that little empirical evidence currently exists regarding these effects.

More specifically, the Pilot will provide information on the direct effects of exchange transaction fee and rebate levels on execution quality and market quality and will facilitate studies of the impact of fees and rebate levels on market participant behavior and competition, including potential conflicts of interest. Sections IV.C.2 and IV.D. discuss many potential economic effects for which this economic analysis

⁶⁷⁶ The share volume is obtained from Cboe, available at http://markets.cboe.com/us/equities/market_share/ (last visited September 18, 2018). To compute the maximum profit attainable, staff took the difference between the highest possible transaction fee and the lowest possible rebate and multiplied it by the monthly share volume. For a midpoint profit, the median of the transaction fees less the median of the rebates is computed and multiplied it by share volume. In order to make the results comparable to those reported above from Form 10-K filings, the monthly profits are annualized by multiplying each monthly profit amount by 12.

⁶⁷⁷ Monthly share volume obtained from Cboe for July 25, 2017 through August 24, 2017, Cboe, U.S.

Equities Market Volume Summary, available at http://markets.cboe.com/us/equities/market_share/ (last visited September 18, 2018).

⁶⁷⁸ In contrast, one commenter opined that the primary benefit of the Pilot would be “the ‘better fills’ that institutional investors will get after the pilot is introduced.” Nasdaq Letter III, at 9. This commenter asserted that the Commission had not done a proper cost benefit analysis because its analysis of benefits did not account for the “opportunity costs” inherent in order routing decisions, or other factors which would impact institutional orders. *See id.* Consequently, the commenter asserted that the Commission overstated the benefit of the Pilot. *See id.* However, the Commission does not agree that “better fills” will

be a certain result of the Pilot. Furthermore, the Commission disagrees that it has not adequately analyzed the costs of the Pilot. As noted above, the Commission has quantified the likely economic effects of the Pilot where possible; however, the Commission is unable to quantify all of the economic effects because it lacks the information necessary to provide reasonable estimates. The Commission agrees with the commenter that quantifying benefits using existing data is difficult, thus underscoring the need for a Pilot. A more detailed analysis of the Pilot’s impact on trading costs can be found in Section IV.C.2.b.

⁶⁷⁹ *See* Proposing Release, *supra* note 2, at Section V.

is unable to draw unambiguous conclusions. For example, many commenters disagreed on how reducing exchange fees and rebates affects the competitive landscape between exchanges and off-exchange venues in the market for trading services,⁶⁸⁰ and the analysis here recognizes that many competitive forces can drive order flow in either direction. The Pilot will provide insight into the impact of transaction fees and rebates on this competitive landscape and can perhaps even shed light into the mechanism behind any observed changes. Further, one commenter argued that this economic analysis “does not accurately account for the actual level of orders impacted by conflicted broker routing.”⁶⁸¹ The Commission believes that it cannot establish the actual level of orders impacted by potentially conflicted broker routing with current data and has designed the Pilot in part to gather more data on the extent to which rebates impact order routing decisions, as explained in the section that follows. The Commission also notes that the Pilot seeks to study the effects of exchange pricing models on market quality and execution quality, which could affect all orders. The Pilot will facilitate the study of order flow among different venues, which could provide insights into whether changes in exchange transaction-based fees and rebates affect, for example, the level of fragmentation. Existing literature suggests that transaction-based pricing has contributed to an increase in the number of venues competing for order flow over time.⁶⁸² By offering rebates or Linked Pricing, start-up maker-taker and taker-maker exchanges have been able to attract order flow from exchanges such as NYSE and Nasdaq, thereby reducing liquidity externalities, or concentration of order flow to a preferred venue, and leading to increased fragmentation of the market for trading services.⁶⁸³ By altering the access fee and rebate structures for exchanges, researchers may be able to identify whether these changes lead to more (or less) concentration of liquidity and how they affect competition for order flow among

exchanges, which could lead to less (or more) market fragmentation.⁶⁸⁴

Test Group 2 will provide insight into the natural equilibrium level of access fees, within the current regulatory structure, in the absence of rebates and Linked Pricing.⁶⁸⁵ As discussed above, prohibiting exchanges from offering Linked Pricing in Test Group 2 is intended to complement and reinforce the prohibition on rebates.⁶⁸⁶ Although Rule 610(c) caps the maximum access fee for exchanges at \$0.0030, in the absence of rebates and Linked Pricing, competition among exchanges could drive the average access fee to an amount substantially below \$0.0030.⁶⁸⁷ As noted in Section IV.A.2, exchanges have a reduced competitive incentive to reduce fees because doing so would require reducing the rebates that attract order flow to the exchange. Test Group 2 will allow competition among exchanges, in the absence of pressure to offer high rebates or Linked Pricing, to determine the level of access fees, which the Commission and others can observe during the Pilot. Like the other examinations the Pilot can facilitate, the results of an analysis of the equilibrium access fees are not currently predictable with much certainty.

The Pilot will facilitate studies of the impact of exchange transaction-based

⁶⁸⁴ See, e.g., Fidelity Letter, at 9.

⁶⁸⁵ Equilibrium refers to conditions of a system in which all competing influences are balanced. For instance, with respect to the Test Group 2, this could be the level of transaction fees charged by exchanges from which no exchange has any incentive to increase or decrease that fee outside of a constrained competitive margin. This will be the equilibrium transaction fee. See also, discussion in Section II.C.7.e. An important potential benefit of the Pilot could result if the no rebate Test Group were able to demonstrate a set of conditions wherein regulatory fee caps might not be necessitated in an environment in which natural competitive forces could effectively cap access fees. This would occur if in the no-rebate Test Group the equilibrium fee charged during the Pilot was lower than the fee cap—implying that the fee cap was not binding in this situation.

⁶⁸⁶ If Linked Pricing were not prohibited, market participants could potentially circumvent the prohibition on rebates through Linked Pricing mechanisms. Therefore, including prohibitions on rebates or Linked Pricing could provide information to the Commission and the public about potential conflicts of interest associated with rebates or substitutes for rebates, such as Linked Pricing, as well as the equilibrium fee that emerges in the absence of rebates or Linked Pricing.

⁶⁸⁷ See, e.g., Fidelity Letter, at 9; Citadel Letter, at 5. In addition to removing rebates or Linked Pricing in Test Group 2, the Commission could also temporarily suspend limitations on access fee caps imposed by Rule 610(c). Implementing multiple changes within a single test group, however, could prevent researchers and others from clearly determining the effect of the prohibition of rebates on order routing decisions of broker-dealers from the effect resulting from the removal of access fee caps if Rule 610(c) restricted access fees during the Pilot.

fees and rebates on liquidity by studying metrics such as the quoted spreads.⁶⁸⁸ The width of the quoted spread is considered to be an indicator of a stock’s liquidity, with narrower spreads generally indicating more liquid securities. The analysis below in Section IV.C.2.b.iv identifies several reasons that reducing fees and rebates could increase or decrease quoted spreads. The Pilot could provide information on whether exchange fees and rebates affect the liquidity of securities, as measured by the quoted spreads, across different test groups.⁶⁸⁹

The Commission disagrees with commenters who said that the Pilot was inappropriate because of a one-size-fits-all approach.⁶⁹⁰ In selecting the number of securities for each Test Group, the Commission staff divided NMS securities into three common stock strata and three ETP strata by liquidity to determine how many stocks each stratum requires to achieve statistical power.⁶⁹¹ The staff also separately examined ETPs to determine how many ETPs would be required to achieve statistical power within each Test Group, and within each Test Group by liquidity strata, helps to ensure that researchers will be able to use Pilot data to inform the Commission regarding the issue of whether different securities should have the same regulatory treatment.

ii. How the Pilot Facilitates Study

The Pilot will simultaneously create different fee environments, each of which restricts transaction-based fees differently to allow for the comparison of securities that are simultaneously in different regulatory regimes. The study of these comparisons will inform the Commission about economic distortions that may arise as a result of transaction-based fees. Because of the size and length of the Pilot, the Commission believes that the different fee environments over representative subsamples of NMS securities, even though implemented temporarily, will produce effects on market participant behavior that are identical or similar to

⁶⁸⁸ See, e.g., ICI Letter II at 3 (noting that the Pilot could facilitate the study of how access fees and rebates affect liquidity, including quoted spreads).

⁶⁸⁹ See. Academic studies suggest that the majority of retail orders are executed off-exchange at prices based on the NBBO, thereby providing retail investors with better prices in the presence of rebates. If, however, large rebates provide incentives for broker-dealers to route retail orders to these exchanges instead of to off-exchange venues, retail customers may not be fully aware of the total cost associated with their orders. See, e.g., Angel, Harris, & Spatt, *supra* note 530.

⁶⁹⁰ See, e.g., Nasdaq Letter I at 9.

⁶⁹¹ See *supra* Section II.C.5 (discussing statistical power) and *infra* note 695.

⁶⁸⁰ See e.g., Cboe Letter I, at 12; NYSE Letter I, at 9; Nasdaq Letter I, at 2, 5 (suggesting that the Pilot may impact competitive dynamics between exchanges and ATSs).

⁶⁸¹ See, e.g., Nasdaq Letter III at 1.

⁶⁸² As discussed in the baseline, the number of exchanges has increased since 2005, and market share has become less concentrated over the same time period. The majority of the U.S. equities exchanges belong to three exchange groups. The Commission believes that any analyses of the effects of transaction-based fees on order routing decisions can appropriately control for exchange groups.

⁶⁸³ See, e.g., ICI Letter II at 2.

those that would arise under a similar permanent change.

As explained below, three distinct features of the Pilot's design will facilitate analyses of the relationship, if any, between fees and potential economic distortions. Specifically, the Pilot is designed to provide (1) representative results; (2) more direct access to data that is currently unavailable or requires lengthy and labor-intensive effort to compile and process; and (3) sufficient information to determine causality. The following sections discuss in detail how each of these aspects of the Pilot could facilitate studies of the issues described above.

(1) Representative Results

In the context of the Pilot, representative results mean that the impact of the Pilot's terms on a Test Group during the Pilot Period is likely to be consistent with the impact of the results on the Test Group if the Pilot's terms were permanent (as opposed to temporary). Representative results are desirable for researchers and policy makers because it ensures that inferences drawn from the results of analysis of Pilot data are likely to be similar to those that would emerge if the terms were permanent. As discussed in the baseline, current analyses are limited by some combination of the following: Data from a single broker-dealer, a small sample of securities, a single exchange, or a short sample period. By contrast, the Commission believes that the Pilot, as designed, will produce more representative results. Specifically, as discussed in detail below, the Pilot will cover a large stratified sample of NMS stocks (including ETPs), both maker-taker and taker-maker exchanges, and transaction fee caps as well as a prohibition on rebates and Linked Pricing, and will have a two-year duration with an automatic sunset at the end of the first year unless the Commission determines, at its discretion, that the Pilot shall continue for up to one additional year.⁶⁹²

The Commission believes that the Pilot will produce representative results, presenting a significant improvement on existing studies, because the Pilot applies to a large stratified sample of NMS stocks (including ETPs) with prices of at least \$2.00 per share at the date of the Pilot

Securities selection, with average daily volume of 30,000 shares or more, and with no restrictions on market capitalization.⁶⁹³ In particular, the Commission recognizes that any possible conflicts of interest related to transaction-based fees could vary across securities such that the results of a pilot focused only on large capitalization stocks may not provide information relevant to small capitalization stocks or ETPs.⁶⁹⁴ Including a broad sample of NMS stocks allows the results to inform policy choices across subsets of these securities. The stratification of the stocks selected for each Test Group is designed to ensure that each Test Group and the control group have a similar composition within a given stratum, facilitating a comparison of Test Groups and the Control Group, which further supports the representativeness of results. If, for instance, the Test Groups and Control Group had a different composition within strata, researchers outside the Commission might not be able to distinguish whether differences across Test Groups and the Control Group stem from different fee environments or different sample composition, rendering the results less representative. In addition, the Commission believes that the sample sizes in the Test Groups are sufficient to provide the statistical power necessary to identify differences across the samples, even within strata.

The Commission notes that while the adopted Pilot will be able to provide representativeness within strata, changes since the Proposal affect the representativeness of the Test Groups as a whole. In particular, in response to commenters who called for fewer stocks to be included in the Pilot, Commission staff conducted a supplemental analysis of Test Group sizes needed to achieve statistical power.⁶⁹⁵ In contrast to its

⁶⁹³ See, e.g., Brandes Letter, at 2 (supporting applying the Pilot to the "widest range of stocks possible"); Spatt Letter, at 1–2.

⁶⁹⁴ See, e.g., Battalio Equity Market Study, *supra* note 5307.

⁶⁹⁵ The supplemental analysis made several improvements over the analysis used to identify the proposed test group sizes in an attempt to refine the analysis to respond to commenters' desire for smaller test groups while preserving statistical power. First, the supplemental analysis used more refined methodology that more directly controlled for time series and cross-sectional dependencies. Second, the supplemental analysis considered three quoted spread strata instead of two market capitalization stratum. The market capitalization strata was originally necessary to control for any overlap with the Tick Size Pilot, but quoted spread strata more directly align with the potential economic significance of fees and rebates relative to anticipated transaction costs and the Tick Size Pilot has ended. Third, the supplemental analysis eliminated stocks that trade below 30,000 shares per day. See also *supra* Section ILC.6. See *supra*

analysis in the Proposal,⁶⁹⁶ the Commission analyzed the sample sizes in each stratum rather than using the lowest power stratum to determine the ratio of test group stocks to control stocks. As a result, the ratio of test group stocks to control group stocks is lower for some strata. In other words, the Commission was able to reduce the number of securities in test groups by weighting the composition of the test groups relative to the control group more heavily toward securities in certain strata in which more data would be needed to achieve statistical power. While analyses of the Pilot that do not consider the strata may fail to provide representative results, the addition of the stratum identifier to the Exchange Lists will allow researchers in and outside the Commission to consider the strata in their analyses.

The Commission believes that the inclusion of a broad sample of NMS stocks, including small and mid-capitalization stocks, ensures representative results from the Pilot. Although previous studies, as discussed above, suggest that any possible conflicts of interest are likely to be the greatest for small-capitalization securities,⁶⁹⁷ the Commission believes that it is important to the design of the Pilot to include these small and mid-capitalization stocks (including ETPs). In particular, including these securities in the Pilot will allow the results of the Pilot to inform policy choices across any subset of these securities.

Representativeness of results of the Pilot will also be promoted by the choice of the Pilot Security selection date. Rule 610T(b) and (c) contemplate that the Commission will select and announce the Pilot Securities prior to the Pilot start date. As noted in the Proposal, the Commission anticipates that it will assign and designate by notice each Pilot Security to one Test Group or the Control Group approximately one month prior to the start of the Pilot. By assigning securities close to the start of the Pilot, each Test Group and the Control Group are likely to be more comparable during the Pilot. Because stratification criteria (e.g., market capitalization and liquidity) vary naturally over time, the closer the assignments occurs to the Pilot start date, the more comparable the Test Groups will be during the Pilot. Selection of securities close to the start of the Pilot also will be more likely to

note 175 (citing commenters that favored smaller test groups).

⁶⁹⁶ See Proposing Release, *supra* note 2, at 13019.

⁶⁹⁷ See, e.g., Battalio Equity Market Study, *supra* note 5307; Harris, *supra* note 5307; RBC Letter I, at 5–6.

⁶⁹² As designed, the Pilot will exclude NMS securities that have prices below \$2.00 per share as of the date of pilot selection and NMS securities with average daily volume of less than 30,000 shares. As detailed above, the data will also be produced for a six-month pre-Pilot Period and a six-month post-Pilot Period.

include the intended universe of securities, by avoiding securities that exit between the adoption of the Rule and the start of the Pilot, while also capturing new securities that enter the market during this period. Further, to the extent that market participants would change their behavior in anticipation of the Pilot, setting the selection period close to the Pilot effective date could reduce the effect of such behavior on pre-Pilot data.

The results of the Pilot will be further representative because the Pilot applies to all U.S. equities exchanges regardless of fee structure. Broker-dealers potentially face transaction-fee related conflicts of interest regardless of whether those fees are on maker-taker exchanges or taker-maker exchanges, and rebates on either the make or take side can both impact market quality and execution quality. Further, a pilot that addresses only a single fee structure would not produce results relevant for policy choices that also would apply to another fee structure.

Applying the Pilot to all exchanges also improves upon the existing analysis of the limited fee experiment conducted by Nasdaq,⁶⁹⁸ which only covered a single exchange, as explained in Section IV.B.1.a.ii. While the results from that study are suggestive that broker-dealers routed customer orders to other exchanges that did not change their transaction-based fees and rebates, reasons other than potential conflicts of interest could have impacted the changes in order routing decisions. The Commission believes that the Pilot will achieve representativeness by requiring transaction-fee changes for all U.S. equities exchanges, which will allow researchers in and outside the Commission to identify how these revisions affect order routing decisions across exchanges. As discussed above, excluding non-exchange trading centers does not forfeit the representativeness of the results to be obtained from the Pilot, as including them would expand the Pilot to dissimilarly situated trading centers whose fee models and regulatory treatment are incomparable to exchanges. Further, the Pilot will require that changes to fees or rebates are applied at the security level, which means that for any given security, the limitation on access fees or rebates is ubiquitous across all exchanges.

In addition, the Pilot achieves representativeness by imposing a fee cap and a prohibition on rebates and Linked Pricing. The existing literature suggests that the potential distortive effects arising from access fees could

induce behavior that would be different from the distortions arising from rebates or Linked Pricing. Therefore, the inclusion of caps on both fees and rebates or Linked Pricing allows for a more comprehensive analysis of any possible conflicts of interest than could be achieved by focusing solely on fees or rebates.

The Commission further believes that the duration of the Pilot will produce sufficiently representative results. If broker-dealers incorporate transaction fees and rebates into their order routing decisions, a two-year duration for the Pilot, with an automatic sunset at the end of the first year, unless the Commission publishes a notice determining that the Pilot shall continue for up to a second year, would likely make it economically worthwhile for broker-dealers to change their routing behavior during the Pilot by making it costly to avoid the Pilot.⁶⁹⁹ Specifically, as discussed below, the Commission recognizes that broker-dealers will incur costs to incorporate new fee schedules that are consistent with the Pilot's requirements into their order routing decisions.⁷⁰⁰ Broker-dealers could ignore the Pilot to avoid these costs. If enough broker-dealers ignore the Pilot, the Pilot might not produce results that provide the Commission a sense of the likely impact of permanent changes to fee caps or rebates. However, to the extent that broker-dealers incorporate transaction-based fees and rebates into their order routing decisions, ignoring the Pilot will also impose costs on broker-dealers, and these costs increase with the duration of the Pilot. The Commission believes that the Pilot duration, even with a one-year sunset, is long enough to produce representative results because, as discussed below in Section IV.C.2.b.ii, broker-dealers that incorporate transaction-based fees and rebates into their routing decisions will find it economically worthwhile to adapt their behavior in response to the Pilot. Further, the provision to suspend the automatic sunset facilitates representative results because it provides the Commission with flexibility as the data from the Pilot develops. For example, the Commission could suspend the sunset if, for example, it believed that additional time would help ensure that market developments are fully reflected in the

data with sufficient statistical power for analysis, recognizing that such market developments are uncertain. Therefore, the sunset provides flexibility to the Commission to observe developments during the Pilot to determine whether to allow the sunset to occur.

Some commenters disagreed that one year will be sufficient to achieve a representative sample.⁷⁰¹ One commenter said that "robust data . . . should take two years" and that "technological changes . . . to routing and algorithmic logic for some firms are a hurdle that could require significant time to implement."⁷⁰² Another commenter noted the "complexities of the pilot and the opportunities for significant market evolutions."⁷⁰³ The Commission notes that it will consider these and other concerns, as noted above, in deciding whether or not to suspend the automatic sunset.

The Commission believes that the Pilot will produce representative results despite the Pilot's treatment of stocks cross-listed on Canadian exchanges during the Pilot and the exclusion of stocks with average daily volume of less than 30,000 shares. A supplemental staff analysis found that the exclusion of the interlisted Canadian stocks from the selection of securities for test group inclusion would not materially impact the representativeness of the remaining sample.⁷⁰⁴ Second, the exclusion of securities with average trading volume of less than 30,000 shares per day should not materially affect the representativeness of the results because the trading in these stocks generates less than \$100 per day in fees or rebates. Additionally, low trading volume stocks tend to have wider spreads rendering a rebate of \$.0030 a significantly smaller incentive relative to the size of the spread than it would be for higher volume tighter spread securities. Because of these two factors, the Commission believes fees and rebates are economically much less meaningful inducements to provide liquidity for these stocks. Because of the diminished economic significance of rebates in

⁷⁰¹ See, e.g., Babelfish Letter at 3 and Healthy Markets Letter at 19.

⁷⁰² See Babelfish Letter at 3.

⁷⁰³ See Healthy Markets Letter I at 19.

⁷⁰⁴ Specifically, the supplemental analysis compared the distributional characteristics of all US listed stocks (including Canadian interlisted stocks) to the distributional characteristics of the subset of US listed stocks that excludes Canadian interlisted stocks to determine whether distributional characteristics of the subset differs statistically significantly from the distributional characteristics of all US listed stocks. The analysis finds that the distribution of the subset that excludes Canadian interlisted securities is statistically similar to the distribution of all US listed stocks.

⁶⁹⁹ See, e.g., Joint Asset Managers Letter, at 2. Other commenters agreed that the Pilot duration will be sufficient but for other reasons. See, e.g., Fidelity Letter at 9 and CFA Letter at 6.

⁷⁰⁰ See, e.g., Citi Letter, at 5 and Larry Harris Letter, at 11. Also, see *infra* Section IV.C.2.b.ii for a discussion of the costs broker-dealers could incur during the Pilot.

⁶⁹⁸ See, e.g., Larry Harris Letter, at 9.

these extremely low volume stocks, the Commission believes that there is a lower risk of applying a suboptimal transaction-based fee regulatory regime in these stocks. In other words, because rebates are economically less meaningful for these securities the benefits of the Pilot in informing policy decisions regarding transaction-based fees in these securities are likely low. In addition, the supplemental staff analysis found that excluding these securities increased the potential statistical power of the Pilot.

Some commenters suggested that the exclusion of ATSS from the data gathering hinders the representativeness of the data obtained from the Pilot.⁷⁰⁵ The Commission understands that ATSS often negotiate bespoke agreements with individual subscribers for a bundle of services for which rebates may or may not play a significant role. Even if the Commission obtained detailed information on all of these agreements, it may not be possible to identify the fees or rebates they pay for order flow from the fees for the other bundled services the ATS offers the subscriber in a manner sufficient for inclusion in the Exchange Transaction Fee Data. Also, as discussed in section IV.D.2.a it is uncertain whether the Pilot will lead to exchanges to be in an improved or diminished competitive position with ATSS. Further, without including ATSS in the Pilot, ample public data exists to assess the market share of ATSS relative to exchange market share to observe and measure off-exchange order flow changes.

(2) Expansion of Readily Available Data

The Commission also expects the Pilot to provide data that would otherwise require lengthy and labor-intensive collection. Having a representative source of data is critical for the production of research and analyses about the impact of transaction-based fees on potential distortions. If more data becomes available, that data will assist the Commission in analyzing potential conflicts of interest.

The Commission believes that the data produced by the Pilot will improve upon existing data,⁷⁰⁶ as is discussed in

more detail below. The ready availability of the Exchange Transaction Fee Summaries will facilitate the study of distortions and the equilibrium level of fees and rebates by reducing the cumbersome nature of collecting fee data. Further, the Pilot will make information on order routing decisions available to the Commission on a more granular level than current readily available data and will improve the feasibility of Commission staff analysis of order routing data during the Pilot.⁷⁰⁷

The Pilot will enable Commission staff to gain improved access to order routing data and will provide access to fee data in a simplified and standardized form, which will improve the quality of the analyses produced as a result of the Pilot. Although certain order routing data and exchange fee schedules are publicly available through a combination of Rule 606 disclosures and exchange websites, respectively, the Pilot will resolve a number of limitations associated with using currently available data to study the effect of transaction-based fees on potential conflicts of interest and their impact on market quality and execution quality.

The order routing data that Commission staff will obtain as a result of the Pilot will provide superior information to that readily available today. Data will be available for a representative sample of NMS stocks, across all broker-dealers, and exchanges, at the daily frequency, which will provide sufficient data for analyses, while providing more statistical power than the Rule 606(a) public reports can provide. Relative to the data that some studies have acquired from broker-dealers and exchanges,⁷⁰⁸ the order routing data will also allow Commission staff to observe a time series of order routing data across broker-dealers and exchanges. Further, more granular order routing data (e.g., daily order routing statistics that separate principal and agency trading as well as auction, post only, and other orders) than that available publicly will facilitate more targeted analysis. Together, these characteristics of the data will facilitate

Commission staff research on issues such as potential conflicts of interest, which will improve the quality of the information available to the Commission for policy decisions.

The following discussion illustrates how the data obtained from the Pilot could be used to study the Commission's objectives.⁷⁰⁹ The key components in the order routing data that facilitate studies of the impact of transaction-based fees and rebates on order routing and execution quality are daily volume information at the exchange, stock, and broker-dealer level, the separation of liquidity taking and liquidity making orders, the Order Capacity, the Order Designation, the time to execution for liquidity-providing orders, and the ability to estimate fill rates. The routing volume allows Commission researchers to measure how much volume each broker-dealer sends to each exchange each day in individual securities, which can be combined with the Pilot Securities Exchange List and the Exchange Transaction Fee Summary to observe patterns in routing and correlate those patterns with fees and Test or Control Group membership. The exchange level is required to match the order routing data with the fee data; the broker level is required to allow for different routing strategies across broker-dealers; and the daily level in the data facilitates statistical power. The separation of liquidity taking and liquidity making orders allows researchers to match the order routing volume to the potential fee or rebates in the Exchange Transaction Fee Summary. Order Capacity allows Commission researchers to compare order routing and execution quality statistics for Agency Orders to Principal Orders, which are less subject to conflicts of interest concerns than Agency Orders and, thus, provides an added means of obtaining causal identification. Order Designation allows researchers to exclude auction orders and to separately analyze Post Only orders because these orders types are subject to different fee structures (auction orders do not get rebates) or exist for the purpose of capturing rebates (Post Only). Excluding or separately analyzing these orders types provides for cleaner tests that are better able to measure the impacts consistent with the objectives of the Pilot. Finally, the time to execution and ability to estimate fill rates (using orders received, executed, canceled or rerouted)

⁷⁰⁵ See, e.g., Nasdaq Letter I, at 2, 5 and RBC Letter I, at 4.

⁷⁰⁶ See Section IV.C.1.a. For commenter statements supporting the usefulness of the data to be obtained from the Pilot See, e.g., Clark-Joseph Letter, at 1, AJO Letter, at 1, CII Letter, at 3, NYSTRS Letter, at 1, Barnard Letter, at 1; ICI Letter I, at 1–2; MFS Letter, at 1; Nuveen Letter, at 2; Better Markets Letter, at 2; RBC Letter I, at 2; Invesco Letter, at 2; CFA Letter, at 1; State Street Letter, at 2; Wellington Letter, at 1; Joint Pension Plan Letter, at 2; Oppenheimer Letter, at 2; Angel

Letter I, at 1. Some commenters suggest that the data will not be useful because it excludes data from ATSS and doesn't account for other forms of remuneration that broker dealers receive which may also impact order routing decisions. See NYSE Letter I at 1,8–10; ProAssurance Letter, at 2; Cboe Letter I, at 15; Nasdaq Letter I, at 2.

⁷⁰⁷ The aggregation and availability of the data gathered by the Pilot is one of the primary benefits of the Pilot and provides much of the value of the data collected. See, e.g., NYSE Letter II, at 13; Cboe Letter I, at 3.

⁷⁰⁸ See, e.g., Battalio Equity Market Study, *supra* note 530.

⁷⁰⁹ See NYSE Letter II, at 13 suggesting that the proposing release did not provide an illustration for how the data could be used to study the Commission's objectives.

provides Commission researchers with execution quality information not readily available for liquidity providing or liquidity taking orders.⁷¹⁰

An additional requirement of the Pilot is that the exchanges will be required to provide a standardized dataset of fees, the Exchange Transaction Fee Summary, to the public. In particular, this information will allow researchers in and outside the Commission to create proxies for which exchanges are likely to be more or less expensive and which offer the highest rebates. For instance, within Test Group 1, the maximum allowable access fee is \$0.0010; however, each exchange may have different base and top-tier fees. Thus, only knowing that a security is in Test Group 1 will be incomplete information about the impact of transaction-based fees and rebates. Moreover, the Exchange Transaction Fee Summary will provide researchers in and outside the Commission with historical (realized) average and median per share fees and rebates to enable an ex post analysis of how actual fees affected past order routing decisions, which is not available from any data source today.

Exchanges will construct Exchange Transaction Fee Summaries according to an XML schema to be published on the Commission's website, and exchanges will update this information monthly.⁷¹¹ These data will be standardized and consistently formatted, which will ease the use of these data for researchers in and outside the Commission, as each exchange will have to report the Base, Top Tier, average and median fees, as detailed above in Section III.E. Each month, exchanges will be required to report realized average and median per share fees, as well as any "spot" revisions to fees associated with Form 19b-4 fee filings to the Commission. These fee data will be publicly posted on each exchange's website.⁷¹²

The Exchange Transaction Fee Summary released during the Pilot will:

(1) Ease aggregation across exchanges, which affords researchers in and outside the Commission an opportunity to obtain representative results; (2) replicate across studies, which will provide validation of findings; and (3) reduce burdens associated with fee data collection, which could encourage more research on the impact of fees and rebates on routing behavior. Thus, the Commission believes that a standardized reporting of summary data on fees by the exchanges will facilitate analysis of the effect of transaction-based fees.

The rule will require that the Exchange Transaction Fee Summary be structured using an XML schema to be published on the Commission's website.⁷¹³ Data that are structured in a standard format can result in lower costs to analysts and higher quality data. An additional key benefit of structured data is increased usability. If, for instance, the Exchange Transaction Fee Summary were not standardized across the exchanges, researchers would have to manually rekey the data, a time-consuming process which has the potential to introduce a variety of errors, such as inadvertently keying in the wrong data or interpreting the filings inconsistently, thereby reducing comparability. With the data in the reports structured in XML, researchers in and outside the Commission could immediately download the information directly into databases and use various software packages for viewing, manipulation, aggregation, comparison, and analysis. This will enhance their ability to conduct large-scale analysis and immediate comparison of the fee structures of exchanges. The Commission believes that requiring these reports to be made available in an XML format will provide flexibility to researchers in and outside the Commission and will facilitate statistical and comparative analyses across exchanges, test groups, and date ranges.

(3) Causality

In addition to providing representative results, the Commission

expects the Pilot to achieve the benefits identified above because it will, among other things, provide insight into the degree to which exchange transaction-based fees and rebates cause economic distortions that either harm or benefit investors. Such causal information is especially useful when considering policy choices aimed at reducing any possible harmful distortions. As detailed in the baseline, exogenous shocks are a means by which researchers may analyze a causal relationship between changes to transaction-based fees and rebates and changes to order routing decisions of broker-dealers.⁷¹⁴ This Pilot facilitates the analysis of causality through an exogenous shock that simultaneously creates several distinct fee environments, each of which restricts transaction-based fees or rebates differently, enabling synchronized comparisons to the current environment.

The Commission believes that the Pilot is able to facilitate the examination of causality because the Pilot will produce a single exogenous shock that differentially impacts either fees or rebates on both maker-taker and taker-maker exchanges. Exogenous shocks, such as those in the Pilot provide researchers with data to analyze the direction of causality.⁷¹⁵ For example, a researcher seeking to study the impact of the rebates on transaction costs could estimate a difference-in-differences test that compares transaction costs during the Pilot to the transaction costs before the Pilot and then compare the changes in Test Group securities to the changes in Control Group securities. It also will allow investors who receive 606(b)(3) data from their broker-dealers to directly test with their own 606(b)(3) data whether, in the absence of rebates in the most actively traded stocks, they are better able to compete for queue priority and thereby capture the quoted spread when posting liquidity. More generally, the Pilot will allow researchers, including Commission staff and others, to run difference-in-difference tests on many measures of execution quality and market quality based on publicly available data to examine the causal impact of transaction-based fees and rebates on execution and market quality.

As discussed above, the Pilot will produce a single exogenous shock that

⁷¹⁰ The Commission recognizes that many trade-based execution quality statistics are readily estimated from publicly available data. See Section IV.E.5.g *infra* for a discussion of an alternative to require order-based execution quality statistics during the Pilot.

⁷¹¹ The standardized fee data, as would be required by the proposed Pilot, is discussed *supra* Section III.E.2.

⁷¹² Rule 610(T) requires each exchange to publicly post on its website downloadable files containing the Exchange Transaction Fee Summary and update them on a monthly basis. Similarly, each exchange will be required to publicly post on its website downloadable files containing daily aggregated and anonymized order routing statistics, updated monthly. Each exchange will also be required to provide daily on its website downloadable files containing the List of Pilot Securities and the Pilot Securities Change List.

⁷¹³ As an open standard, XML is widely available to the public at no cost. As an open standard, XML is maintained by an industry consensus-based organization, rather than the Commission, and undergoes constant review. As updates to XML or industry practice develop, the Commission's XML schema may also have to be updated to reflect the updates in technology. In those cases, the supported version of the XML schema will be published on the Commission's website and the outdated version of the schema will be removed in order to maintain data quality and consistency with the XML standard. The Commission's XML schema will also incorporate certain validations to help ensure data quality.

⁷¹⁴ As discussed in the baseline, analysis of causality can be accomplished through either exogenous shocks or econometric methods, such as instrumental variable analysis.

⁷¹⁵ Other econometric techniques, such as instrumental variables methodology, are used when an exogenous shock (or other controlled experiment) cannot be established.

differentially affects multiple Test Groups at the same time. The simultaneity of the exogenous shock across Test Groups facilitates examinations of causality, particularly in the presence of any confounding effects. For instance, if some market-wide event were to result in deviations in order routing behavior during the Pilot, the event would likely affect stocks in each Test Group as well as the Control Group. The simultaneity allows researchers in and outside the Commission to control for the impact of the market-wide event, because the impact would likely affect the Test Groups and the Control Group similarly. For example, in the difference-in-differences test of transaction costs mentioned above, any market-wide effect would result in changes to fill rates in both the Control Group and Test Group 2. Therefore, the comparison of the changes in Test Group 2 to the changes in the Control Group subtracts the market-wide effect from the total effect, thus isolating the effect of the Pilot.

In addition, to facilitate causal analysis of data during the Pilot Period, the Commission believes that it is important to collect sufficient data during a pre-Pilot Period.⁷¹⁶ The pre-Pilot data can then be compared with the data that will be produced during the Pilot Period, which will permit analysis of any changes to order routing behavior, execution quality, and market quality between the two for the Pilot Securities in each of the Test Groups. To make this comparison informative, the length of the pre-Pilot Period needs to be long enough to obtain sufficient statistical power to permit analysis of the stocks and ETP Pilot Securities. In turn, sufficient statistical power in tests that compare the pre-Pilot data to the Pilot data would allow all researchers to more easily use the information obtained from the Pilot to inform future regulatory consideration of exchange transaction fees and rebates and their impact on the markets. The Commission believes that at least six months of pre-Pilot data may be required to obtain the necessary statistical power to permit analysis of the Pilot Securities during the Pilot, particularly ETPs.⁷¹⁷

The Commission further believes that the combination of the representative sample, data from the Pilot, and the exogenous shock will facilitate analysis by Commission staff (or institutions who receive 606(b)(3) reports from their broker-dealers) of the degree to which transaction-based fee- and rebate-

motivated order routing harms order execution quality. In particular, with the exogenous shock, the Order Routing Data, the Exchange Transaction Fee Summaries, and publicly available data, researchers at the Commission can identify both the degree to which transaction fees and rebates impact order routing and, the impact of transaction fee- and rebate-motivated order routing impacts execution quality.

Several commenters seemed to state that the Pilot would produce flawed causal results because the Pilot does not include all forms of remuneration.⁷¹⁸ While the Commission acknowledges that other forms of remuneration may impact routing decisions, the results will still be informative. Even if some order flow migrates between exchanges and off-exchange venues, Commission staff should still be able to identify the impact of exchange fees and rebates on exchange routing.

The Pilot Securities Exchange List and the Pilot Securities Change List further enhance the ability for researchers both inside and outside of the Commission to analyze the effects of transaction-based fees on order routing decisions. By requiring daily updates to the Pilot Securities Change List, the Pilot will provide broker-dealers with the information they need to track the exact securities in each Test Group in real-time and when securities exit the Pilot. This information will be crucial for broker-dealers that choose to adjust their routing behavior during the Pilot. If broker-dealers are unable to track which securities are in which Test Groups, the Pilot results could provide misleading causal information.

iii. Potential Limitations on the Benefits

The Commission recognizes that pilots are unpredictable and as such considered whether possible limitations associated with pilots generally, as well as certain issues presented by the design of this Pilot in particular, would limit the benefits of the Pilot. This section discusses, in greater detail below, issues associated with pilots in general and the potential concerns with resultant research and analyses.

Pilots may face limitations related to the unpredictable nature of market conditions and confounding events. Even if a pilot lasted several years, not all of the market conditions of interest could be experienced. Depending on the requirements of pilots, such limitations might reduce the usefulness of the

information obtained.⁷¹⁹ The Commission believes, however, that the value of the information obtained from the Pilot is not dependent upon having variation in market conditions over time, and that the duration of the Pilot will provide sufficient information to inform policy decisions.

In addition, pilots also face the limitation that market participants, knowing that a pilot is underway, may not act as they would in a permanent regime.⁷²⁰ In the context of this pilot, broker-dealers could choose to retain their current order-routing decisions for the duration of the Pilot, which could be costly to such broker-dealers.⁷²¹ Broker-dealers, when deciding whether to adjust any order routing behavior that currently depends on fees and rebates, would likely trade off the costs of retaining strategies that are no longer profitable because of the restrictions imposed by the Pilot against the costs of adjusting the algorithms for their smart order routing systems. Alternatively, broker-dealers could substantially change their business model in order to

⁷¹⁹ For instance, a pilot could be designed where the information obtained from the Pilot would only be valuable if certain market conditions, such as high market volatility or a recessionary period occurred. If, however, markets experience low volatility or are in an expansionary period, the Pilot may either not be sufficiently long enough to capture the events that it requires to be useful or would have to be extended to ensure that those market conditions could occur.

⁷²⁰ For example, one study provided evidence suggesting that trading behavior may not have completely adjusted to the Regulation SHO pilot. See Ekkehart Boehmer, Charles Jones, & Xiaoyun Zhang, *Unshackling Short Sellers: The Repeal of the Uptick Rule*, Colum. U. (2008), <https://www0.gsb.columbia.edu/mygsb/faculty/research/pubfiles/3231/UptickRepealDec11.pdf>. Despite this effect, the study found evidence consistent with the evidence gathered from the Regulation SHO pilot. See Securities Exchange Act Release No. 50103 (July 28, 2004), 69 FR 48008 (Aug. 6, 2004) (hereinafter "Regulation SHO").

⁷²¹ If broker-dealers have smart order routing systems that use algorithms that maximize rebate capture, as suggested in the Battalio Equity Market Study, *supra* note 530, then for at least some subset of securities, broker-dealers would not be able to pursue rebates from those exchanges, so it would be suboptimal for broker-dealers to not reconsider their order routing choices. If broker-dealers, however, already have order routing decisions that are optimal from a customer's perspective (e.g., based on execution quality) and are not driven by potential conflicts of interest (e.g., maximizing rebates), then for at least some broker-dealers, their order routing decision process may be unchanged. It is also possible that for broker-dealers with algorithms that dynamically route based upon real-time market metrics, including liquidity metrics, expected fill rates, and current queue length, routing logic may not change, however, routing choices may dynamically adjust based upon changes in those variables that result from altered fee schedules that broker-dealers may implement in conjunction with the Pilot.

⁷¹⁶ See Healthy Markets Letter I, at 19.

⁷¹⁷ See *supra*. Section II.D.3.

⁷¹⁸ See, e.g., Cboe 15–16; NYSE at 9–10; Nasdaq I at 7; RBC Letter I, at 4; ProAssurance at 2.

avoid the Pilot.⁷²² In addition, the Commission recognizes that the anticipated analysis of order routing data from the Pilot could cause broker-dealers to improve execution quality. This could reflect the “Hawthorne effect,” which refers to the idea that people will often improve their behavior if they believe that they are observed. These outcomes could lead to results that would not represent the effects of a permanent rule change. If that were to occur, a few commenters suggested that this could lead to the potential benefits of the Pilot to not justify the costs or risks that the pilot imposes.⁷²³

The Commission believes that the Pilot is designed to obtain empirical information about how fees and rebates affect order routing decisions because the size and length of the Pilot render it unlikely that broker-dealers that currently focus their routing on rebates would maintain existing order routing decisions or alter their business models to avoid the Pilot as suggested by some commenters. In particular, the Commission believes that the Pilot duration is likely to make it economically worthwhile for broker-dealers to adjust their order routing behavior. The costs of “waiting out” the Pilot increase with the duration of the pilot, whereas the costs of adjusting the algorithms of the smart order routers, discussed below in Section IV.C.2.b.ii do not.

In addition, the potential compromise of the data due to the Hawthorne effect is limited by at least two factors. First, this is not the Commission’s first pilot study. Market participants are relatively accustomed to the Commission collecting data for analysis. Second, the analysis of pre-Pilot data will allow for a baseline observation of unaffected broker-dealer order routing activity. If broker-dealers do not act on conflicts of interest during the baseline period, the Hawthorne effect is irrelevant unless it causes that good baseline behavior.⁷²⁴ If, on the other hand, broker-dealers do act on conflicts of interest during the baseline and the Hawthorne effect results in good behavior during the Pilot, the Pilot should facilitate the measurement of the conflicts. As a result, the Commission believes that the Pilot will produce useful data despite

⁷²² It could be costly for broker-dealers to completely alter their business models because they may not find it worthwhile to do so for a temporary pilot.

⁷²³ See, e.g., FIA Letter, at 3; Citadel Letter, at 4.

⁷²⁴ The Commission does not believe that the Hawthorne effect will cause “good” behavior in the baseline because broker-dealers would need to implement system changes similar to those described in Section IV.B.2.c prior to the pre-Pilot.

the possible influence of the Hawthorne effect.

The Commission recognizes that not all objectives of the Pilot would be straightforward to study. For example, the changes in fees or rebates imposed by the Pilot may change transaction costs in a way that results in changes to order routing decisions by broker-dealers, even absent potential conflicts of interest. Studying how order routing changes during the Pilot, without jointly studying why it changes, would not be sufficient to understand any possible conflicts of interest. Researchers can carefully study the data to distinguish the proportion of changes in order routing decisions resulting from execution quality considerations from those resulting from potential conflicts of interest. Nonetheless, this complication could reduce the number and/or quality of studies of the Pilot.

Another limitation on the benefits from the Pilot is that the Pilot will not require that the order routing data be released to the public. As a result, fewer independent analyses of the Pilot’s order routing datasets are likely to be performed, compared to the analysis that might have been obtained if the data were publicly released. However, the Commission believes that sufficient analysis will be produced to yield credible and reliable results without public dissemination of the order routing data. In addition, institutions, including broker dealers, asset managers, and transaction cost analysis (TCA) providers, may produce their own analyses using proprietary data and information. To the extent that interested parties prepare their own analyses, they may submit them to tradingandmarkets@sec.gov with the words “Transaction Fee Pilot Analysis” in the subject line, and the Commission will post those reports on its public website.⁷²⁵

Additionally, only NMS stocks with prices of at least \$2 prior to the start of the Pilot are eligible for inclusion in the Pilot. One commenter suggested that NMS stocks with prices between \$1 and \$2 also be included in the Pilot, as the commenter believed that the impact of fees and rebates are likely to be greatest for these securities.⁷²⁶ The Commission agrees with the commenter who stated that the initial Test and Control Groups in the Pilot would be more representative if they contained securities with prices below \$2.

⁷²⁵ As noted above, the Commission encourages market participants to disclose what sources of data they used for their analyses and describe the methodology they used, and to make those reports publicly and freely available.

⁷²⁶ See James Angel Letter I, at 2.

However, excluding securities with prices below \$2 helps to keep the sample of stocks more stable across the Pilot. This occurs because if a stock’s price falls below \$1 it is subject to different regulations, such as a different tick size, and thus would be excluded from the Pilot. By excluding stocks below \$2 the Pilot mitigates the risk that the representativeness of the sample may diminish over time as Pilot stocks are removed due to their stock prices falling below \$1. The Commission believes that the data obtained from the Pilot will be sufficient to obtain data on the effects to changes in fees and rebates on small, low-priced securities (those with prices close to \$2, or any Pilot security that drops below \$2 per share, but exceeds \$1 per share, after the start of the Pilot).

b. Other Benefits of the Transaction Fee Pilot

Other benefits may emerge that could affect markets and market participants for the duration of the Pilot, such as potentially reduced conflicts of interest for some Test Groups, lower all-in costs of trading, or improved market quality. The Commission believes that many of the benefits discussed below will be temporary in nature and affect markets and market participants only for the duration of the Pilot. Because the Commission lacks information on the extent to which the impact of exchange fee-and-rebate pricing models affect investors,⁷²⁷ the Commission is unable to quantify many of the temporary benefits of the Pilot discussed below.

Some commenters stated their belief that the Pilot would not help investors and issuers.⁷²⁸ As discussed in Sections IV.C.2.b and IV.D.1 the Commission acknowledges that the Pilot could harm execution quality and/or market quality, but the impacts of the Pilot are uncertain. The Pilot could also improve execution quality and/or market quality for the reasons explained in those same sections. For example, as discussed in detail below,⁷²⁹ the Commission is uncertain about whether, or among which securities, the Pilot will result in increases or decreases in quoted spreads and investor transaction costs. A decrease in quoted spreads and/or investor transaction costs during the Pilot in some or all stocks in test groups would benefit investors. Likewise, the Commission is uncertain about how the Pilot will affect price efficiency—the

⁷²⁷ See *supra* Section IV.A.1 (Market Failure at the Broker Dealer Level) and Section IV.A.2 (Market Failure at the Exchange Level).

⁷²⁸ See, e.g., Nasdaq I, at 1.

⁷²⁹ See *infra* Section IV.C.2.b.iv

Pilot could plausibly improve or degrade price efficiency in certain test group stocks.⁷³⁰ Any improvements would benefit issuers and investors.

The Commission believes that another temporary benefit of the rule will be that the Pilot could prevent some traders from indirectly quoting in sub-pennies.⁷³¹ Rebates have the practical effect of reducing the minimum tick size by the size of the rebate, and in effect allow trading centers to offer quotations superior to the existing quote. Several studies suggested that the use of exchange fees and rebates to effectively undercut quotations by sub-pennies is

particularly severe in taker-maker markets.⁷³² The Pilot would, in some test groups, reduce or eliminate rebates, which could stem this indirect reduction of tick sizes, and could provide the Commission and the public with information currently unavailable about this issue.

2. Costs of the Pilot

This section describes the compliance costs associated with the Pilot, followed by the additional costs, some of which are temporary, that could affect issuers, investors, broker-dealers, exchanges,

and other market participants resulting from the Pilot.

a. Exchange Compliance Costs of the Pilot

The Pilot will impose costs on exchanges to comply with the Pilot's requirements to collect, calculate, and publicly post data certain required by the Pilot on their websites, transmit the order routing datasets to the Commission, as well as to implement fee changes, if required in order to comply with the Pilot's restrictions. Table 4 provides a summary of the costs discussed in this section.

TABLE 4—SUMMARY OF COMPLIANCE COSTS FOR EXCHANGES

Exchange type	Pilot securities exchange list ⁷³³	Exchange transaction fee summary ⁷³⁴	Order routing data ⁷³⁵	Fee filings ⁷³⁶	Total	
	Listing	All	All	All	Listing	Non-listing
Per exchange						
Implementation	15,400	26,100	24,000	96,800	162,000	147,000
Periodic:						
—2-yr Pilot	83,500	55,000	103,800	148,400	391,000	307,000
—1-yr Pilot	50,100	36,600	69,200	74,200	230,000	180,000
Total (implementation + periodic):						
—2-yr Pilot	98,900	81,000	127,800	245,200	553,000	454,000
—1-yr Pilot	65,500	62,700	93,200	171,000	392,000	327,000
Total across exchanges						
Implementation	92,000	339,000	311,000	1,258,000	2,001,000	
Periodic:						
—2-yr Pilot	501,000	714,000	1,350,000	1,929,000	4,494,000	
—1-yr Pilot	301,000	476,000	900,000	964,000	2,641,000	
Total (implementation + periodic):						
—2-yr Pilot	593,000	1,054,000	1,661,000	3,187,000	6,495,000	
—1-yr Pilot	393,000	815,000	1,211,000	2,223,000	4,642,000	

i. Updating the Pilot Securities Exchange List and Pilot Securities ChangeList

During the Pilot, the primary listing exchanges will maintain and make public prior to the start of each trading day the Pilot Securities Exchange List of the securities included in each test or control group on its website. Further, each primary listing exchange will publicly post on its website the updated Pilot Securities Change List prior to the start of each trading day, which will list, separately, changes to applicable Pilot Securities. Additional details of what

will be included in each list are provided in Section II.E.1.

Upon the initial publication of the List of Pilot Securities by notice by the Commission, the primary listing exchanges⁷³⁷ will need to determine which of those securities are listed on their market, and then compile a list of those securities and publicly post on their websites that list as a downloadable file in pipe-delimited ASCII format. The Commission initially estimated that the costs associated with the initial compilation of the Pilot Securities Exchange List would cost

\$2,060 per exchange based on an estimated burden of 8 hours. However, one commenter stated that it “anticipates it could take as many as 44 hours” to compile the initial Pilot Securities Exchange List.⁷³⁸ The commenter stated that its estimates of the costs associated with the Pilot are based on its “prior experience implementing the Tick Size Pilot.”⁷³⁹ In light of this comment, the Commission is increasing its estimate.⁷⁴⁰ Accordingly, the Commission estimates that each primary listing exchange would incur, on average, a one-time

⁷³⁰ See *infra* Section IV.D.1.

⁷³¹ 17 CFR 242.612 (Rule 612 of Regulation NMS) prohibits traders from submitting sub-penny quotations on securities trading at prices over \$1.00. The purpose of the sub-penny quotation prohibition was two-fold: (1) To prevent high frequency traders from front-running standing non-marketable limit orders and (2) to reduce the complexity of trading systems. See NMS Adopting Release, *supra* note 10, at 37550–57.

⁷³² See, e.g., Angel, Harris, & Spatt, *supra* note 530; Harris, *supra* note 530. One study noted that as a result of the Tick Size Pilot test group with the trade-at provision, taker-maker markets have seen a

significant increase in market share, in part due to this quotation issue. See Carole Comerton-Forde, Vincent Gregoire, & Zhuo Zhong, *Inverted Fee Venues and Market Quality 1* (August 10, 2018) (unpublished manuscript) (forthcoming J. Fin. Econ.) https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2939012&download=yes.

⁷³³ See *infra* Section IV.C.2.a i.

⁷³⁴ See *infra* Section IV.C.2.a ii.

⁷³⁵ See *infra* Section IV.C.2.a iii.

⁷³⁶ See *infra* Section IV.C.2.a iv.

⁷³⁷ The primary listing exchanges are NYSE, Nasdaq, NYSE American, NYSE ARCA, BATS and IEX.

⁷³⁸ See NYSE Letter I, at 15.

⁷³⁹ See *id.*

⁷⁴⁰ The Commission notes that the Tick Size Pilot required the exchanges and FINRA to also select the Pilot securities whereas the Transaction Fee Pilot does not. Therefore, the Transaction Fee Pilot could result in lower costs than the Tick Size Pilot. Nonetheless, the Commission believes it is reasonable to rely on this commenter's estimate because this commenter has expertise on these costs likely to result in incorporating relatively precise information into the cost estimates.

burden of approximately 44 burden hours per primary listing exchange to compile and publicly post their initial Pilot Securities Exchange List. Consequently, the Commission now estimates a cost of approximately \$11,700 per listing exchange to compile the initial list of securities.⁷⁴¹ The Commission understands that each primary listing exchange has existing systems to monitor and maintain the Pilot Securities Exchange List and the Pilot Securities Change List as a result of certain corporate actions.⁷⁴² While these systems can be used to collect the data required to be made public for the Pilot Securities Exchange List and the Pilot Securities Change List, these systems would have to be adapted to conform to the requirements of the Pilot. The Commission estimates that it would cost each primary listing exchange approximately \$3,720 to develop appropriate systems for the Pilot, or about \$22,300 in aggregate across the six U.S. primary listing exchanges.⁷⁴³ Once these systems are established, the Commission estimates that it would cost each listing exchange approximately \$83,500 for the entire duration of the Pilot, or approximately \$501,000 across the six primarily listing exchanges,⁷⁴⁴ to

⁷⁴¹ This estimate is based on the following: [(Compliance Manager (22 hours) × \$298) + (Programmer Analyst (22 hours) × \$232)] = \$11,660 ≈ \$11,700 per exchange, or \$11,660 × 6 primary listing exchanges = \$69,960 ≈ 70,000 in aggregate. The burden hours are obtained from *supra* Section III.D.1. The Commission estimates the wage rate associated with these burden hours based on salary information for the securities industry compiled by the Securities Industry and Financial Markets Association (SIFMA). The estimated wage figure for attorneys, for example, is based on published rates for attorneys, modified to account for a 1,800-hour work-year and multiplied by 5.35 to account for bonuses, firm size, employee benefits, and overhead, yielding an effective hourly rate for 2013 of \$380 for attorneys. See Securities Industry and Financial Markets Association [SIFMA], *Management & Professional Earnings in the Securities Industry—2013* (October 7, 2013), available at <https://www.sifma.org/resources/research/management-and-professional-earnings-in-the-securities-industry-2013/>. These estimates are adjusted for inflation based on Bureau of Labor Statistics data on CPI-U between January 2013 (230.280) and January 2017 (242.839). Therefore, the 2017 inflation-adjusted effective hourly wage rates for attorneys are estimated at \$401 (\$380 × 242.839/230.280). The Commission discusses other costs of compliance with the rule below.

⁷⁴² The Commission notes that the primary listing exchanges maintained public web pages containing similar lists with respect to the recently concluded Tick Size Pilot. The systems to produce lists for the Tick Size pilot should be adaptable to meet the requirements of the Transaction Fee Pilot.

⁷⁴³ This estimate is based on the following: [(Attorney (4 hours) × \$401) + (Compliance Manager (4 hours) × \$298) + (Programmer Analyst (4 hours) × \$232)] = \$3,724 per exchange, or \$3,724 × 6 exchanges = \$22,344 ≈ 22,300 in aggregate. The burden hours are obtained from *supra* Section III.D.1.

⁷⁴⁴ If the Pilot were to automatically sunset at the end of the first year, the total number of days that

publicly post on each exchange's website the Pilot Securities Exchange List and Pilot Securities Change List prior to the start of each trading day in pipe-delimited ASCII format. If the Commission determined that the Pilot shall automatically sunset at the end of the first year, the Commission estimates that the costs to each exchange would be \$50,100 for a one-year Pilot duration and the six-month post-Pilot Period, or approximately \$301,000 across the six primarily listing exchanges.⁷⁴⁵

In sum, the Commission estimates a total cost for each listing exchange of approximately \$98,900, or \$593,000 in aggregate across exchanges, to comply with the requirement to update and post on its website at the beginning of each trading day the list of its listed securities in each of the Test Groups. This includes an estimated \$15,400 in one-time implementation costs and \$83,500 in ongoing costs. This estimate is based on one provided by a commenter who, based on their experience with the Tick Size Pilot, estimated that it would take up to 44 hours to compile.⁷⁴⁶ Accordingly, the Commission continues to believe its burden estimates are reasonable.

iii. Producing the Exchange Transaction Fee Summary in XML Format

In addition to the Pilot Securities Exchange List provided by the primarily listing exchanges, all U.S. equities exchanges would also need to publicly post on their websites the Exchange Transaction Fee Summary, which are

the exchanges would need to provide the Pilot Securities Exchange List and the Pilot Securities Change Lists would be up to 630 business days (504 business days for the two-year Pilot horizon (252 business days per year × 2 years), and up to 126 business days for the six-month post-Pilot Period). The cost estimate for providing these lists for the entire period is based on the following: [(Compliance Manager (0.25 hour × 630 trading days) × \$298) + (Programmer Analyst (0.25 hour × 630 trading days) × \$232)] = \$83,475 ≈ 83,500, or \$83,475 × 6 exchanges = \$500,850 ≈ 501,000, in aggregate. The burden hours are obtained from *supra* Section III.D.1. One commenter provided an estimate of 300.5 burden hours for providing these lists, but the Commission continues to believe its own higher burden estimates are reasonable. See Section III.D.6, *supra*.

⁷⁴⁵ If the Pilot were to automatically sunset at the end of the first year, the total number of days that the exchanges would need to provide the Pilot Securities Exchange List and the Pilot Securities Change Lists would be up to 378 business days (252 business days for the one-year Pilot horizon, and 126 business days for the six-month post-Pilot Period). The cost estimate for providing these Lists for the entire period is based on the following: [(Compliance Manager (0.25 hour × 378 trading days) × \$298) + (Programmer Analyst (0.25 hour × 378 trading days) × \$232)] = \$50,085 ≈ \$50,100, or \$50,085 × 6 exchanges = \$300,510 ≈ \$301,000, in aggregate. The burden hours are obtained from *supra* Section III.D.1.

⁷⁴⁶ See, e.g., NYSE Letter I, at 15.

downloadable files containing the initial set of fees at the outset of the Transaction Fee Pilot as well as monthly updates to include both changes to fees and rebates reported in Form 19b-4 fee filings and realized average and median per share fees and rebates, as discussed in Section II.E.2. The Exchange Transaction Fee Summary would need to be updated in response to any changes to its fee schedule following the beginning of each calendar month from the pre-Pilot Period through the post-Pilot Period. The exchanges would be required to provide information on any transaction-based fee and rebate changes, according to Rule 610T(e), that they make during the Pilot, including the effective dates of fee revisions. The rule also requires that each exchange calculate numerous statistics relating to their fees as discussed in more detail in Section II.E.2.

A requirement at the outset of the Pilot is that exchanges would need to report their base and top-tier fees and rebates, which the Commission estimates would cost each exchange \$1,130, or about \$14,700, in aggregate across the 13 U.S. equities exchanges.⁷⁴⁷ The reported base and top-tier fees and rebates would be mandatory elements of the Exchange Transaction Fee Summary. Concurrent with the submission of the Form 19b-4 fee filings to the Commission at the outset of the Transaction Fee Pilot, the exchanges also would be required to publicly post on their websites downloadable files containing the initial Exchange Transaction Fee Summary, using an XML schema to be published on the Commission's website. The Commission estimates that it will cost exchanges \$530 each to post this summary dataset to their websites.⁷⁴⁸

The rule would also require that exchanges compute the monthly average and median realized per share fees and rebates, as detailed in Section II.E.2. These data will provide the Commission and the public with aggregated data on the actual per share levels of fees and rebates assessed in the prior month, which the Commission believes is critical for estimating the effects of fees and rebates on order routing decisions. The Commission believes that the costs

⁷⁴⁷ The estimate is based on the following: (Compliance Manager (2 hours) × \$298) + (Senior Business Analyst (2 hours) × \$265) = 1,126 ≈ \$1,130, or \$1,126 × 13 equities exchanges = \$14,638 ≈ 14,600 in aggregate. The burden hours are obtained from Section III.D.2, *supra*.

⁷⁴⁸ This estimate is based on the following: (Compliance Manager (1 hours) × \$298) + (Programmer Analyst (1 hours) × \$232) = \$530 per exchange, or \$530 × 13 U.S. equities exchanges = \$6,890 ≈ 7,000 in aggregate. The burden hours are obtained from *supra* Section III.D.2.

associated with computing these summary data on fees and rebates are likely to be larger than the costs associated with updating the Exchange Transaction Fee Summary, discussed in detail below, and would likely require new systems by the exchanges to track the average and median fees.

The Commission estimates that each exchange would have a one-time cost of about \$24,000, or approximately \$311,000 in aggregate across the 13 U.S. equities exchanges, associated with the development and implementation of systems tracking realized monthly average and median share fees pursuant to the rule.⁷⁴⁹ The Commission further anticipates that it would cost an additional \$12,000 annually, or \$155,000, in aggregate, per year, to ensure that the system technology is up to date and remains in compliance with the rule.⁷⁵⁰

Moreover, as discussed above, exchanges would be required to produce monthly updates to the Exchange Transaction Fee Summary to capture realized average and median per share fees as well as any revisions to fee schedules made by the exchanges, which would be reflected in changes to Base or Top-Tier fees and rebates, detailed in Section I.E.2. The Commission estimates that each month it would cost each exchange \$530 to update the dataset of summary fees to reflect the updates to historical realized average and median per share fees and changes to the Base and Top-Tier fees. This would require each exchange to make a total of 36 updates to the Exchange Transaction Fee Summary from the pre-Pilot Period through the post-Pilot Period, if the Commission determined that the Pilot should continue for up to a second year and not automatically sunset at the end of the first year.⁷⁵¹ Each exchange would have

⁷⁴⁹ This estimate is based on the following, which reflects the Commission's experience with and burden estimates for SRO systems changes: [(Attorney (20 hours) × \$401) + (Compliance Manager (20 hours) × \$298) + (Programmer Analyst (20 hours) × \$232) + (Senior Business Analyst (20 hours) × \$265)] = 23,920 = \$24,000 per exchange, or 23,920 × 13 exchanges = \$310,960 = 311,000 in aggregate. The burden hours are obtained from *supra* Section III. D.2.

⁷⁵⁰ This estimate is based on the following, which reflects the Commission's experience with and burden estimates for SRO systems changes: [(Attorney (10 hours) × \$401) + (Compliance Manager (10 hours) × \$298) + (Programmer Analyst (10 hours) × \$232) + (Senior Business Analyst (10 hours) × \$265)] = \$11,960 = \$12,000 per exchange, or \$11,960 × 13 exchanges = \$155,480 = \$155,000 in aggregate. The burden hours are obtained from *supra* Section III.D.2.

⁷⁵¹ This estimate of updates to the Exchange Transaction Fee Summary is the aggregation of updates from the pre-Pilot Period (6), the two-year pilot period if the Commission determines that an

total costs of updates to the Exchange Transaction Fee Summary of approximately \$19,000 per exchange, or \$248,000 among the 13 exchanges over the pilot duration, including pre- and post-periods.⁷⁵² If the Pilot were to automatically sunset at the end of the first year, without the Commission determining that an extension for up to an additional year was needed, this would decrease the total number of updates to the Exchange Transaction Fee Summary to 24.⁷⁵³ Under an automatic sunset at the end of the first year, each exchange would have total costs of updates to the Exchange Transaction Fee Summary of approximately \$12,700 per exchange, or \$169,000 among the 13 exchanges over the pilot duration, including pre- and post-periods.⁷⁵⁴ As detailed above, the Commission estimates that the costs associated with the monthly updates to the Exchange Transaction Fee Summary would be a small fraction of the costs associated with the initial allocation of fees required at the outset of the Pilot.

As discussed in Section II, the rule will require that the Exchange Transaction Fee Summary be published on the exchanges' websites using an XML schema to be published on the Commission's website. The Commission understands that there are varying costs associated with varying degrees of

extension of up to an additional year was needed (24), and the post-pilot period (6), for a total number of 36 updates.

⁷⁵² This estimate is based on the following: [(Compliance Manager (1 hours) × \$298) + (Programmer Analyst (1 hours) × \$232)] = \$530 per exchange, or \$530 × 36 fee changes per exchange = \$19,080 = \$19,000. The 36 fee changes for the exchange encompass six updates during the six-month pre-Pilot Period, 24 updates during the two-year Pilot Period, assuming that the Commission determines that the additional year is required, and six updates during the six-month post-Pilot Period. In aggregate, updates to the Exchange Transaction Fee Summary are estimated to cost \$19,080 × 13 U.S. equities exchanges = \$248,040 = \$247,000. The burden hours are obtained from *supra* Section III. D.2.

⁷⁵³ This estimate of updates to the Exchange Transaction Fee Summary is the aggregation of updates from the pre-Pilot Period (6), the one-year pilot period with an automatic sunset at the end of the first year (12), and the post-pilot period (6), for a total number of 24 updates.

⁷⁵⁴ This estimate is based on the following: [(Compliance Manager (1 hours) × \$298) + (Programmer Analyst (1 hours) × \$232)] = \$530 per exchange, or \$530 × 24 fee changes per exchange = \$12,720 = \$12,700. The 24 fee changes for the exchange encompass six updates during the six-month pre-Pilot Period, 12 updates during the one-year Pilot Period, assuming that the Commission determines that the additional year is not required and the Pilot is automatically sunset at the end of the first year, and six updates during the six-month post-Pilot Period. In aggregate, updates to the Exchange Transaction Fee Summary are estimated to cost \$12,720 × 13 U.S. equities exchanges = \$165,360 = \$165,000. The burden hours are obtained from *supra* Section III.D.2.

structuring. The Commission believes that most of the exchanges already have experience applying the XML format to market data. For example, the exchanges and market participants regularly use the FIX protocol⁷⁵⁵ and FpML⁷⁵⁶ to exchange information on highly structured financial instruments and related market data.⁷⁵⁷

The Commission anticipates that implementation of the Pilot's XML schema would draw upon exchange resources and experiences previously used to implement other supply chain information standards, like those discussed above, that were developed by industry consensus-based organizations. Costs generally associated with the implementation may include those for: Identifying the data required by the Pilot within the exchange source systems; mapping the relevant fields in the exchanges' data source systems to the Commission's XML schema; implementing, testing and executing the validation rules; and developing the website posting processes as required by the rule. The initial costs to exchanges of complying with the Commission's XML schema in order to publicly post the Exchange Transaction Fee Summary in this format would be \$500 per exchange, or \$6,500 in aggregate across the 13 exchanges.⁷⁵⁸ For all updates to

⁷⁵⁵ The Financial Information eXchange (FIX) protocol is an electronic communications protocol that provides a non-proprietary, free and open XML standard for international real-time exchange of information related to the securities transactions and markets. See Fix Trading Community, available at <https://www.fixtrading.org/>.

⁷⁵⁶ FpML (Financial products Markup Language) is an open source XML standard for electronic dealing and processing of OTC derivatives. It establishes the industry protocol for sharing information on, and dealing in, financial derivatives and structured products. See Financial products Markup Language [FpML], available at <http://www.fpml.org/>.

⁷⁵⁷ Most of the exchanges have at least some portion of their data available through XML formats. For instance, the NYSE Group of exchanges provides daily closing prices, among other data, in XML, Excel, and pipe-delimited ASCII, while the Nasdaq exchanges (Nasdaq, BX, and PHLX) and Cboe exchanges (Cboe BZX, Cboe BYX, Cboe EDGA, and Cboe EDGX), provide daily share volume data, among other data, in XML. Information on the use of XML by exchanges is available for the NYSE, www.nyse.com, Nasdaq, www.nasdaqomx.com, and Cboe, www.cboe.com, exchange groups, respectively, and was obtained from a staff review of information on publicly available exchange websites. The Commission was unable to obtain information from CHX or IEX on their use of XML from information available on their publicly available websites.

⁷⁵⁸ This estimate is based on the following, which reflects the Commission's experience with and burden estimates for systems changes to map to an XML schema: [(Programmer Analyst (1 hours) × \$232) + (Senior Business Analyst (1 hours) × \$265)] = \$497 = \$500 per exchange, or \$500 × 13 exchanges = \$6,461 = \$6,500 in aggregate. See Securities

Continued

the Exchange Transaction Fee Summary, the Commission estimates that any burden associated with making those available using the XML schema is included in the costs of the updates discussed above.

In sum, the Commission estimates the total cost of the pilot associated with producing the exchange transaction fee summary in XML format to be approximately \$81,000 per exchange if the Pilot runs for 2 years and \$62,700 per exchange if the Pilot sunsets at the end of the first year. These costs comprise of approximately \$26,100 in one time implementation costs and \$55,000 in ongoing costs if the Pilot runs for two years, or \$36,600 if the Pilot sunsets at the end of the first year. These costs aggregate to approximately \$1,054,000 in total costs across all exchanges if the Pilot runs for the entire two years, and \$815,000 if the Pilot sunsets at the conclusion of the first year.

iv. Producing the Order Routing Data

The rule also will require as part of the Pilot that exchanges prepare, in pipe-delimited ASCII format, and transmit to the Commission, order routing data, updated monthly, containing aggregated broker-dealer order routing information. As discussed in Rule 610T(d) and in Section II.E.3, the datasets would contain separate order routing data for liquidity-providing and liquidity-taking orders aggregated by day, by security, by broker-dealer, and by exchange.

The Commission believes that as long as the CAT Phase 1 data are available at the implementation of the Pilot, the exchanges would be able to use that data to construct the order routing data required by the rule. In particular, the CAT data will include records for every order received by an exchange that indicate the member routing the order to the exchange and details regarding the type of security. The CAT data will also include other information necessary to create the order routing data such as order type information, special handling instructions, and execution information. In the event that the CAT Phase 1 data were not available, the exchanges would have to use existing systems to collect the required order routing data. Regardless of which system exchanges use for the order routing data, the Commission anticipates they would

incur costs in producing the downloadable files containing aggregated monthly order routing data to be transmitted to the Commission.

The Commission estimates that each exchange would have a one-time cost of approximately \$23,900, or approximately \$311,000 in aggregate across the 13 exchanges, associated with the development and implementation of systems needed to aggregate the order routing information, as well as store the data, in the pipe-delimited ASCII format specified by the rule and as detailed in Rule 610T(d).⁷⁵⁹ The Commission anticipates that it will cost each exchange an additional \$12,000 per year, or approximately \$156,000 in aggregate per year, to ensure that the system and storage technology is up to date and remains in compliance with the rule.⁷⁶⁰

The rule will require that exchanges produce monthly updates of the order routing data, and transmit them to the Commission in pipe-delimited ASCII format by the end of the month, as detailed in Section II.E.3 and Rule 610T(d). The Commission estimates that the transmittal and updates of the order routing datasets would cost \$1,888 each month. This will require each exchange to make a total of 36 updates to the order routing data from the pre-Pilot Period through the post-Pilot Period (if the core Pilot lasts for a full two years). Each exchange would have recurring costs of updates to the order routing data of approximately \$68,000 per exchange, or \$884,000 among the 13 exchanges over the entire duration of the Pilot, and the pre-Pilot and post-Pilot periods.⁷⁶¹ If the Commission were

⁷⁵⁹ This estimate is based on the following, which reflects the Commission's experience with and burden estimates for SRO systems changes: [(Attorney (20 hours) × \$401) + (Compliance Manager (20 hours) × \$298) + (Programmer Analyst (20 hours) × \$232) + (Senior Business Analyst (20 hours) × \$265)] = \$23,920 = \$23,900 per exchange, or \$23,920 × 13 exchanges = \$310,960 = \$311,000 in aggregate. The burden hours are obtained from *supra* Section III.D.3.

⁷⁶⁰ This estimate is based on the following, which reflects the Commission's experience with and burden estimates for SRO systems changes: [(Attorney (10 hours) × \$401) + (Compliance Manager (10 hours) × \$298) + (Programmer Analyst (10 hours) × \$232) + (Senior Business Analyst (10 hours) × \$265)] = \$11,960 = \$12,000 per exchange, or \$11,960 × 13 exchanges = \$155,480 = \$156,000 in aggregate. The burden hours are obtained from *supra* Section III.D.3.

⁷⁶¹ This estimate is based on the following: [(Compliance Manager (4 hours) × \$298) + (Programmer Analyst (3 hours) × \$232)] = \$1,888 per exchange, or \$1,888 × 36 fee changes per exchange = \$67,968 = \$68,000. The burden hours are obtained from *supra* Section III.D.3. The 36 updates to the order routing data for each exchange encompass six updates during the six-month pre-Pilot Period, 24 updates during the two-year Pilot Period, assuming that the Commission determines

to allow the Pilot to automatically sunset at the end of the first year, this would decrease the total number of monthly updates to the order routing data by 12 to 24.⁷⁶² Under the automatic sunset, each exchange would have recurring costs of updates to the order routing data of approximately \$45,300 per exchange, or \$589,000 among the 13 exchanges over a one-year Pilot, and the pre-Pilot and post-Pilot periods.⁷⁶³

One commenter stated that the Commission underestimated the number of burden hours required to produce the order routing data required by the Pilot.⁷⁶⁴ This commenter indicated that the Commission allocated 160 burden hours to compile and produce the order routing data, while the commenter estimates that it would take approximately 400 burden hours.⁷⁶⁵ Over the entire Pilot duration, including the six-month pre and post-Pilot periods, the Commission estimates that exchanges would have initial systems burden hours of 80 hours, an additional annual burden of 40 hours to update and maintain those systems, plus 84 burden hours per year to produce and publicly post order routing data monthly.⁷⁶⁶

In sum the Commission estimates the costs of producing the order routing data to include a one-time cost of approximately \$23,900 per exchange to set up the data gathering process, \$12,000 per year to maintain the data gathering systems, and \$1,888 per

at the end of the first year that it shall continue the proposed Pilot for up to an additional year, and six updates during the six-month post-pilot period. In aggregate, updates to the order routing data are estimated to cost \$67,968 × 13 U.S. equities exchanges = \$883,584 = \$884,000.

⁷⁶² This estimate of updates to the order routing data is the aggregation of updates from the pre-Pilot Period (6), the one-year Pilot Period assuming that the Commission allows the Pilot to automatically sunset at the end of the first year (12), and the post-Pilot Period (6), for a total number of 24 updates.

⁷⁶³ This estimate is based on the following: [(Compliance Manager (4 hours) × \$298) + (Programmer Analyst (3 hours) × \$232)] = \$1,888 per exchange, or \$1,888 × 24 fee changes per exchange = \$45,312 = \$45,300. The burden hours are obtained from *supra* Section III.D.3. The 24 updates to the order routing data for each exchange encompass six updates during the six-month pre-Pilot Period, 12 updates during the first year of the Pilot Period, assuming that the Commission determines at the end of the first year that it shall automatically sunset the proposed Pilot, and six updates during the six-month post-pilot period. In aggregate, updates to the order routing data are estimated to cost \$45,312 × 13 U.S. equities exchanges = \$589,056 = \$589,000.

⁷⁶⁴ See NYSE Letter I, at 15.

⁷⁶⁵ However, it is unclear exactly how the commenter aggregated the data in the Proposing Release to arrive at 160 hours because they did not provide details of their calculation.

⁷⁶⁶ See Proposing Release, *supra* note 2, at 13061. Discussion of comments on these estimates is presented in Section III.D.3 *supra*.

Exchange Act Release No. 78309 (July 13, 2016), 81 FR 49431, 49475 (July 27, 2016) ("Disclosure of Order Handling Information"). The estimate is lower than that for proposed Rule 606 disclosures because the costs for those disclosures encompassed many additional requirements beyond the mapping to an XML schema.

month to publish the data. Specifically, the Commission estimates initial one-time implementation costs of approximately \$23,900 and ongoing costs of approximately \$103,800 per exchange if the Pilot lasts two years or \$69,200 if the Pilot lasts one year. These costs total approximately \$127,800 per exchange if the Pilot lasts two years—or approximately \$1,661,000 in aggregate. These costs decline to approximately \$93,200 per exchange—or \$1,211,000 in aggregate—if the Pilot sunsets after one year.

v. Fee-Related Costs to Exchanges

When exchanges alter their fees they are required to submit a Form 19b-4 filing with the Commission. Consequently, the Commission expects most exchanges to file two 19b-4 Forms that they would not have otherwise done. Additionally, the Commission expects that the pilot may increase the complexity of these filings. This section provides estimates for the costs associated with the submission of 19b-4 Forms by the exchanges during the Pilot.

At the outset of the Pilot, each equities exchange if their fees do not at that time comply with the Pilot's pricing restrictions, would need to file with the Commission a comprehensive Form 19b-4 fee filing reflecting all of the applicable fees and rebates applicable to each of the Pilot Groups, as well as the Control Group—to reflect the temporary changes to transaction-based fees and rebates as a result of the Pilot. The Commission anticipates that exchanges will incur costs associated with and devote time to optimally assign fees and rebates across Test Groups, within the parameters allowed by the Pilot, including any incentives, tiers, caps, and discounts available. The Commission estimates that it would cost \$48,400 per-exchange for the initial Form 19b-4 fee filing or \$629,100 in aggregate.⁷⁶⁷ The Commission further anticipates that exchanges would bear similar costs upon the completion of the Pilot to prepare Form 19b-4 fee filings for filing with the Commission to reflect changes in fees at the conclusion of the Pilot, should they wish to change their fees or revert to their former pricing models after the Pilot concludes.

⁷⁶⁷ The estimate is based on the following: [(Attorney (40 hours) × \$401) + (Compliance Attorney (40 hours) × \$352) + (Assistant General Counsel (25 hours) × \$449) + (Director of Compliance (15 hours) × \$470)] = \$48,395 = \$48,400, or \$48,395 × 13 equities exchanges = \$629,135 = \$629,100 in aggregate. See OMB Control No. 3235-0045 (August 19, 2016), 81 FR 57946 (August 24, 2016) (Request to OMB for Extension of Rule 19b-4 and Form 19b-4 Filings).

In addition to the initial production of the Form 19b-4 fee filing at the outset of the Pilot, exchanges may also choose to make periodic updates to their fee and rebate schedules, and file Form 19b-4 fee filings to effectuate those changes and thereby notify the Commission and the public of those updates. As noted in the baseline, the average exchange makes approximately seven changes to its fee schedules per year. While recognizing the possibility that as a result of the Pilot, exchanges may revise their fee schedules more or less often during the Pilot, the Commission has no basis to expect an increase in the number of Form 19b-4 fee filings other than at the beginning or end of the Pilot and has no basis to expect a decrease.

The Commission also recognizes that as an outcome of the Pilot, the complexity of the Form 19b-4 fee filings could increase if exchanges seek to impose different fees within Test Groups 1, Test Group 2, and the Control Group, thereby increasing the overall costs for exchanges to revise their fee and rebate schedules.⁷⁶⁸ As discussed above, the Pilot may require exchanges to design new fee structures to comply with the Pilot's Test Groups, which would then translate into additional information in each Form 19b-4 fee filing submitted during the Pilot. These costs are likely to increase because the exchanges could take more time to design and describe fee structures in each filing than they do designing fee structures today. As discussed above in the baseline, the average fee schedules of exchanges are complex, with many different categories of fees or rebates assessed to NMS stocks. Assuming the frequency remains constant, then the Pilot could increase the incremental costs incurred by exchanges to file the expected Form 19b-4 fee filings during the Pilot.⁷⁶⁹ The additional costs would

⁷⁶⁸ The Commission believes that the inclusion of Linked Pricing prohibitions for Test Group 2 should not increase the complexity of Form 19b-4 filings for exchanges because many exchanges already report non-cash incentives, such as tiered pricing or volume discounts, as part of their standard filings. Further, the Commission does not believe that many exchanges currently use Linked Pricing mechanisms and instead mostly rely on rebates.

⁷⁶⁹ Maintaining the current average frequency of 7 19b-4 filings per year would mean that the average exchange would file a total of 14 19b-4 filings during the two-year pilot (7 filings × 2 year duration). If the Commission were to allow the Pilot to automatically sunset at the end of the first year, then the total number of 19b-4 filings could decrease by 7 filings. Annually, across all 13 exchanges, the Commission estimates that there will be 91 19b-4 filings (7 filings × 13 exchanges). If the Commission determines that the Pilot shall continue for a second year, in aggregate, the 13 exchanges could file a total of 182 19b-4 filings (91 × two-year Pilot duration).

only be relevant for Form 19b-4 fee filings that occur during the Pilot Period, and would not apply to Form 19b-4 fee filings in the pre-Pilot or post-Pilot Periods, as the Commission does not believe that there will be any incremental costs associated with increased complexity of these filings during these periods. The Commission estimates that each exchange would bear an incremental cost of \$10,600 per Form 19b-4 fee filing to account for the increased complexity associated with the requirements of the Pilot, or approximately \$1,929,000 for the anticipated 182 Form 19b-4 fee filings for fee and rebate revisions across the 13 U.S. equities exchanges during the two-year pilot duration.⁷⁷⁰ If the Pilot were to automatically sunset at the end of the first year, the Commission estimates that exchanges would bear costs of approximately \$964,000 for the anticipated 91 Form 19b-4 filings for fee and rebate revisions across the 13 U.S. equities exchanges during the first year of the Pilot duration.

In sum, the Commission expects the pilot to impose on each exchange a one-time cost of \$48,400 at the beginning and end of the pilot for the additional 19b-4 filings required by the pilot, as well as an ongoing cost of approximately \$10,600 per additional 19b-4 filing to account for increased complexity in 19b-4 filings caused by the Pilot. If we assume that exchanges continue to file 19b-4 filings at an average rate of 7 per year and if the pilot lasts for 2 years, these incremental costs sum to approximately \$148,400 per exchange—which declines to \$74,200 if the pilot ends after the first year. Combining the cost of the two additional 19b-4 filings with the cost of potential increased complexity provides an estimated cost of the pilot associated with 19b-4 filings of approximately \$245,200 per exchange—or \$3,187,000 in aggregate—if the pilot lasts two years, or \$171,000 per exchange—or \$2,223,000 in aggregate—if the pilot expires after the first year.

⁷⁷⁰ The estimate is based on the following: [(Attorney (8 hours) × \$401) + (Compliance Attorney (8 hours) × \$352) + (Assistant General Counsel (6 hours) × \$449) + (Director of Compliance (4 hours) × \$470)] = \$10,598 = \$10,600, or \$10,598 × 182 fee changes in aggregate across 13 exchanges over the two-year pilot duration = \$1,928,836 = \$1,929,000 in aggregate, assuming that the Commission determines that the Pilot shall continue for up to an additional year. If the Pilot were to automatically sunset after the first year, the Commission believes that the costs associated with 91 19b-4 filings (13 exchanges × 7 filings) would be approximately \$964,000 (≈\$10,598 × 91 filings). See Request to OMB for Extension of Rule 19b-4 and Form 19b-4 Filings, *supra* note 767.

vi. Other Costs to Exchanges

The Pilot may result in more complicated fee structures that could also increase an exchange's processing costs of tracking and calculating monthly invoices for its members during the Pilot; however, the Commission does not have any information on the costs to exchanges for tracking and calculating monthly member invoices and therefore cannot provide estimates of quantified costs and no commenters provided such information.

b. Other Costs Associated With the Pilot

This section considers additional costs that may occur as a result of the Pilot. Specifically, this section discusses how the Pilot may impact exchanges' fee revenue, broker-dealer compliance costs, brokerage commissions, liquidity, and issuers.

i. Loss of Exchanges' Fee Revenue

The Commission analyzed whether exchanges could experience a change to their fee revenues associated with transaction-based fees and rebates for either of two reasons: A decline in the margin between fees and rebates,⁷⁷¹ or a decline in overall trading volume on an exchange as a result of the Pilot.⁷⁷² In the Proposing Release the Commission stated its belief that only stocks in the test group with a cap of \$0.0005 (former Test Group 2) would experience narrower margins and estimated that these narrower margins could result in exchanges incurring revenue losses of up to \$7,650,000 per month.⁷⁷³ With the removal of the former Test Group 2 the Commission now believes that the Pilot may not have a significant effect on Exchange revenue, at least not because of narrower margins between fees and rebates.

For stocks in Test Group 1 (the Test Group with a fee cap of \$0.0010) the Commission does not believe that the Pilot will result in narrower margins earned by the exchanges because the fee cap in this group is double the current typical average net capture (*i.e.*, margin) that exchanges earn which is approximately \$0.0005.⁷⁷⁴

Consequently, the exchanges can maintain current margins by reducing the rebate offered at the same level as fees charged are reduced.⁷⁷⁵ For stocks in Test Group 2, the Commission also does not believe that the Pilot is likely to shrink margins. For these stocks the fee cap remains at \$0.0030, while exchanges are prohibited from paying rebates and offering Linked Pricing. Consequently, the prohibition of rebates for securities in this Test Group would conceivably allow the exchanges to reduce fees to as low as \$0.00025—if charged to both parties in a transaction—without reducing the exchange's average net capture per trade. While less likely given competitive dynamics, if the exchanges wanted to increase their net capture, it is possible under the pilot terms for total net capture in group one to be as high as \$0.002 (if both side were charged the maximum of \$0.001), and in group two to be \$0.003, both of which are far in excess of the average net capture that exchanges receive today. For these reasons, the Commission now expects the effects of the Pilot on exchange revenue through impacting per-trade margins to be minimal.

In addition, the Commission believes that the impact of the Pilot on exchange revenues through changes in trading volume are difficult to determine in advance, but recognizes that the magnitude of such changes could be significant and some potential lost revenue could be in a transfer to investors or among exchanges. The Commission considered whether individual exchanges could experience a decline in trading volume for four reasons, as multiple commenters suggested: If exchanges lose volume to off-exchange venues, if volume declines because of increased transaction costs, if the Pilot reduces excessive intermediation, or if volume shifts among exchanges. The Commission recognizes that the Pilot presents a risk that the Pilot could result in less fee revenue for exchanges due to lower trading volumes. However, the Commission believes that decreased trading volume, while one possible

outcome of the Pilot, is not the only reasonable outcome, and that the *ex ante* effect of the Pilot on trading volume is difficult to determine.

First, several commenters stated that reducing or eliminating the ability for exchanges to pay rebates may cause exchanges to become less competitive relative to off-exchange venues like ATs, which would not be so constrained. The analysis in Section IV.D.2.a identifies significant uncertainty in the potential for exchanges to be less competitive relative to off-exchange venues such as ATs, and identifies conditions in which they could actually be more competitive.⁷⁷⁶ Consequently, the Commission cannot determine in advance of the Pilot whether exchanges will lose volume to off-exchange venues.

Second, total trading volume, and consequently exchange revenue, could decline if the Pilot increases transaction costs. A number of issuers expressed the concern via comment letters that the Pilot would lead to lower levels of trading volume because of their experience with the Tick Size Pilot.⁷⁷⁷ However, not all issuers felt that the Pilot would result in lower trading volumes. One issuer “welcomed [the] opportunity for [its] stock to be included in the Pilot” and did not “expect that a reduction or outright removal of rebates will have any significant or harmful effects on . . . [its] stock's trading volume.”⁷⁷⁸ On the other hand, if the Pilot decreases the cost of trading on the exchanges, then the Pilot could increase trading volumes on the exchanges. This view was expressed by one commenter who stated their belief “the Pilot will reduce the costs of trading on exchanges, which may increase trading volumes on the exchanges.”⁷⁷⁹ Lower costs of trading, caused by the reduction in fees, might increase trading volume on exchanges for at least two reasons. First, lower trading costs may induce trades that would otherwise not have occurred by allowing investors the ability to trade on smaller increments of information. Lower trading costs may also induce the participation of new traders, such as short-term traders for whom transaction costs are of greatest concern, to transact in a given stock

⁷⁷¹ On a given trade, an exchange earns the margin between fees and rebates. For example, if an exchange charges a take fee of \$0.0030 per share and offers a make rebate of \$0.0025 per share then the margin captured by the exchange is \$0.0005 per share traded.

⁷⁷² A number of commenters expressed concern that the Pilot would lead to decreased exchange revenue largely through decreased trading volume. *See, e.g.*, Cboe Letter I, at 7; NYSE Letter I, at 3 and 15–16.

⁷⁷³ *See* Proposing Release, *supra* note 2, at 13063.

⁷⁷⁴ *See* Proposing Release *supra* 1 at 13067.

⁷⁷⁵ This was the case in Canada when in January 2017 the Canadian Securities Administrators (CSA) approved the lowering of the fee cap for non-interlisted Canadian stocks from \$0.0030 to \$0.0017. In response to this regulation, the Toronto Stock Exchange retained its \$0.0004 margin per trade for continuous trading—high priced securities (\$1.00 and over) by lowering both fees and rebates by \$0.0008. Fees for taking liquidity on non-interlisted securities reduced from \$0.0023 to \$0.0015 whereas rebates provided to liquidity providers declined from \$0.0019 to \$0.0011. Fees and rebates for inter-listed securities remained unchanged. *See* <https://www.tsx.com/resource/en/1501>.

⁷⁷⁶ *See* Section IV.D.2.a. *See also* Section IV.C.2.b.iv

⁷⁷⁷ *See, e.g.*, Leaf Letter, at 1–2; Ennis Letter, at 2.

⁷⁷⁸ T. Rowe Price Letter, at 4–5.

⁷⁷⁹ *See, e.g.*, TD Ameritrade Letter, at 7. Other commenters also either expressed their belief that the Pilot would not reduce trading volumes (*see, e.g.*, IEX Letter II, at 8; T. Rowe Price Letter, at 5) or expressed uncertainty about the outcome of the Pilot on trading volume (*see, e.g.*, Credit Suisse Commentary, at 5).

who would not otherwise participate. Consequently, if the Pilot leads to decreased trading costs, then trading volumes in those stocks may increase—increasing exchange revenue. In Section IV.C.2.b.iv below, the Commission discusses its belief that the effect of the Pilot on liquidity and transaction costs is not clear and could either increase or decrease. Given this uncertainty in the impact on liquidity, the Commission cannot determine in advance whether the Pilot will result in a reduction in liquidity that would reduce trading volume.

Third, the Pilot may decrease trading volume, and thus exchange revenues, if it results in a reduction in intermediation by market makers for two reasons, but this would be a transfer to investors. The first reason is that market makers from time to time will use marketable orders to balance inventory. If these market makers decline to participate due to reduced rebate incentives, then their marketable orders will not arrive—diminishing trading volume. The second reason decreased intermediation may lead to lower volumes is that non-market makers might begin to execute their trades via non-marketable orders. Non-market makers may submit marketable orders because of an inability to achieve high fill rates with non-marketable limit orders due to significant competition from market makers. The reduction in intermediation may result in situations where two traders with offsetting trades, who would have generated two separate trades with market makers as the counterparty instead execute their trade with each other resulting in one trade. This could occur, for example, if the Pilot reduces queue lengths for investors as discussed in Section IV.C.2.b.iv.(2) below. While this effect would result in a loss in revenue to exchanges that would collect margin on a smaller number of trades, it would be a net gain for investors because executions on a smaller proportion of marketable orders would mean that the investors pay less in transaction fees and would more often capture, or earn, the spread where previously they would have paid the spread to transact.

Fourth, even if overall trading volume does not decline or shift to off-exchange venues during the Pilot, individual exchanges may experience a decline in trading volume if the Pilot leads to a change in market share among the lit exchanges. This mechanism is discussed in Section IV.D.2.a. This section also highlights the difficulties in determining the expected redistribution of market share among the existing exchanges due to potentially

countervailing economic effects. To this point, one commenter noted that the loss in revenue estimated above relied on “exchanges’ existing market share percentages” which “assumes that exchanges would remain equally competitive for order flow.”⁷⁸⁰ The Commission agrees that the Pilot may impact the level and distribution of trading volume on lit exchanges but notes that such a redistribution would be a transfer among exchanges rather than an economic cost.

The Commission acknowledges that the reduction or elimination of rebates may particularly affect smaller exchanges due to the liquidity externality, especially if their primary competitive differentiation is based upon a modified fee model. As discussed in the Proposing Release liquidity tends to consolidate.⁷⁸¹ Thus, the restrictions on rebates resulting from the Pilot could harm smaller exchanges that may be competing by paying large rebates rather than by producing better prices or execution quality. In the short run, this could lead to lost revenue for these exchanges. It could also have longer-term effects if smaller exchanges consolidate or exit as a result of the Pilot. However, the Commission does not believe that consolidation or exit is likely during the pilot because only about a quarter of NMS stocks will be included in test groups.

The Pilot could also impact exchanges’ fee revenue after the conclusion of the Pilot if as a result of the Pilot broker-dealers permanently alter their order routing decisions after the Pilot is completed. One commenter argued that this may be the case and suggested that the Commission’s claim that the Pilot’s effect on broker-dealers’ routing decisions would be temporary “[was] contradicted by the Commission’s own finding that broker-dealers would not change their behavior unless the Transaction Fee Pilot lasts for at least one year.”⁷⁸² To this point, given the competitive nature of financial markets, the Commission does not expect that it would take most broker-dealers up to one year to alter their behavior. Indeed, this commenter supports this belief by stating that exchange and non-exchange trading centers vigorously compete for trading volume, and that market participants are sensitive to revisions in transaction-based pricing models.⁷⁸³ Given this competition, the Commission believes market participants will likely adjust

their behavior quickly both upon the implementation and conclusion of the Pilot, and that the Pilot duration will incentivize broker-dealers not to “wait out” the Pilot who could be otherwise inclined to do so if the duration were not sufficiently long.⁷⁸⁴

If the Pilot results in a decline in fee revenue for exchanges, then this could lead to other costs borne by investors as a result. Exchanges could promote additional order types and may even initiate new types of markets as a result of the Pilot, which would only serve to further fragment markets and add to their complexity, the costs of which could be borne by investors.⁷⁸⁵ In particular, the Commission recognizes the remote possibility that an exchange holding company could attempt to optimize its overall performance during the Pilot by further diversifying with other exchange models. The Commission believes, however, that a new equity exchange registered in direct response to the Pilot would be unlikely to become operational before the conclusion of the Pilot. In addition, the Commission believes that it is unlikely that exchanges will promote additional order types as a result of the Pilot.

In sum, the Commission believes that the costs to the exchanges due to narrower margins earned per trade are likely to be minimal—if any—due to the removal of the proposed Test Group with the fee cap of \$0.0005. However, the Commission does expect that there could be a change in trading volume or a redistribution of market share among exchanges as market participants re-optimize their order routing systems as a result of the Pilot. However, due to the reasons discussed in this section, the Commission cannot determine in advance of the Pilot whether these market share/trading volume changes will increase or decrease exchange revenue. Consequently, the Commission acknowledges that the Pilot may lead to lower trading volume/market share for exchanges, which would impose a cost in terms of lost transaction fee revenue, but is unable to quantify the expected magnitude of this potential cost and no commenter provided an estimate of the amount of the lost transaction fee revenue.

While the Commission cannot determine in advance of the Pilot its impact both in terms of direction and magnitude, the Commission has attempted to estimate the costs should volume decline. Using data from Table 3 in section IV.B.2.e the Commission

⁷⁸⁰ NYSE Letter I, at 17.

⁷⁸¹ See Proposing Release, *supra* note 2, at 13042.

⁷⁸² See NYSE Letter I, at 15–16.

⁷⁸³ See State Street Letter, at 2.

⁷⁸⁴ See Section IV.C.1.a.iii, *supra*.

⁷⁸⁵ See Section III.A. See also, e.g., Fidelity Letter, at 8.

estimates an annualized upper bound on the profit earned from transaction fees for each exchange. Aggregated across all exchanges this number equals approximately \$3 billion per year. However, only about 1/4th of NMS securities will be in a test group subject to the Pilot, so the Commission estimates the Pilot could affect the approximately \$750 million per year across all exchanges, depending on how much volume changes. Consequently, if the Pilot were to cause a 10% reduction in trading volume on exchanges then this change could reduce fee revenue on the exchanges by approximately \$150 million over two years or \$75 million if the Commission were to allow the Pilot to automatically sunset at the end of the first year. However, the Commission does not believe that the 10% reduction in trading volume is a reasonable assumption. While the Swan Study shows that Nasdaq lost 10% of its volume using one volume measure, it lost only 200,000 shares in another. In addition, the Swan Study finds no change in overall volume or in off-exchange volume, just a migration from Nasdaq to other exchanges. Therefore, the Commission does not believe that either the 10% volume reduction or, consequently, the estimate of \$150 million revenue reduction is reasonable.

ii. Broker-Dealer Systems Costs

Although the costs of compliance with the Pilot will primarily affect the exchanges, broker-dealers and other market participants are also likely to incur costs as a result of the Pilot. Commenters provided mixed information on the magnitude of these costs. While some commenters stated that the costs to broker-dealers of the Pilot would be substantial,⁷⁸⁶ other commenters stated that the costs for broker-dealers associated with the Pilot would not be significant or expensive because exchange fee schedules change regularly and broker-dealers are used to adapting their order routing algorithms to new and changed fee schedules.⁷⁸⁷ This section provides the Commission's estimates for broker-dealer compliance costs associated with the Pilot.⁷⁸⁸

⁷⁸⁶ See, e.g., Larry Harris Letter, at 10–11; STANY Letter, at 2; FIA Letter, at 3; Nasdaq Letter I, at 10; Nasdaq Letter III, at 9.

⁷⁸⁷ See, e.g., Vanguard Letter, at 3; Healthy Markets Letter I, at 34.

⁷⁸⁸ One commenter stated that the Commission did not consider implementation and coding costs. See STANY Letter at 2. However, the commenter does not elaborate on why the Proposing Release estimates of \$3,741,000 implementation costs for broker-dealers to adjust their order routing systems at the beginning and end of the Pilot and the \$20,726,000 costs for broker-dealers to update their order routing systems for fee changes during the

In response to the Pilot, market participants might have a one-time cost at the onset and the conclusion of the Pilot to adjust their systems to reflect the shocks and potential additional complexity of transaction-based fees. In addition, there may be additional modifications to routing strategies that are made in subsequent months to adjust to changing liquidity dynamics as behavior changes associated with the pilot settle in. Many broker-dealers have smart-order routing systems that use algorithms to route orders based on certain criteria, such as fill rates, time to execution, lowest fees, or highest rebates.⁷⁸⁹ One commenter agreed, stating that such systems changes “should primarily consist of modifications to the routing tables and other associated operational activities.”⁷⁹⁰ The Commission understands that some of the associated changes and modifications may already be coded into the smart order router (SOR) algorithms such that changes to associated liquidity shifts may be dynamic and automated, i.e., in need of little additional modification.

To estimate these costs, the Commission assumes (1) that all broker-dealer members of exchanges will adjust their systems for the pilot and (2) that all broker-dealer members of exchanges have automated order routing systems.⁷⁹¹ While the Pilot does not directly require broker-dealers to adjust their systems, the Commission expects broker-dealers who do not update their systems may incur significant costs relative to those who do in terms of potential impacts on execution quality and in their ability to manage fees and rebates. Broker-dealers might choose to

Pilot failed to consider implementation and coding. See Proposing Release, *supra* note 2, at 13063–13064.

⁷⁸⁹ See Bacidore, Jeff, Hernan Otero, and Alak Vasa, 2011, Does smart routing matter?, Journal of Trading 6, 32–37. (available at <http://jot.ijournals.com/content/6/1/32>), which found that smart-order routers designed to maximize rebates delivered worse execution quality to their clients.

⁷⁹⁰ See FIF Letter at 8. See also FIA Letter at 3; Nasdaq Letter I at 10.

⁷⁹¹ Even in the absence of smart-order routers, broker-dealers could still adjust their execution determinations to take advantage of the changes implemented during the Pilot and these adjustments would incur costs. While the Commission does not estimate these particular costs, the assumption that all broker-dealers have automated order routing systems is reasonable and is necessary to enable the estimation of cost estimates. The Commission believes, however, that the costs to adjusting manual systems could be lower than the costs to adjust automated routing systems. If any broker-dealers still route orders manually, they likely do so because setting up and maintaining manual systems is not economical for them. It is likely that such firms utilize exchange routing services.

adjust their systems for the Pilot for many reasons, including to recognize that the Pilot could affect execution quality for investors and/or to better manage fees and rebates.⁷⁹² Therefore, the cost estimates assume that broker-dealers will adjust to their existing systems to capture changes in fees and rebates associated with each Test Group of securities, rather than bearing start-up costs associated with implementing new order routing systems.

In its estimates, the Commission recognizes that the costs associated with adjusting the execution algorithms by broker-dealers for the Pilot are likely to be more costly than the periodic updates that broker-dealers may make to incorporate changes to fee schedules implemented by exchanges or to fine tune their strategies. The additional expected costs may occur because changes for the Pilot are likely to require more complex programming that segments stocks into different fee regimes (assuming exchanges implement fees customized to each Test Group), rather than just altering codes or inputs. As of July 2017, exchanges have 18 fee categories and 21 rebate categories, on average.⁷⁹³ If exchanges maintain the same level of complexity in their fee schedules during the Pilot, up to a two-fold increase in the number of fee and rebate categories could occur, which would increase complexity for broker-dealers who incorporate fees into their order routing decisions.⁷⁹⁴ Additionally, the Commission agrees with the commenter who stated that, to the extent that broker-dealers' order routing algorithms are programmed to the exchange, and not the individual security, the Pilot will increase complexity by requiring an adjustment to this methodology.⁷⁹⁵ The Commission estimates that the costs to broker-dealers that are members of exchanges to make the initial adjustment to their order routing systems at the outset of the Pilot would be approximately \$9,000 per broker-dealer, or \$3,573,000 in aggregate across the 397 broker-dealers that are currently members of equities exchanges.⁷⁹⁶ The

⁷⁹² See sections IV.C.1.a.iii and IV.E.5.a for additional discussion.

⁷⁹³ See Table 2 in Section IV.B.2.f *supra*.

⁷⁹⁴ In addition, the Commission recognizes the potential costs to exchanges of this complexity above in Section IV.C.2.a.

⁷⁹⁵ See Larry Harris Letter, at 10–11.

⁷⁹⁶ This estimate is based on the following, which reflects the Commission's experiences with and burden estimates for broker-dealer systems changes: [(Attorney (5 hours) × \$401) + (Compliance Manager (10 hours) × \$298) + (Programmer Analyst (10 hours) × \$232) + (Senior Business Analyst (5 hours) × \$265)] ≈ \$9,000 per broker-dealer that is a member of at least one exchange. As of December 31, 2016,

Commission further estimates that broker-dealers would bear a similar cost to adjust their order routing systems at the conclusion of the Pilot.

Additionally, the Commission expects that broker-dealers would update their order routing systems with changes to fees or rebates submitted by exchanges through Form 19b-4 fee filings to the Commission during the Pilot. As discussed in the baseline, exchanges, on average, make changes to fees or rebates approximately seven times per year; therefore, broker-dealers are likely to have experience in updating the order routing systems to reflect these routine changes to fees and rebates.⁷⁹⁷ As in the estimates of the costs of the initial and final adjustments, broker-dealers are likely to face higher costs per update as a result of the Pilot because of the added complexity of having to update multiple modules within their order routing systems. The Commission's estimates of these updates assume that exchanges update their fees schedules as often during the pilot as at present. Therefore, the costs to broker-dealers associated with the Pilot are the additional costs associated with the complexity of the updates and not the total cost of the updates.⁷⁹⁸ In other words, broker-dealers would have updated their systems (or routing tables) anyway in the absence of the Pilot to reflect the same number of exchange fee and rebate changes. The Commission estimates described below reflect the additional cost of the Pilot ("additional costs"), which is how much more an update might cost during the Pilot compared to a scenario without the Pilot.

The Commission believes that the per-update additional costs associated with these changes are likely to be a small fraction of the costs associated with the initial costs of adjusting the routing systems to reflect the required fee and rebate revisions at the outset of the Pilot. The Commission estimates that the additional costs to broker-dealers that are members of exchanges to make periodic adjustments to their order

397 unique broker-dealers were members of exchanges (Form X-17a-5). The aggregate costs of updating order routing systems to reflect the Transaction Fee Pilot requirements would cost $\$9,000 \times 397 \approx \$3,573,000$. Note that smaller broker dealers will often use the smart order router of larger broker dealers or those offered by exchanges, and will therefore benefit indirectly from the work done by the providers of their smart order routing services.

⁷⁹⁷ Several commenters made similar statements. See, e.g., Vanguard Letter, at 3; Healthy Markets Letter I, at 34.

⁷⁹⁸ The Commission cannot estimate and commenters provided no insight into the degree to which the number of fee and rebate revisions by exchanges will increase or decrease during the Pilot.

routing systems to reflect changes in fees and rebates would be \$265 per adjustment, or approximately \$105,000 in aggregate across the 397 broker-dealers that are members of U.S. equities exchanges.⁷⁹⁹ As shown above, the Commission expects that exchanges, if submitting changes to fees and rebates at the same rate as they have in the last five years, would submit 182 total revisions to fees and rebates over the two-year pilot duration. Therefore, the aggregate costs of updating order routing systems would be \$48,000 per broker-dealer, or \$19,056,000 in total across all broker-dealers.⁸⁰⁰ If the Pilot were to automatically sunset at the end of the first year, the aggregate costs of updating order routing systems would be \$24,000 per broker-dealer, or \$9,528,000 in total across all broker-dealers.

In sum the Commission believes that the all in costs to broker-dealers of updating their order routing systems as a result of the Pilot will average approximately \$66,000 per broker-dealer to update their systems over the entire Pilot Period. If the Pilot automatically sunsets at the end of the first year, the costs associated with these updates will be approximately \$42,000 per broker-dealer.⁸⁰¹ The Commission notes that these estimates may be overstated. Not all broker-dealers are members of all exchanges, which would reduce the total number of changes to the order-routing systems that they would implement. Additionally, the exchanges could resort to more

⁷⁹⁹ This estimate is based on the following, which reflects the Commission's experiences with and burden estimates for broker-dealer systems changes: [(Compliance Manager (0.5 hours) \times \$298) + (Programmer Analyst (0.5 hours) \times \$232)] = \$265 per broker-dealer that is a member of at least one exchange. The aggregate costs updating order routing systems to reflect the periodic fee and rebate revisions would cost $\$265 \times 397 \approx \$105,000$.

⁸⁰⁰ If 182 total fee and rebate changes were to occur over the duration of the Pilot (13 equities exchanges \times 7 revisions per year \times 2 years = 182), each broker-dealer would bear costs of updating its order routing systems of $\$265 \times 182 \approx \$48,000$, or \$19,056,000 ($\$48,000 \times 397$) in aggregate across all broker-dealers over the first year of the Pilot. The Commission estimates that costs would be \$9,528,000 ($\265×13 exchanges \times 7 updates \times 397 broker-dealers) if the Commission determined that Pilot automatically sunset at the end of the first year.

⁸⁰¹ These costs reflect the estimated cost of \$9,000 at the outset of the Pilot to update the order routing system to reflect the changes to the fee structure for securities in the test groups, \$48,000 to reflect the incremental costs of the estimated 182 revisions to fee schedules during the Pilot (\$265 per revisions \times 7 revisions per year \times 2 years \times 13 exchanges), and \$9,000 at the conclusion of the Pilot to unwind changes to the order routing systems, for a total of \$66,000 per broker-dealer. If the Pilot were to automatically sunset at the end of one year, then these costs would be approximately \$42,000 ($\265×7 revisions \times 13 exchanges $+ 2 \times \$9,000$) per broker-dealer.

simplified fee schedules relative to the current baseline, which would reduce broker-dealers' costs of updating their systems for the Pilot.

iii. Temporary Increase in Brokerage Commissions

Beyond the implementation and compliance costs for exchanges and broker-dealers associated with the Pilot, the changes to the exchange transaction-based fee and rebate structure could lead to temporary increases in brokerage commissions charged to their customers. Several studies show, and several commenters concurred, that brokerage commissions today are at historically low levels.⁸⁰² Brokerage clients may have a preference for low commissions with services provided by broker-dealers, and in turn, may allow broker-dealers to capture rebates (and bear the costs of access fees), either through explicit contracts or implicit agreements.⁸⁰³ As a result, the Pilot could lead to higher overall commissions as rebates obtained by broker-dealers fall,⁸⁰⁴ thereby temporarily reducing the overall welfare of retail brokerage clients as a result of increased commissions.⁸⁰⁵

For instance, the elimination of rebates and Linked Pricing in Test Group 2 could result in a transfer from broker-dealers to exchanges. Assuming, as discussed above, the margin between fees and rebates is approximately \$0.0002 per share,⁸⁰⁶ with transaction fees of \$0.0030 per share and rebates of \$0.0028 per share, Test Group 2 could result in a transfer of \$0.0028 from broker-dealers to the exchanges with

⁸⁰² See, e.g., Angel, Harris, & Spatt, *supra* note 530.

⁸⁰³ See Regulation NMS Subcommittee Recommendation for an Access Fee Pilot (June 10, 2016), available at <https://www.sec.gov/spotlight/emsac/emsac-regulation-nms-recommendation61016.pdf> ("June Recommendation"). See also Shawn O'Donoghue, 2015, "The Effect of Maker-Taker Fees on Investor Order Choice and Execution Quality in U.S. Stock Markets", Working Paper, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2607302.

⁸⁰⁴ Several commenters made similar statements. See, e.g., NYSE Letter I, at 13; ASA Letter, at 2.

⁸⁰⁵ The Commission acknowledges differing effects on brokerage commissions could occur as a result of the Pilot depending on whether the client is a retail customer versus an institutional customer. For instance, some brokerage accounts charge per-transaction commissions to retail clients. Institutional commissions, on the other hand, are highly negotiated and may be based on something other than a per trade or per share basis, such as a flat fee for use of a broker's order routing algorithm; however, data on the structure or magnitude of institutional commissions is not publicly available.

⁸⁰⁶ There are approximately 8,000 NMS securities and just under 800 will be included in Test Group 2.

respect to their passively posted non-marketable orders, particularly because exchanges would be prohibited from offering Linked Pricing mechanisms that could act as substitutes for cash rebates.⁸⁰⁷ The estimates of the potential increased revenue to exchanges are as follows.

Assuming that the share volume in Test Group 2 would be approximately 12.5% of the total share volume across all securities,⁸⁰⁸ using data from Table 2 in the baseline, Test Group 2 would have share volume of approximately 11.5 billion each month.⁸⁰⁹ If the margin between fee revenue and rebate cost is \$0.0002, as discussed above, then under the assumption that exchanges reduce fees to \$0.0002 in Test Group 2, the Commission anticipates no change in revenue for exchanges, and no transfer from broker-dealers. If, instead, exchanges charged the maximum fees of \$0.0030 while they are prohibited from paying rebates or Linked Pricing in Test Group 2, the Commission estimates a monthly aggregate increase in revenues across all exchanges of \$32,200,000.⁸¹⁰ If the volume on each exchange does not change, then the estimated annual average increase in revenues across all exchanges would be \$386.4 million [$\$32,200,000 \times 12 = \$386.4M$]. This transfer of rebates from the broker-dealers to exchanges could potentially increase exchange revenue by approximately 64.1%.⁸¹¹ Moreover,

⁸⁰⁷ Although the Commission believes that competition among exchanges would drive transaction fees down for Test Group 2 as a result of the elimination of rebates, exchanges could charge transaction fees as high as the current cap of \$0.0030.

⁸⁰⁸ As designed, the Pilot would allocate an equal number of securities to the two test groups and the control group (e.g., the test groups combined would have approximately 25% of the NMS securities and the control group would have 75%). Each test group will have one-half of the combined test group allocation, thereby, in total leaving each test group with 12.5% of NMS securities included in the pilot. Assuming that the allocation of share volume would be similar due to the stratification of the sample discussed above, each test group would have approximately 12.5% of total share volume each month.

⁸⁰⁹ Table 2 in the baseline shows aggregate exchange share volume for July 2017 was 91.7 billion shares, of which 12.5% would be 11.5 billion shares. Further, the Commission estimates that these volume figures would be similar across all months, assuming no seasonality in share volume.

⁸¹⁰ If Test Group 2 has monthly share volume of 11.5 billion shares, and the margin would increase by \$0.0028 (\$0.0030—\$0.0002), the revenue increase per month is estimated to be 11.5 billion \times \$0.0028 = \$32,200,000.

⁸¹¹ As discussed in section IV.B.2.d, the net of rebate revenue for NYSE (NYSE, NYSE Arca, NYSE American, and NYSE National), Nasdaq (Nasdaq, BX, and PSX), and Cboe (Cboe BZX, Cboe BYX, Cboe EDGA, and Cboe EGDG), was \$602 million during 2017 (\$196M + \$253M + \$153M). If the estimated margin increased by \$386.4 million, then

these costs could likely fall to investors in the form of higher commissions or fees charged to cover the decrease in broker-dealer revenue due to losses in rebates for securities in Test Group 2.⁸¹²

The Commission further acknowledges that if brokerage commissions were to increase as a result of the Pilot, broker-dealers could continue to charge higher commissions even after the conclusion of the Pilot. However, due to competition among broker-dealers, including the proliferation of low-cost online broker-dealers, the Commission believes that broker-dealers would be unlikely to significantly increase brokerage commissions as a result of the Pilot.⁸¹³

Lastly, the Commission acknowledges that brokerage commissions may decrease during the Pilot if the Pilot results in lower execution costs for some test groups, then those lower costs may be passed on to investors in the form of lower commissions. For example, if a broker-dealer pays the transaction fee more often than they earn the rebate, the reduction of fee caps would reduce the cost of transacting for this broker-dealer, which the broker-dealer may pass onto investors in the form of lower commissions.⁸¹⁴

iv. Temporary Reduction in Liquidity

The effect of the Pilot on liquidity is uncertain as there are reasons why the Pilot may increase as well as decrease liquidity. Several commenters expressed concern that the Pilot would reduce liquidity. These commenter statements largely focus on the impact of the reduction or elimination of rebates. In considering the comments, and as analyzed in the following sections, the Commission considered the impact of the direct effect of rebates on quoted spreads, the impact of a loss of liquidity provision on quoted spreads and depth, the impact of changes in adverse selection on transaction costs, and the impact of potential conflicts of interest on execution quality. In addition, the Commission analyzed estimates of the costs of a potential reduction in liquidity provided by commenters.

The Pilot could result in a positive, negative, or neutral change in liquidity

the percentage increase in this margin would be \$386.4 million/\$602 million = 64.1%.

⁸¹² Consistent with this idea one commenter suggested that, any benefits or costs accruing to broker-dealers as a result of changes in fees and rebates are likely to be passed onto their customers. See Decimus Letter, at 2.

⁸¹³ See *supra* Section IV.B.2. and IV.D.2. (discussing the competitive environment for broker-dealer services). *But cf.* Decimus Letter, at 2–4; NYSE Letter I, at 13; ASA Letter, at 2 (noting the possibility that commissions would increase).

⁸¹⁴ See Decimus Letter, at 2–4.

for the stocks in test groups. Adding to this uncertainty, some commenters felt that to the extent that there are liquidity effects, such effects would be minimal.⁸¹⁵ Also, the impacts of the Pilot on liquidity may not be uniform across all securities and several commenters believed that widening of spreads would be limited to a small number of securities. Some commenters stated that the widening of spreads is unlikely to affect the most and least liquid securities, or will not adversely affect liquidity at all.⁸¹⁶ Further, as some commenters explained, less liquid stocks tend to have wider spreads, and therefore, the impact of rebates as an incentive to provide liquidity may become less relevant for these securities.⁸¹⁷

(1) Direct Impact of Fees and Rebates on Quoted Spreads

The Commission believes the impact of the Pilot on liquidity and transaction costs through a direct adjustment of the quoted prices is uncertain. One study argues that transaction-based rebates may artificially narrow the quoted spread on make-take exchanges by the amount of the rebate.⁸¹⁸ This effect would particularly impact retail investors whose orders are largely internalized at the best quoted prices. However, whether rebates can effectively narrow quoted spreads in a given stock depends on whether that stock's natural quoted spread (without artificial narrowing) is constrained by the tick size. For example, if a stock has a natural quoted spread of less than one penny, which is the minimum tick size, then rebates cannot possibly artificially narrow the quoted spread. Many of the most active stocks have average quoted spreads very close to a penny and the Commission believes that the natural spread in some of these stocks could be at or less than a penny. Consequently, the Commission believes that rebates might not artificially narrow spreads in at least some of the most active stocks and, therefore, that the Pilot might not result in wider quoted spreads in all stocks.⁸¹⁹

(2) Potential Reduction in Liquidity Provision

The Commission recognizes that the Pilot could reduce the incentives to

⁸¹⁵ See, e.g., Angel Letter II, at 3.

⁸¹⁶ See, e.g., Citigroup Letter, at 3; Credit Suisse Letter, at 1; Decimus Letter, at 4; MFS Letter, at 1.

⁸¹⁷ See, e.g., IEX Letter II, at 5; Credit Suisse Commentary, at 3.

⁸¹⁸ See Angel, Harris, & Spatt, *supra* note 530.

⁸¹⁹ See also TD Ameritrade Letter, at 3 (concurring with the view that the Pilot is less likely to affect highly liquid securities).

provide liquidity, but believes that the impact of this reduced incentive on quoted spreads and transaction costs could be positive or negative and could vary across securities. In particular, the Commission believes that despite a potential reduction in liquidity provision, some investors could actually experience lower or higher transaction costs in some securities for several reasons. Generally, this section provides reasons to expect an increase in transaction costs as well as reasons to expect a decrease in transaction costs. Likely, several of these effects will offset to create a new equilibrium, but the Commission cannot predict whether investors will face higher or lower transaction costs in this new equilibrium.

First, some commenters stated that the removal of rebates could cause some liquidity providers to stop providing liquidity, which would result in a temporary increase in transaction costs during the Pilot as the remaining liquidity providers would face less competition for their services and therefore could charge wider spreads to liquidity demanders.⁸²⁰ One Commenter suggested that this effect could be seen by comparing spreads on non-rebate exchanges like Cboe EDGA with the rebate paying exchange Cboe EDGX. The Commenter noted that average spreads on Cboe EDGX tend to be lower than those on Cboe EDGA.⁸²¹ However, the Commission does not believe that this data point provides robust evidence that spreads will widen across all securities because EDGA and EDGX tend to trade securities with different characteristics, consistent with another commenter who stated that “EDGA only traffics in the most liquid names” consequently comparing average spreads on EDGA and EDGX is not appropriate. Additionally this analysis does not establish a causal link between rebates and quote quality.⁸²²

The Commission notes that a reduction in liquidity provision might not result in wider quoted spreads and greater transaction costs, particularly in more active securities. In particular, as suggested by some commenters, if rebates result in excessive intermediation,⁸²³ or if “natural” buyers

and sellers set quoted prices,⁸²⁴ a reduction in rebates need not widen quoted spreads and increase transaction costs and could actually reduce transaction costs to the benefit of investors. Excessive intermediation makes it more difficult for non-market makers to get passive orders to the front of the queue and could induce them to cross the spread to trade aggressively a greater fraction of the time. If a reduction in rebates can result in less excessive intermediation, then a reduction in liquidity provision by market makers might not adversely impact transaction costs but could instead decrease queue lengths faced by non-market maker liquidity providers such as institutional investors. This could allow investors trading test group stocks to potentially experience better execution quality because they could be able to obtain better queue priority on their passive orders. Better queue priority would both diminish adverse selection costs for passive orders and also decrease the fraction of time investors are required to pay the spread and potential take fee to execute a trade.⁸²⁵ The Commission does not have the data necessary to empirically analyze whether rebates indeed result in excessive intermediation, but expects the Pilot to facilitate such analysis.

The Commission recognizes the risk, noted by some commenters, that the Pilot could increase the cost of transacting if the reduction of rebates leads to a reduction in quoted depth.⁸²⁶ If the reduction in rebates in test group securities results in liquidity providers such as market makers posting less displayed liquidity, quoted depth could decline even if quoted spreads does not decline. This lower depth could result in increased costs of transacting larger quantities. These effects could be more pronounced in small stocks if, as some commenters suggest, rebates are important to induce market makers to provide liquidity in small stocks either directly or through cross subsidization of liquidity.⁸²⁷

unnecessarily subsidizes quoting in sufficiently liquid securities, resulting in ‘excessive intermediation’ that crowds out long-term investor participation in the market.”). *See also* T. Rowe Price Letter, at 2.

⁸²⁴ *See, e.g.*, Mulson Letter.

⁸²⁵ *See* Pragma Letter, at 2; IEX Letter I, at 6; IEX Letter III, at 4–6. *But cf.* NYSE Letter II, at 11.

⁸²⁶ *See* Pragma Letter, at 2; Nasdaq Letter I, at 6.

⁸²⁷ *See* Nasdaq Letter I, at 8–9; Nasdaq Letter III, at 9. However another commenter suggested that the impact of the Pilot on small stocks would be mitigated by the fact that small stocks tend to have wider spreads, and thus rebates form a smaller fraction of total market making incentives. *See* Decimus Letter, at 4–5

The Commission also recognizes the potential for a reduction in liquidity and an increase in transaction costs for ETPs and particularly less active ETPs. Multiple commenters expressed concern that the Pilot might particularly reduce liquidity in ETPs.⁸²⁸ These commenters noted that, unlike in stocks, the Pilot might affect liquidity for ETPs in one of two ways: It may affect liquidity in shares of the ETP, or it may affect liquidity in the underlying assets of the ETP. The Pilot may reduce liquidity in the shares of the ETP if the reduction of or elimination of rebates induces market makers to stop or reduce providing liquidity for shares of an ETP. Moreover, another commenter expressed concern that the Pilot is inconsistent with exchanges programs for ETP market makers, whereby incentives are made available to market makers to act as liquidity providers for small, less liquid ETPs and therefore the negative impact of the Pilot could be the most pronounced among illiquid ETPs.⁸²⁹ Additionally, the Pilot may affect the liquidity of ETPs if it impacts the liquidity of the underlying securities. If the Pilot affects liquidity in shares of an ETP or impacts the liquidity of the ETP’s underlying securities, it will also affect the costs to authorized participants of eliminating ETP mispricing by participating in the create-redeem process.⁸³⁰

Additionally, the Commission recognizes that the Pilot might result in other unforeseen changes to market dynamics,⁸³¹ including improved or diminished execution quality by certain trading centers which could shift the level of market participation. Also, the Pilot may affect the ability of exchanges and ATSS to draw liquidity provision through innovative methods other than rebates. The effects of these changes may have a positive, neutral, or negative effect on liquidity. Consequently, the Commission believes that there is significant uncertainty surrounding the effects of the Pilot on liquidity.

(3) Conflicts of Interest

As noted above, the Commission is not certain of the extent to which some broker-dealers route investor orders to avoid fees or to capture rebates in such

⁸²⁸ *See, e.g.*, ICI Letter I, at 4; BlackRock Letter, at 1–2; FIA Letter, at 4; SIFMA Letter, at 4; Issuer Network Letter I, at 3; Schwab Letter, at 3; Fidelity Letter, at 9; Invesco Letter, at 2; State Street Letter, at 3; Clearpool Letter, at 8; STA Letter, at 4; STANY Letter, at 4; Healthy Markets Letter II, at 8; Healthy Markets Letter I, at 11; Nasdaq Letter I, at 8; NYSE Letter I, at 7; Cboe Letter I, at 17; Credit Suisse Commentary, at 6; Morgan Stanley Letter, at 3–4.

⁸²⁹ *See* Virtu Letter, at 7.

⁸³⁰ *See infra* Section IV.D.1.

⁸³¹ *See* IEX Letter II, at 7.

⁸²⁰ *See also* Pragma Letter, at 2; Magma Letter, at 2; STA Letter, at 3; STANY Letter, at 2; Morgan Stanley Letter, at 3–4; Energizer Letter, at 1.

⁸²¹ *See* NYSE Letter II, at 2, 9. *See also*, Nasdaq Letter III, at 4–6 (presenting similar data suggesting that quote quality on make-take exchanges is better than on inverted exchanges).

⁸²² *See* section IV.C.1.a.ii.(3) for a discussion on causality, *See also* Mulson Letter II, at 1.

⁸²³ *See* NYSE Letter II, at 4 (noting that “some institutions believe maker-taker pricing

a way that reduces execution quality. To the extent they do, the Pilot could improve execution quality. This would occur if, as many commenters and studies have argued, the offering of rebates produces a conflict of interest that induces orders to be routed to exchanges with sub-optimal execution quality.⁸³² Consequently, the removal or reduction of rebates may cause orders to be routed to exchanges with better execution quality and the execution quality in the stocks in the Test Groups could improve. As noted above, commenters disagreed on whether broker-dealers act on such conflicts of interest and the Commission lacks sufficient information to determine the magnitude of any such conflicts. The Commission notes that the objective of the Pilot is, in part, to study such conflicts of interest.

(4) Cost Estimates

Multiple commenters provided quantitative cost estimates associated with expected changes in liquidity. The commenters' estimates all rely on the assumption that a reduction in rebates will increase quoted spreads and transaction costs but took different approaches, resulting in a wide range of estimates from \$24 million to \$4 billion per year. Overall, while the Commission appreciates the cost estimates, the Commission reiterates that the Pilot could either increase or decrease investor transaction costs for the reasons explained above. However, for the reasons discussed below, the Commission believes that each of the commenters overestimated the potential costs to investors. Below, the Commission first describes each estimate, adjusts the estimate for the change in the structure of the Pilot and then discusses how the assumptions might affect the estimation.

The first commenter estimated costs of \$24 million per year. Across all three proposed test groups, this commenter calculated an anticipated reduction in the average rebate of \$0.002267 per share, and that approximately 50% of all liquidity providers will be affected by the rebate reduction by "updating their quotes to less aggressive prices," leading to an increased cost to cross the spread of \$0.001134 per share.⁸³³ Assuming only stocks with an average quoted spread in excess of \$0.02 will be adversely affected by the rebate reduction, this commenter estimated that the costs to its customers of a wider

quoted spread would be \$24 million annually.⁸³⁴

To account for the changes to the Pilot since the proposal, Commission staff estimate that this commenter's approach would estimate a cost of \$12.7 million per year. To arrive at this estimate, the Commission adjusted the average rebate reduction to 0.0024 to account for the change to the test groups and adjusted the average implied volume to account for the inclusion of less than half the number of stocks in test groups.

Despite these adjustments, the Commission notes that the estimate is likely imprecise. In particular, this estimate relies on an assumption that the spreads will widen by 50% of the reduction in rebates but does not provide support for this assumption. The commenter does not explain why they expect this relation between rebates and liquidity or provide an explanation for why they feel that 50% is the appropriate adjustment to use. Further, this adjustment does not allow for some liquidity demanders to supply liquidity more often if queue lengths decline with rebates. Such a switch would reduce the impact on transaction costs. The commenter also does not explain whether the share volume used to estimate the costs was all share volume in securities with average quoted spreads of less than two cents or just that portion likely to be in a test group. If the commenter included all volume, the estimates would be closer to \$6.34 million.

A second commenter estimated that if effective spreads widened by 10% for the 100 top securities, "the Pilot could conservatively cost investors over \$400 million more in annual execution costs."⁸³⁵ The commenter does not provide an analysis, either quantitative or qualitative, to support their belief that a 10% increase is appropriate to use or explain their methodology. The commenter provided little information about its assumptions or underlying data that would allow the Commission to examine the robustness of the estimate or to adjust the estimate for the changes in the Pilot since the proposal. As such the best way for the Commission to adjust the estimate for the changes in the Pilot is to divide it by two, \$200 million, because the changes reduced the number of securities in the Pilot by slightly more than half. However, because of uncertainties about methodology and assumptions, the Commission cannot adjust with any certainty the \$400 million estimate and does not believe

that a \$200 million estimate is reliable. The Commission recognizes that the changes to the Pilot could also change the commenter's estimate of how much spreads widen.

A third commenter provided an analysis that suggested that, due to wider spreads, the increased costs to investors would be at least \$1 billion per year and potentially \$4 billion.⁸³⁶ Like the first commenter, this \$1 billion estimate assumes an adjustment to transaction costs based on the reduction in the rebate, except that this commenter doubled the rebate to adjust transaction costs. To compute their estimate, the commenter estimates the weighted reduction in rebates across all stocks, taking into account the fact that most stocks will see no change in rebates. The commenter then uses the expected weighted average reduction in rebates to compute their estimate for the Pilot's impact on average spreads across all stocks. The commenter then multiplies the expected impact on spreads by total trading volume to arrive at a total of approximately \$1 billion in estimated costs per year.⁸³⁷ Using the commenter's method, the adopted rule would have an average rebate reduction of approximately \$0.0004, which would widen spreads by \$0.0009, or approximately half the prior increase, for a new cost estimate of \$600 million per year.

Other commenters responded to this commenter's \$1 billion estimate in various ways. One commenter criticized the use of quoted spreads to estimate costs.⁸³⁸ Likewise, several commenters

⁸³⁶ See NYSE Letter I, at 13 and NYSE Letter IV, at 4. The commenter estimated the \$1 billion increase in expected costs by computing a new consolidated spread, equal to the current consolidated spread + (rebated reduction × 2), where the rebate reduction is the blended average fee change of \$0.00082, and multiplied this rebate reduction by 2 as market makers on both sides of the quote will adjust to reflect the rebate reduction. The commenter indicated that this estimation results in a 1.1% increase in average spreads to 28.1 bps. *Id.* at Addendum 4–5. For principal trades, the anticipated increase in costs as calculated by this commenter is the cost to cross the wider spread netted against lower access fees, while for agency trades, the costs equal the cost to cross the new wider spread. The commenter showed, "on net, an estimated cost of \$1.08bn to the industry, of which \$721MM would be incurred by agency flow." *Id.* at Addendum 5. See also STANY Letter, at 2.

⁸³⁷ The Commenter adjusts their estimate to account for agency verses principle flow using the following formulas. Agency cost = Change in Spread*1/2 * Market Notional Value * Agency Share; Principal Cost = [Change in Spread*1/2 * Market Notional Value * Principal Share]—[Fee Reduction * Market Volume * Principal Share * Maker/Taker Venue Share].

⁸³⁸ See IEX Letter II, at 6. "Given that institutional investor orders are typically far larger than [the quoted spread], and retail investor orders are generally executed off-exchange," the quoted spread is "particularly relevant" in "cases where a

⁸³² See Section III.A.

⁸³³ See TD Ameritrade Letter, at 3.

⁸³⁴ See *id.*

⁸³⁵ Choe Letter I, at 3.

suggested that the commenter's estimates of potential harm are overstated by as much as 90%.⁸³⁹

The Commission views the commenter's \$1 billion estimate as likely overstating the realistic costs associated with the Pilot should it result in increased spreads. One reason the estimate may be overstated is that, as some commenters have noted, and as discussed in section IV.C.2.b.iv.(1), the Pilot might have a diminished impact on penny constrained securities. In a supplemental analysis using TAQ data from the last quarter of 2017 and the first two quarters of 2018, the Commission estimates that between 50–70% of share trading volume occurs in stocks that are penny constrained.⁸⁴⁰ Consequently, to the extent that rebates play a diminished or no role in determining the spread of penny constrained stocks the commenter's estimates will significantly overstate the impact of increased spreads on transaction costs. Also, the commenter's estimate assumes that spreads will widen by twice the reduction in rebates, an assumption that some commenters question and that the Commission views as a likely upper limit to the impact of the Pilot on quoted spreads.⁸⁴¹ This assumption does not take into account that non-market makers may begin to provide liquidity more often during the Pilot in securities with lower or no rebates due to a potential decrease in intermediation by market makers, which may mitigate the impact of less intermediation by market makers as a

market participant is attempting to buy or sell, on an exchange, fewer shares than the total amount displayed at the [NBBO].[.]' *Id.* NYSE responded to this comment by noting that nearly all trading on exchange is for amounts smaller than the quoted depth, so the quoted spread is relevant. *See* NYSE Letter II, at 10.

⁸³⁹ *See, e.g.,* IEX Letter II, at 4; Healthy Markets Letter II, at 2 (arguing that the NYSE cost estimate to investors of \$1 billion has been "sufficiently debunked as purely fictional"); Decimus Letter, at 4 (arguing that the NYSE approach ignores potential indirect benefits to market participants of lower access fees (and possibly lower brokerage commissions), and that the Pilot would provide the information necessary to obtain meaningful analysis of changes to fees and rebates on order routing decisions and execution quality).

⁸⁴⁰ To determine if a stock is penny constrained, the Commission applied the simple filter: If the stock's trade weighted quoted spread was less than 1.1 cents, then the stock was considered penny constrained. This threshold yielded approximately 50% of trading volume occurring in stocks that are penny constrained. If the threshold is lifted to 2 cents (implying that at least some of the time the stock was penny constrained), then the fraction of trading volume in penny constrained stocks rises to 70%. Note that the sample period for the supplemental analysis is during the Tick Size Pilot. As such, these figures could underestimate the percentage of volume in penny constrained securities.

⁸⁴¹ *See* Section IV.2.b.iv.(1).

result of lower rebates.⁸⁴² Consequently, the Commission acknowledges that to the extent that the Pilot impacts spreads in a certain small number of test group stocks, this could engender costs to investors. However, as described above, the Commission believes that the estimate of \$1 billion per year is likely a significant overstatement of the actual costs that would be incurred in such a scenario.⁸⁴³

The commenter's \$4 billion estimate is based on the comparison between the spreads on a maker-taker exchange compared to the spreads on a taker-maker exchange described above in Section IV.C.2.b.iv(2), which the Commission views as even more imprecise than the \$1 billion estimate for the reasons laid out above. Beyond the concerns expressed in Section IV.C.2.b.iv(2), the Commission notes that the difference between the spreads of a maker-taker exchange and a taker-maker exchange would result from the difference between the fee paid to post an order and the rebate to post. As such, the implied impact of no rebates would be no more than ½ the spread difference. Thus, thus using the full spread difference overstates costs by a factor of 2. Further, to get the \$4 billion estimate, the commenter applied the spread differential to all NMS securities. Because Test Group 2 will be only about 12.5% of securities, applying the spread differential to all NMS securities overstates the cost by a factor of 8. In sum, using the commenter's approach, but correcting for these issues, would yield a cost 16 times smaller than the commenter's, or \$125 million.

v. Impact on Issuers

Several commenters expressed concerns that adverse effects to liquidity could induce long-term costs, such as higher costs of capital for issuers subject to certain Test Groups where the

⁸⁴² One assumption made by NYSE is that "a reduction in the average passive rebate. . . will result in both the bid and offer being backed off, on average, by the exact same amount as the rebate reduction." However, as another commenter argued this "assumes that only rebate driven liquidity providers set the quote" when "in reality the quote is almost always set by natural investors, who have a view of fair price, that is informed by both fundamental and quantitative research as well as the likely impact of their own short term trading intentions. *See* Mulson Letter, at 1. As discussed earlier in this section, the many potential effects of rebates on quoted spreads create significant uncertainty. *See* also Decimus Letter, at 4; Mulson Letter, at 1; IEX Letter II, at 4. NYSE responded to these comments by noting that even if their volume estimates are overstated by 20%, the cost is still significant and suggesting that investors would not provide liquidity because doing so would increase leakage costs. *See* NYSE Letter II, at 10–11.

⁸⁴³ *See* Mulson Letter I, at 1 and IEX Letter II, at 4.

incentives to provide liquidity are reduced, likely affecting small and mid-capitalization issuers most severely.⁸⁴⁴ One commenter believed that issuers would have higher costs of capital as a result of wider spreads, making any attempts to raise capital more expensive, particularly for issuers in certain Test Groups of the Pilot.⁸⁴⁵ Additionally, a number of commenters also expressed concern that wider spreads due to a reduction in rebates could also adversely affect issuers that engage in share repurchase programs.⁸⁴⁶

The Commission addresses these comments in the capital formation analysis in Section IV.D.3 and concludes that the Pilot is not expected to have a large impact on issuer cost of capital. While the Commission acknowledges the risk that the Pilot may impact liquidity for some securities, as explained above, the Commission believes that the impact of such an effect on the cost of capital for such securities would likely be minimal.⁸⁴⁷

With the exception of the impact on cost of capital, one commenter stated that the Pilot will require burdensome expenditures by public companies at the start and conclusion of the Pilot.⁸⁴⁸ The Commission recognizes that some national securities exchanges and broker-dealers are public companies that could incur the costs described in Sections IV.C.2.a and IV.C.2.b.ii at the start and conclusion of the Pilot. However, the commenter did not provide details on what expenditures other public companies will incur as a result of the Pilot. The Commission does not know what such expenditures would be or what they would entail; nevertheless, we do not believe that there will be any such expenditures.

vi. Costs to Broker-Dealers of Reverse Engineering Identities in the Order Routing Data

Some commenters expressed concern that proposed public dissemination of order routing information would enable competitors to gain proprietary information regarding trading strategies.⁸⁴⁹ The commenters suggested

⁸⁴⁴ *See* NYSE Letter I, at 3, 13–14; ASA Letter, at 3; *e.g.,* Level Brands Letter, at 1; Johnson Letter, at 1; P&G Letter, at 1; Sensient Letter, at 1; Apache Letter, at 2; Ethan Allen Letter, at 1–2.

⁸⁴⁵ *See* NYSE Letter I, at 3 and section IV.D.3 for further discussion of NYSE's cost of capital estimates.

⁸⁴⁶ *See, e.g.,* Apache Letter, at 2; ACCO Letter, at 1; NorthWestern Letter, at 2; Weingarten Letter, at 1.

⁸⁴⁷ *See* section IV.D.3

⁸⁴⁸ *See* Nasdaq Letter I at 10.

⁸⁴⁹ *See, e.g.,* FIA Letter, at 3; Virtu Letter, at 7–8; SIFMA Letter, at 6; FIF Letter, at 2; Citadel Letter,

Continued

that, for example, market participants could learn the identities of individual broker-dealers by sending a specific broker-dealer an order for a relatively thinly-traded security and then study the order routing reports to identify which broker-dealers transacted that security on a given day. The concern is that if market participants can identify the primary venues that certain broker-dealers tend to rout to, then they may be able to use this information along with live market data to identify specific trading algorithms of individual broker-dealers. This could increase transaction costs for broker-dealers if the market participants are able to use this data to identify when a certain algorithm is being used to execute a trade in live time and then to opportunistically trade around the algorithm to profit from any price impact created by the trades.

As described above, the Commission has modified its proposal in response to these comments. Consequently, the Commission is not adopting the requirement that exchanges publicly post the order routing datasets and instead the Commission will receive the order routing data. This change significantly reduces the risks identified by the commenters about reverse engineering, and the Commission is sensitive to the need to protect the data from unauthorized disclosure.

D. Impact on Efficiency, Competition, and Capital Formation

The Commission has considered the effects of the Pilot on efficiency, competition, and capital formation.⁸⁵⁰ As discussed in further detail below, the Commission believes that many of the direct effects of this rule on efficiency, competition, and capital formation would likely be temporary in nature and affect markets only for the duration of the Pilot. The Commission believes that the information obtained as a result of the Pilot could improve regulatory efficiency, because analyses of this data are likely to provide a more representative view of the effect of transaction-based fees on order routing decisions than would be available to the Commission in the absence of the Pilot. Further, the Pilot may have a number of temporary effects on price efficiency, the competitive dynamics between

at 4; Citi Letter, at 6; TD Ameritrade Letter, at 5; STANY Letter, at 5; IEX Letter I, at 10; Credit Suisse Commentary, at 6; Morgan Stanley Letter, at 4.

⁸⁵⁰ Exchange Act Section 3(f) requires the Commission when engaging in rulemaking to consider or determine whether an action is necessary or appropriate in the public interest, and to consider, in addition to the protection of investors, whether the action will promote efficiency, competition, and capital formation. See 15 U.S.C. 78c(f).

exchanges, exchanges and off-exchange trading venues, broker-dealers, and issuers, including ETPs. Although the Pilot may temporarily affect liquidity,⁸⁵¹ the Commission does not believe that this will result in the Pilot having a significant effect on capital formation. One commenter believed that the Commission did not sufficiently address the impacts of the Pilot on efficiency, competition, and capital formation in the proposing release.⁸⁵² Several other commenters stated that the Commission inadequately provided justification for the assertions in the proposing release that the effects on efficiency, competition, and capital formation would be temporary in nature and “would affect markets only for the duration of the [proposed] Pilot.”⁸⁵³ The Commission addresses below commenters’ concerns about issues stemming from efficiency, competition, and capital formation.

1. Efficiency

This section discusses the potential impact the Pilot could have on efficiency. The Commission believes that information learned from the Pilot could potentially improve future regulatory efficiency. Additionally, the Commission believes that the Pilot could have a number of temporary impacts on efficiency, including: The efficiency of capital allocation, price efficiency and price discovery, and the efficiency of fees and rebates.

As discussed in detail above,⁸⁵⁴ the Commission believes that there is significant uncertainty regarding the effect, if any, that the Pilot will have on liquidity and trading volume on exchanges. Therefore, the Commission is unable to determine *ex ante* the overall effects the Pilot will have on the efficiency of capital allocation, price efficiency, or the efficiency of fees and rebates.⁸⁵⁵ However, the Commission believes that the Pilot will provide

⁸⁵¹ See *supra* Section IV.C.2.b.iv.

⁸⁵² See Nasdaq Letter I, at 3, 8. This commenter expressed concern that the Proposal did not consider the effects on issuers and ETPs. See *id.*, at 8. This commenter also stated that “the Proposal is a blunt tool lacking nuance that will negatively affect efficiency, competition, and capital formation—none of which have been adequately addressed by the Commission.” See *id.*

⁸⁵³ See NYSE Letter I, at 15–16. See also, e.g., Level Brands Letter, at 1; Johnson Letter, at 1; Knight-Swift Letter, at 1.

⁸⁵⁴ See *supra* Sections IV.C.2.b.i and IV.C.2.b.iv.

⁸⁵⁵ One commenter stated that it did not “expect that a reduction or outright removal of rebates will have any significant or harmful effects on the quality of prices displayed in the public lit market, interfere with genuine liquidity and price formation, or negatively impact [its] stock’s trading volume, spread or displayed size.” See T. Rowe Price Letter, at 5.

useful data that will better inform future policy recommendations of the effects of fees and rebates on price efficiency.⁸⁵⁶

The Pilot will provide the Commission with an opportunity to empirically examine the effects of an exogenous shock to transaction fees and rebates on order routing behavior, execution quality and market quality. Insofar as the data produced by the Pilot permits the Commission and the public to evaluate and comment upon the potential impacts of alternative policy options, the rule may promote regulatory efficiency.⁸⁵⁷ In the absence of the Pilot, the Commission would have to rely on currently available data to inform future policy decisions related to transaction-based fees and rebates and data limitations may impair the efficiency of policy decisions based on this information.⁸⁵⁸

The temporary efficiency impacts the Commission expects during the Pilot depend on how the Pilot fee and rebate restrictions for the two Test Groups balance the interests of different groups of market participants. For example, if during the Pilot, the lower fee cap and no-rebate restriction induced by the Pilot cause broker-dealers to be more likely to route customer orders to trading centers with better pricing, higher speed of execution, or higher probability of execution, rather than to trading centers with the largest rebates,⁸⁵⁹ the Pilot may temporarily improve the efficiency of capital allocation by lowering execution costs.⁸⁶⁰ Alternatively, the efficiency of capital allocation could be reduced if, as a response to the loss in revenue from rebates, broker-dealers increase commissions or fees charged to customers.⁸⁶¹ Higher commissions or fees could reduce customers’ willingness to trade or could lead to a lower injection of capital into the markets by investors because a larger fraction of each investable dollar would go to compensate broker-dealers for the lost revenue. However, because rebates are generally accompanied by higher transaction fees, the overall costs to broker-dealers to route orders to exchanges could decline for some Test Groups, which could lead to a decrease in commissions or fees and temporarily

⁸⁵⁶ See *supra* Section IV.C.1.a.ii.

⁸⁵⁷ See *supra* Section IV.C.1.a.i for a discussion of the potential benefits from studying the Pilot data and *supra* Section IV.C.1.a.iii for a discussion of the potential limitations of studying the Pilot data.

⁸⁵⁸ See *supra* Section IV.B.1.b.

⁸⁵⁹ See *supra* Section IV.C.1.b.

⁸⁶⁰ See *supra* Section IV.C.2.b.iv.

⁸⁶¹ See *supra* Section IV.C.2.b.iii.

increase the efficiency of capital allocation.

For the duration of the Pilot, lower transaction fees could improve the liquidity of stocks and ETPs in some Test Groups by reducing the costs to execute marketable orders.⁸⁶² As marketable orders become less costly, these orders are likely to be routed to exchanges with lower transaction fees, improving execution quality and possibly creating a liquidity externality,⁸⁶³ whereby lower transaction fee venues will become the preferred trading center for marketable and non-marketable orders.⁸⁶⁴ An increase in liquidity could improve informational efficiency by allowing securities prices to adjust more quickly to changes in fundamentals.

As a result of the Pilot, price efficiency might also improve; quoted spreads also may more closely reflect the net cost of trading and could temporarily increase price transparency for securities in certain test groups.⁸⁶⁵ Currently, most broker-dealers do not relay information about amounts of fees paid or rebates received on trades to their customers, thereby limiting the transparency of the total costs incurred to execute a trade. The Pilot would not mandate disclosure by the exchanges or the broker-dealers of order-level transaction-based fees and, therefore, will not resolve the limitations to transparency of the total fees paid and rebates received by broker-dealers for particular orders. As fees decline or rebates are removed in some Test Groups, however, the deviation in the net cost of trading from the quoted spread could shrink, thereby at least partially improving price transparency for the duration of the Pilot, and temporarily improving pricing efficiency and price discovery.⁸⁶⁶ Therefore, as an additional benefit of the Pilot, the Pilot will allow an examination of the temporary effect of revisions to transaction fees and rebates on quoted spreads, to better inform

future policy recommendations of the effects of exchange transaction-based fees and rebates on price efficiency.⁸⁶⁷

On the other hand, if the reduction in rebates and Linked Pricing harms liquidity,⁸⁶⁸ or causes more informed order flow to be routed to off-exchange trading venues,⁸⁶⁹ then the Pilot may temporarily impair price efficiency and the price discovery process.⁸⁷⁰ A reduction in rebates could cause informed traders to route more of their non-marketable orders to off-exchange trading venues, which could reduce price discovery, because these orders would no longer be included in displayed quotes or limit order book depth. If liquidity temporarily worsens, then it may lead to a temporary widening of the NBBO, which could lead to a decline in the overall informational efficiency of prices. If liquidity worsens, it could also cause informed traders to route more of their marketable orders off-exchange, which could harm price discovery by reducing the ability of market participants to discern the direction of their order flow. However, if spreads widen or queues shorten, it could attract informed non-marketable orders onto exchanges, which could improve price discovery, because exchange quotes would be more informative. Because the Commission cannot *ex ante* predict the effects of the Pilot on liquidity and competition between exchanges and off-exchange trading venues for order flow,⁸⁷¹ the Commission is unable to determine the overall effects of the Pilot on price efficiency and the price discovery process.

Changes in liquidity could also impact the price efficiency of ETPs. A change in liquidity for either the ETP itself or the underlying securities could impact the create-redeem process for ETPs. This process is an important element in ETP price efficiency and helps to keep the price of the ETP in line with the value of its underlying securities. If there is a mispricing, authorized participants can trade on the mispricing by either purchasing the

underlying shares to create a share of the ETP, or by redeeming a share of the ETP and selling the assets underlying the ETP. These actions affect the existing supply of ETP shares and help to eliminate mispricing. Consequently, if the Pilot impacts liquidity in either the underlying assets, or the ETP itself, it will impact the cost to authorized participants of eliminating mispricing by participating in the create-redeem process. Since the Commission does not *ex ante* know how the Pilot will impact liquidity,⁸⁷² it cannot quantify the effects of the Pilot on ETP price efficiency. If the Pilot results in improved liquidity for the stocks in the various Test Groups, or for the ETP itself, then its impact on the create-redeem process may be positive and ETP price efficiency may increase as its value may more closely track the value of their underlying assets through a lower cost create-redeem process. The opposite is true if the Pilot negatively affects liquidity in either the ETPs or the underlying securities.

Finally, the Commission acknowledges that the fee caps and prohibition on rebates or Linked Pricing imposed on the Test Groups during the Pilot further constrain the exchanges' abilities to strategically choose fee and rebate schedules and for some NMS stocks may restrict the fees and rebates further beyond the current levels, which could be less efficient from the exchanges' perspective. The rule could temporarily result in more or less efficient fee and rebate schedules because the exchanges might not be able to optimize their pricing structure for some Test Groups of securities.⁸⁷³ While the Commission does not currently have information to determine the current level of efficiency of fees and rebates, the information that the Commission and the public receive from the Pilot could enable the analysis of market impacts stemming from changes to fees, potentially permitting the Commission to assess alternative requirements for transaction-based fees and rebates that may be more efficient.

Several commenters asserted that fee and rebate restrictions proposed by the Commission would be government imposed price-controls that would increase inefficiencies and harm consumers.⁸⁷⁴ One of these commenters elaborated that "Government-imposed price controls are well understood to have a negative impact on competition and innovation" and that "they are only

⁸⁶² See *supra* Section IV.C.1.b.

⁸⁶³ As discussed in detail above, improvements in execution quality could present as better prices for execution, higher probability of execution, and faster time to execution. See *supra* Section IV.C.2.b.iv.

⁸⁶⁴ See *infra* Section IV.D.2.b.

⁸⁶⁵ See *supra* Section IV.C.1.b.

⁸⁶⁶ Some commenters argued that transaction fees and rebates harm price transparency because the prices displayed by exchanges do not include fee or rebate information and therefore do not fully reflect net trade prices. See ICI Letter I, at 2; Goldman Sachs Letter, at 3; Invesco Letter, at 2; State Street Letter, at 2; Wellington Letter, at 1; Oppenheimer Letter, at 2; Capital Group Letter, at 3; Citi Letter, at 2. A number of academic studies also made this argument. See, e.g., Angel, Harris, & Spatt, *supra* note 530, and Harris, *id.*

⁸⁶⁷ See *supra* Section IV.C.1.a.ii.

⁸⁶⁸ See *supra* Section IV.C.2.b.iv.

⁸⁶⁹ See *infra* Section IV.D.2.a.

⁸⁷⁰ Some commenters argued that rebates improved price discovery by promoting displayed liquidity on exchanges and narrowing the NBBO. See, e.g., State Street Letter, at 2; Virtu Letter, at 3; Magma Letter, at 3; Schwab Letter, at 1; Fidelity Letter, at 3; Cboe Letter I, at 15–16. One commenter argues that the removal of rebates could harm price discovery by causing more market participants to route their orders to off-exchange venues, instead of lit exchanges, where they would be included in the price discovery process. See Nasdaq Letter I, at 2, 4.

⁸⁷¹ See *supra* Section IV.C.2.b.iv and *infra* Section IV.D.2.a.

⁸⁷² See *supra* Section IV.C.2.b.iv.

⁸⁷³ See *supra* Section IV.C.2.b.i.

⁸⁷⁴ See Nasdaq Letter I, at 2, 5; Cboe Letter I, at 7.

indicated where they overcome severe market imperfection such as monopoly ownership of a critical resource.”⁸⁷⁵ As discussed in detail above,⁸⁷⁶ the Commission believes that the current fee and rebate system may have resulted in a number of market failures, including rebates incentivizing brokers to route orders to trading venues that pay the highest rebates, instead of the venues that offer better execution. However, the Commission currently lacks the data to estimate the extent of any existing market failures.⁸⁷⁷ While the Commission acknowledges that the Pilot’s restrictions on rebates and fees could potentially harm efficiency, if these market failures currently do exist, then the fee and rebate restrictions in Test Group stocks could temporarily improve efficiency for the duration of the Pilot. Additionally, the information the Commission learns from the Pilot could be used by the Commission in future rulemakings to inform future policy decisions.⁸⁷⁸

2. Competition

This section discusses the potential effects of the Pilot on competition. The Commission believes that the Pilot could have a temporary effect on the competitive dynamics between exchanges, exchanges and off-exchange trading venues, broker-dealers, and issuers, particularly ETPs. Additionally, as discussed in detail below,⁸⁷⁹ the Pilot could potentially have competitive effects for smaller exchanges that last beyond the Pilot. This could occur if the Pilot attenuates the potentially distortive impact of transaction-based fees and rebates and causes broker-dealers to route orders to trading centers they perceive as more liquid. This could have a lasting effect on the order flow and revenue of smaller exchanges if it produces a liquidity externality that persists beyond the Pilot.⁸⁸⁰ However, the Commission believes that this is unlikely to occur, because the Pilot would be for a limited duration and the effects are unlikely to be significant enough to cause this result.⁸⁸¹

Because the Commission is unable to determine *ex ante* the Pilot’s effects on liquidity,⁸⁸² the Commission is unable

to quantify many of the effects of the Pilot on competition. In the sections below the Commission offers a qualitative discussion of the effects of the Pilot on competitive.

a. Competition Between Exchanges and Off-Exchange Trading Venues

This section discusses the potential effects of the Pilot on competition between exchanges and off-exchange trading venues, including ATSS, which, as discussed in the baseline,⁸⁸³ execute approximately 14% of trading volume. Although the Pilot could temporarily affect the competition for order flow between exchanges and off-exchange trading venues, the Commission believes that the overall effects of the Pilot on this competition are unclear, because, as discussed in detail below, there are reasons why the Pilot may temporarily increase as well as decrease the order flow routed to off-exchange trading venues.

A number of commenters argued that restricting exchange rebates and fees for stocks in the test Groups without placing similar restrictions on off-exchange venues could place exchanges at a competitive disadvantage.⁸⁸⁴ Although the Commission acknowledges that the Pilot may potentially place exchanges at a competitive disadvantage relative to off-exchange trading venues, the Commission believes that the overall effects of the Pilot on this competition would depend on how on-exchange liquidity is affected by the Pilot as well as the renegotiation costs that off-exchange trading venues would incur in order to take advantage of the restrictions on exchange fees and rebates. For example, as discussed in detail above,⁸⁸⁵ ATSS sometimes negotiate bespoke agreements with individual subscribers for a bundle of services. If the costs of renegotiating these agreements are high, then off-exchange trading venues may not be able to adjust their pricing models to take advantage of the exchange pricing restrictions, in which case competition between exchanges and off-exchange venues could be unaffected.⁸⁸⁶

⁸⁸³ See *supra* Section IV.B.2.a.

⁸⁸⁴ Commenters expressed concern that the Pilot would inhibit exchanges’ ability to compete with off-exchange trading centers, in part due to a reduced ability to innovate on changes to fees and rebates. See, e.g., Cboe Letter I, at 7, 16–17; Nasdaq Letter I, at 6; NYSE Letter I, at 1–2, 4–5; Magma Letter, at 2; FIA Letter, at 3–4; ASA Letter, at 3; P&G Letter, at 1; ACCO Letter, at 1; Johnson Letter, at 1.

⁸⁸⁵ See *supra* note 47 and accompanying text.

⁸⁸⁶ It might be difficult for an ATS to renegotiate these agreements with all of their clients in order to take advantage of the exchange price restrictions

Additionally, as discussed below, if off-exchange renegotiation costs are high, some of the restrictions on transaction fees could give certain exchanges a competitive advantage relative to off-exchange venues in attracting certain types of order flow. However, if off-exchange renegotiation costs are small or the Pilot fee and rebate restrictions place certain exchanges at a disadvantage relative to the current pricing policies of some off-exchange trading venues, then the Pilot could affect competition between exchanges and off-exchange trading venues.

Although the Commission acknowledges that the distribution of trading volume could change between exchanges and off-exchange trading venues, the Commission believes these changes are difficult to determine in advance and cannot predict *ex ante* whether these changes would increase or decrease exchange market share.⁸⁸⁷ As discussed above,⁸⁸⁸ the Commission lacks data on the current pricing schedules offered by off-exchange venues as well as information on how this affects the routing decisions of broker-dealers. The Commission also lacks information on how difficult it is for off-exchange trading venues to adjust their pricing schedules. Additionally, as discussed above,⁸⁸⁹ the Pilot’s effects on liquidity could be either positive or negative and vary across securities. Therefore, the Commission is unable to quantify or determine the overall effects that the Pilot will have on competition between exchanges and off-exchange trading venues. However, if competitive rebalancing among trading centers occurs as a result of the Pilot, it could provide information to the Commission about order routing decisions and execution quality to inform future policy actions.

Commenter statements regarding the effects of the Pilot on competition between exchanges and off-exchange trading venues indicated that the Pilot could have different effects on the competition for marketable and non-marketable order flow. In considering the comments, and as analyzed in the following sections, the Commission considered the differential impact

on a subset of securities (*i.e.*, stocks in the Test Groups).

⁸⁸⁷ One commenter agreed and stated the Pilot could cause a shift in the balance of activity between exchanges and off-exchange trading centers, but that the direction of such a shift cannot be presupposed. See Decimus Letter, at 5. This commenter also noted that transaction-based fees are one of the drivers behind the current shift by market participants to off-exchange trading centers. *Id.* at 5–6.

⁸⁸⁸ See *supra* Section IV.B.1.b.vii.

⁸⁸⁹ See *supra* Section IV.C.2.b.iv.

⁸⁷⁵ See Nasdaq Letter I, at 11–12.

⁸⁷⁶ See *supra* Section IV.A.

⁸⁷⁷ See *supra* Section IV.B.1. and Section IV.C.1.a.iii.

⁸⁷⁸ See *supra* Section IV.C.1.a.

⁸⁷⁹ See *infra* Section IV.D.2.b (Competition Between Exchanges).

⁸⁸⁰ See Proposing Release, *supra* note 2, at 13042, for a discussion of a liquidity externality.

⁸⁸¹ See *infra* Section IV.D.2.b (Competition Between Exchanges).

⁸⁸² See *supra* Section IV.C.2.b.iv.

changes in exchange fees and rebates could have on the competition between exchanges and off-exchange trading venues for marketable and non-marketable order flow. As the discussion above indicates, and as commenters point out, it is not clear how the Pilot will affect the competition for both marketable and non-marketable order flow.⁸⁹⁰ Additionally, since the impacts of the Pilot on liquidity may not be uniform across all securities,⁸⁹¹ the effects of the Pilot on competition for marketable and non-marketable order flow may not be uniform across all securities. Therefore, as discussed above, the Commission is unable to quantitatively estimate how the Pilot could affect competition between exchanges and off-exchange trading venues to attract different types of order flow. In the sections below the Commission offers a qualitative discussion regarding how various effects of the Pilot could affect this competition.

i. Marketable Order Flow

The Pilot could increase or decrease the share of marketable order flow routed to off-exchange trading venues. This is reflected in the divergent views of commenters, who argue over the effects that reduced access fees and rebates could have on the share of marketable order flow routed to off-exchange trading venues. In considering these comments, the Commission considered a number of ways the Pilot could potentially impact competition for marketable order flow, including: The impact of changes in liquidity, the direct impact of changes in access fees and rebates, the impact of changes in off-exchange fill rates, and the impact of the Order Protection Rule.

Changes in liquidity caused by the Pilot could affect how much marketable order flow is directed to off-exchange trading venues. However, because the overall effects of the Pilot on liquidity could be positive or negative and vary across securities,⁸⁹² the overall effects of changes in liquidity on the direction of marketable order flow are also unclear. Therefore, the Commission is unable to predict the overall effect that changes in liquidity caused by the Pilot will have on the competition for marketable order flow between exchanges and off-exchange trading venues.

A number of commenters argued that if the Pilot temporarily decreases liquidity in the test Groups due to the

elimination or reduction of rebates,⁸⁹³ more order flow will likely be directed to off-exchange trading venues.⁸⁹⁴ As the Commission previously discussed,⁸⁹⁵ the competition between on and off exchange venues for order flow is characterized as providing a tradeoff between immediacy and execution quality. Off exchange venues tend to get better trade execution on average than lit exchanges, largely because they trade between the prevailing NBBO, but at the cost of not being able to guarantee that a transaction will occur. Thus, the impact of the Pilot on the competition between exchanges and off exchange venues for marketable order flow will depend on how the Pilot impacts execution quality and the cost of immediacy on exchanges compared to the potential for price improvement and the chance of filling an order at an off-exchange venue.

If a reduction in rebates causes quoted spreads to widen,⁸⁹⁶ it could increase the attractiveness of off-exchange price improvement and would likely cause more institutional or proprietary marketable order flow to be directed to off-exchange ATSs. Additionally, if spreads widen, broker-dealers would likely be incentivized to internalize more marketable institutional order flow. If spreads do not widen, a decrease in quoted depth could also result in more marketable orders being routed off-exchange. If quoted depth decreases,⁸⁹⁷ and if market participants believe that off-exchange venues offer improved execution, it could cause more large marketable orders to get routed to ATSs or be internalized, in order to avoid the increased costs of walking up the book. Alternatively, if liquidity improves, it could reduce the cost of immediacy and the benefits of off-exchange price improvement, which could result in more marketable order flow being routed to exchanges.

Changes in exchange access fees and rebates for stocks in the test groups could also directly affect whether some types of marketable order flow are routed to exchanges or off-exchange trading venues. However, as discussed in detail above,⁸⁹⁸ the Commission currently faces limitations in

determining the effects that exchange transaction fees and rebates have on order routing decisions. The Commission is unable to quantify how changes in exchange transaction fees and rebates for stocks in the test groups will affect the routing decisions for marketable order flow between exchanges and off-exchange trading venues. Therefore, the Commission is unable to determine in advance what effect changes in exchange transaction fees and rebates caused by the Pilot will have on the competition for marketable order flow. One of the goals of the Pilot is to provide the Commission with data so that it can better evaluate these effects.

If renegotiation costs are too high for off-exchange trading venues to adjust their pricing schedules, lower transaction fees on maker-taker exchanges could cause some marketable order flow that would be routed to ATSs and other off-exchange trading centers to instead be routed to these exchanges. For example, if the equilibrium transaction fee in Test Group 2 is below \$0.0030 in the absence of rebates, exchanges may be able to draw order flow away from off-exchange trading centers.

Several commenters agreed that lower access fees could induce some market participants to bring order flow back to exchanges.⁸⁹⁹ One of these commenters stated that “the potential that substantially lower take fees in test group securities will counter any potential loss of rebate-driven volume.”⁹⁰⁰ One commenter disagreed and noted that lowering fees would not attract marketable order flow to exchanges.⁹⁰¹ This commenter noted

⁸⁹⁹ See, e.g., IEX Letter II, at 7, 8–9; TD Ameritrade Letter, at 7; Citi Letter, at 4; Decimus Letter, at 5–6.

⁹⁰⁰ See IEX Letter II, at 8.

⁹⁰¹ See NYSE Letter II, at 12; NYSE Letter I, at 16. This commenter argued that market participants choose to send orders to off-exchange venues for reasons other than avoiding fees, such that simply lowering fees would not attract marketable order flow to exchanges. See NYSE Letter I, at 16. Another commenter noted that the Commission’s assertion that any potential degradation of the effective bid-ask spread due to lower or reduced rebates could be mitigated by lower access fees was “not supported by empirical data or substantive analysis.” See Nasdaq Letter I, at 8–9. In response to these comments, the Commission notes that its belief is support by some theoretical studies that show that it is the net fees, *i.e.*, the rebates plus fees, that affect trading costs. See e.g. Colliard, J.E. & Foucault, T. (2012). “Trading fees and efficiency in limit order markets.” *Review of Financial Studies*, Vol. 25 (11), 3389–3421 (available at: <https://academic.oup.com/rfs/article/25/11/3389/1566107>). Some empirical studies produce similar results. See, e.g. Malinova, K. & Park, A. (2015). “Subsidizing Liquidity: The Impact of Make/Take Fees on Market Quality.” *Journal of Finance*, Vol

⁸⁹³ See *id.*

⁸⁹⁴ See, e.g., Magma Letter, at 2; Home Depot Letter, at 1.

⁸⁹⁵ See Securities Exchange Act Release No. 76474 (Nov. 18, 2015), 80 FR 80998 (Dec. 28, 2015), 81116–81117. See also Securities Exchange Act Release Nos. 83663 (July 18, 2018), 83 FR 38768 (August 7, 2018), 38891–38892.

⁸⁹⁶ See *supra* Section IV.C.2.b.iv.2.

⁸⁹⁷ See *id.*

⁸⁹⁸ See *supra* Section IV.B.1.a and Section IV.B.1.b.

⁸⁹⁰ See Decimus Letter, at 5–6.

⁸⁹¹ See *supra* Section IV.C.2.b.iv.

⁸⁹² See *supra* Section IV.C.2.b.iv.

that if high access fees drove market participants to route orders to off-exchange trading centers, then lower cost venues, such as NYSE American or EDGA would have larger market share.⁹⁰² Another commenter disagreed and argued that “the cost of accessing lit markets in the form of access fees on securities exchanges has been one of the key drivers behind the continuing proliferation of non-exchange trading venues.”⁹⁰³ Given the disagreement among commenters, the Commission believes it is possible that lower transaction fees could potentially result in more marketable order flow being routed to exchanges. However, as discussed above, the Commission faces limitations in quantifying the effects that lower exchange transaction fees will have on marketable order flow and is unable to determine how likely this is to occur. One of the goals of the Pilot is to provide the Commission with data so that it can better evaluate these effects.

To the extent that conflicts of interest affect order routing,⁹⁰⁴ lower rebates on taker-maker venues could potentially increase the off-exchange share of trading volume by causing broker-dealers to increase the internalization of smaller marketable orders, even if on-exchange liquidity or execution quality does not change.

Changes in the fill rates of orders at off-exchange trading venues could also affect how much marketable order flow is directed to off-exchange trading venues. However, there are reasons the

Pilot could increase or decrease the fill rates of orders at off-exchange trading venues. Therefore, the effect these changes will have on the competition for marketable order flow is uncertain.

As discussed below,⁹⁰⁵ there are reasons the Pilot could cause an increase or decrease in the non-marketable order flow routed to off-exchange trading venues. If there is an increase in the non-marketable order flow routed to off-exchange trading venues, then the fill rates of marketable orders routed to off-exchange trading venues would increase, which could cause more marketable order flow to be directed to off-exchange trading venues. Alternatively, a decrease in the non-marketable order flow routed to off-exchange trading venues would cause a decrease in the fill rate for marketable orders, which would cause less marketable order flow to be directed to off-exchange trading venues.

One factor that could reduce the chance of marketable orders being routed away from exchanges is that exchanges have a protected quote. One commenter believed that any off-exchange shifts are likely to be limited because these trading centers do not have a protected quote, and any shifts that would occur would still need to be consistent with best execution and not just redistribution to account for market participants’ cost considerations.⁹⁰⁶ However, given that 34% of all transaction volume occurs off-exchange at trading venues without a protected quote, it is unclear how much effect a protected quote will have on this competition.⁹⁰⁷

The Commission does not expect the Pilot will have a significant effect on the competition for retail marketable orders. Normally, these orders are internalized by off-exchange wholesale broker-dealers who pay retail broker-dealers for the order flow.⁹⁰⁸ Since the Pilot does not restrict these rebates, the Commission does not expect the Pilot to affect the routing of marketable retail order flow.

ii. Nonmarketable Order Flow

The Pilot could increase or decrease the share of non-marketable order flow routed to off-exchange trading venues. This is reflected in the divergent views

of commenters, who argue over the effects that reduced rebates could have on the share of non-marketable order flow routed to off-exchange trading venues. In considering these comments, and as discussed below, the Commission considered factors that could affect the decision to supply liquidity on exchanges or at off-exchange trading venues. Furthermore, in considering comments, the Commission also considered a number of ways the Pilot could potentially impact competition for non-marketable order flow, including: The impact of changes in rebates, the impact of changes in liquidity, and the impact of changes in off-exchange fill rates.

The decision to submit a non-marketable order on-exchange or route it to an off-exchange trading venue is a trade-off between the profits earned from providing liquidity on-exchange compared to the expected execution price and probability of having the order filled off-exchange. Higher exchange rebates, wider spreads, higher on-exchange fill rates (shorter on-exchange queue lengths), and lower off-exchange fill rates would all increase the chance of a trader deciding to provide liquidity on-exchange compared to routing an order to an off-exchange venue.⁹⁰⁹ The impact of the Pilot on the competition between exchanges and off-exchange venues for non-marketable order flow will depend on how the Pilot affects these dimensions.

The Commission believes that the overall effect on the competition between exchanges and off-exchange venues for non-marketable order flow from a reduction in rebates for stocks in the test groups is unclear, because a reduction in rebates could result in either an increase or decrease in liquidity.⁹¹⁰ In theory, a reduction in exchange rebates without any changes in liquidity or fill rates would likely cause more non-marketable order flow to be routed to off-exchange trading venues. However, the Commission believes that this event is unlikely, because a reduction in exchange rebates and transaction fees could also affect liquidity. Since a reduction in exchange rebates and transaction fees could cause liquidity to increase or decrease,⁹¹¹ it could also cause the share of non-marketable order flow routed to off-exchange trading venues to increase or decrease.

Several commenters voiced concerns that reduced rebates could cause liquidity to migrate from exchanges to

70(5), 509–36 (available at: <https://onlinelibrary.wiley.com/doi/10.1111/jofi.12230>). According to this literature, the effects of a reduction in rebates could potentially be offset by lower transaction fees. The Commission also notes that some commenters acknowledged this could be a potential effect of lower access fees. See *supra* note 23. However, other academic literature shows that in the presence of a fixed tick size, changes in fees and rebates can still affect trading volume, even in the absence of a change in the total fee. See e.g. Foucault, T., Kadan, O., & Kandel, E. (2013). “Liquidity Cycles and Make/Take Fees in Electronic Markets.” *Journal of Finance*, Vol. 68(1), 299–341 (available at: <https://onlinelibrary.wiley.com/doi/10.1111/j.1540-6261.2012.01801.x>). According to this literature, a reduction in transaction fees may not fully offset the effects of an equal reduction in rebates. Given the mixed results from the academic literature and the disagreement among commenters, the Commission believes it is possible that lower transaction fees could potentially reduce some of the effects of an increase in effective bid-ask spreads caused by a reduction rebates, although the magnitude of this reduction is uncertain. The Commission believes that the Pilot would generate data and analysis that would help the Commission better understand the cumulative effects of changes in transactions fees and rebates on spreads and trading costs. See *supra* Section IV.C.1.a.i.

⁹⁰² See NYSE Letter II, at 12.

⁹⁰³ See Decimus Letter, at 5–6.

⁹⁰⁴ See *supra* Section IV.A.1 (Market Failure at the Broker-Dealer Level).

⁹⁰⁵ See *infra* Section IV.D.2.a.ii (Nonmarketable Order Flow).

⁹⁰⁶ See Healthy Markets Letter, at 10. Another commenter also emphasized that exchanges have the advantage of a protected quote and that they have an advantage in receiving orders that require immediate execution. See IEX Letter II, at 8.

⁹⁰⁷ See *supra* Section IV.B.2.a.

⁹⁰⁸ See Battalio Equity Market Study, *supra* note 330.

⁹⁰⁹ See *supra* Section IV.B.2.b.

⁹¹⁰ See *supra* Section IV.C.2.b.iv.

⁹¹¹ See *id.*

non-exchange trading centers, because exchanges will be restricted from providing rebates as incentives for liquidity provision, whereas non-exchange trading centers could freely offer rebates and other incentives to draw orders away from exchanges.⁹¹² In contrast, several commenters disagreed and noted that ATs generally do not pay rebates and tend to charge lower fees than the large exchanges,⁹¹³ and that such a pricing model would make it challenging for ATs to start providing rebates sufficiently large enough to draw volume from exchanges. If rebates incentivize liquidity provision by providing extra revenue to liquidity providers, a reduction in rebates for stocks in the Test Groups could incentivize them to divert some of their non-marketable liquidity providing orders from maker-taker exchanges to off-exchange trading venues.⁹¹⁴ However, this decision could also be affected by how the rebate reductions impacted other dimensions of liquidity, so the overall effect is difficult to determine.

As discussed above, changes in liquidity could also affect the decision regarding where to route non-marketable limit orders. Since the effects of the Pilot on liquidity could be either positive or negative, The Commission is uncertain how these changes will affect the competition for non-marketable order flow between exchanges and off-exchange trading venues. If on-exchange liquidity worsens and bid-ask spreads widen or

quoted depth decreases,⁹¹⁵ then institutional traders could direct more of their non-marketable orders to supply liquidity on maker-taker exchanges, either because realized spreads increased or because the queue position and fill rates of their on-exchange nonmarketable orders increased.⁹¹⁶ Alternatively, if liquidity improves and either bid-ask spreads tighten or quoted depth increases,⁹¹⁷ institutional traders could direct more their non-marketable orders to off-exchanges venues, because the profits earned from providing liquidity decreased.

Change in the rate that orders are filled off-exchange could also cause changes in the routing of non-marketable orders between exchanges and off-exchange trading venues. However, as discussed below, the effect of the Pilot on the fill rate of off-exchange non-marketable orders is unclear. Therefore it is difficult to determine the Pilot's effect on the routing of non-marketable orders. Changes in the rates at which non-marketable orders are filled off-exchange depend on how the routing of marketable order flow to off-exchange trading venues changes. If a reduction in fees causes more marketable orders to be routed to exchanges⁹¹⁸ it could reduce the fill rate of off-exchange orders, which could cause institutions or proprietary traders to substitute some of their off-exchange orders with non-marketable orders to supply liquidity on maker-taker exchanges. Alternatively, if the Pilot causes more marketable orders to be routed to off-exchange trading venues,⁹¹⁹ it could increase off-exchange fill rates, which could cause more orders that would have supplied liquidity on exchange to be routed to off-exchange venues. However, as discussed above, the Commission is unclear whether the share of marketable order flow routed to off-exchange trading venues will increase or decrease.

The Commission does not expect the Pilot will have a significant effect on the competition between exchanges and off-exchange trading venues for retail non-marketable orders. Often, these orders are routed by retail broker-dealers to maker-taker exchanges or to wholesale broker-dealers who pay retail broker-dealers for the order flow. The Commission believes that, despite the reduction in rebates, these orders will

still be routed to exchanges or to wholesale broker-dealers who pay them for their order flow.⁹²⁰

b. Competition Between Exchanges

This section discusses the potential effects of the Pilot on competition between exchanges that use transaction-based fee and rebate pricing models. Although the Pilot could temporarily affect the competition for order flow between exchanges, the Commission believes that many of the effects of the Pilot on this competition, including the expected redistribution of market share among the existing exchanges, are unclear and difficult to determine in advance. This is reflected in the divergent views of commenters, who disagree about the effects that reduced rebates and transaction fees could have on competition between different types of exchanges.

Exchanges that pay fees and remit rebates frequently revise their fee schedules in order to remain competitive and to attract order flow. The impact of the rule on competition depends on the extent to which the fee cap and prohibition on rebates or Linked Pricing restrict exchanges' transaction-based fee strategies. As discussed in detail above,⁹²¹ the Commission believes that the Pilot, while changing either transaction fees or rebates on certain subsets of securities, could leave the margins that exchanges obtain from transaction-based pricing models unchanged. On the one hand, this could preserve the current state of competition among exchanges in the market for those securities. For instance, it may be possible for exchanges to modify fee structures in a way that leaves margins unchanged and does not impact competition between exchanges.⁹²²

On the other hand, the restrictions on fees and rebates could also alter the competitive dynamics between different exchanges. For example, the restrictions on fees and rebates could make

⁹¹² See, e.g., Choe Letter I, at 7–8; Themis Trading Letter I, at 1; MFS Investment Letter, at 2; Wellington Management Letter, at 1; FIA Letter, at 3–4; ASA Letter, at 3; Era Letter, at 2; Knight-Swift Letter, at 2. One of the commenters suggested the Commission should evaluate how disparate treatment of liquidity provision between exchanges and non-exchange trading centers could affect market participants' incentives to compete for displayed liquidity. See Mastercard Letter, at 2. Another of the commenters also noted that the competitive balance between exchanges and off-exchange trading centers is uneven due to differences in regulatory oversight, including filings of fee changes; the ability to assess different fees to different customers; and the ability to offer sub-penny price improvements. See Choe Letter I, at 8.

⁹¹³ See IEX Letter II, at 8. One commenter disagreed and noted that although "few ATs currently use maker-taker fee structures, but they have done so in the past and would be incentivized to do so in the future" and that "restricting fee structures on exchanges only would encourage those off-exchange venues to expand their use of order-routing incentives to gain a competitive advantage." See NYSE Letter I, at 4–5

⁹¹⁴ It could also result in market makers reducing their overall submission of non-marketable orders to supply liquidity, if it is the case that rebates encourage market makers to engage in excessive intermediation. This in turn could result in a reduction in trading volume. See *supra* note 823 and accompanying text.

⁹¹⁵ See *supra* Section IV.C.2.b.iv.

⁹¹⁶ It could incentivize institutional or proprietary traders to substitute their marketable orders with nonmarketable limit orders on maker-taker exchanges.

⁹¹⁷ See *supra* Section IV.C.2.b.iv.

⁹¹⁸ See *supra* Section IV.D.2.a.i.

⁹¹⁹ See *id.*

⁹²⁰ As discussed in detail below, the Commission believes retail non-marketable orders for securities in Test Group 1 will still be routed to maker-taker exchanges. The restrictions on rebates in Test Group 2 may cause some of these orders to be routed to taker-maker venues, if they result in better execution quality. See *infra* Section IV.D.2.b.

⁹²¹ See *supra* Section IV.C.2.b.i.

⁹²² One commenter agreed with this view and suggested that even though the fee cap for the Proposed Test Group 1 was half of the current level, "there was still significant enough differentiation available in the fee structure that trading may not appear materially different than the control group." See Credit Suisse Commentary, at 3. However, another commenter argued that the fee cap in Proposed Test Group 1 would reduce the exchange's ability to compete on fees by 50%. See Choe Letter I, at 16.

exchanges more similar in Test Group stocks.⁹²³ This could alter competition between exchanges by causing market participants to focus less on differences in fees and rebates and more on other metrics, such as execution quality when deciding to which exchanges to route order flow.

As discussed in detail above,⁹²⁴ the Commission cannot *ex ante* predict whether the Pilot will increase or decrease trading volume on certain exchanges. Consequently, the Commission acknowledges significant uncertainty with respect to the effect of the Pilot on exchange competition.

One commenter suggested that “inverted venues would likely increase market share as maker rebates disappear and the fee differential between venues declines for market makers, lowering the relative cost for queue priority.”⁹²⁵ The Commission acknowledges that it is possible that a reduction in rebates in Test Group stocks could make maker-taker exchanges less competitive for non-marketable orders and cause liquidity provision to migrate to inverted venues. However, if a reduction in rebates reduces excessive intermediation,⁹²⁶ causes market makers to shift their liquidity provision off-exchange,⁹²⁷ or worsens liquidity,⁹²⁸ then institutional or proprietary traders’ non-marketable orders could get better queue position and have higher fill rates on maker-taker venues, which could attract non-marketable order flow from taker-maker venues, where maker participants pay fees for better queue positions and fill rates.

If the Pilot causes changes in liquidity between exchanges in Test Group stocks,⁹²⁹ it could affect the decision where to route marketable order flow. If an exchange experiences an improvement/decline in liquidity it may also experience an increase/decline in marketable order flow, especially since lower differences in fees/rebates between exchanges could reduce broker-dealer conflicts of interest and make them rely more on execution quality when deciding where to route marketable orders.⁹³⁰ Additionally, it is also possible that lower transaction fees on maker-taker venues could make these venues more competitive and better able to attract marketable order flow in Test Group stocks from inverted venues.

The Pilot could also alter competition between exchanges by causing exchanges to choose to compete less intensively for order flow in one Test Group, and instead focus on stocks and ETPs in the other Test Group. Some of the shortfall in the competition for order flow for this subset of securities could be filled by off-exchange trading centers.⁹³¹ Alternatively, exchanges may revise pricing strategies for stocks in other groups, choosing to implicitly subsidize rebates for stocks in Test Group 1 using fees from Control Group stocks.⁹³² This may increase competition for order flow in one Test Group while reducing it in the other. In the presence of tighter restrictions on transaction-based fees during the Pilot Period, exchanges could also compete in other ways to attract trading volume (e.g., discounts on connectivity fees or increased volume discounts), although the Commission believes that for Test Group 1 the ability to offer meaningful volume discounts would be limited in light of the \$0.0010 fee cap in that group.⁹³³

The Pilot also could affect competition between large and small exchanges. The restrictions on rebates resulting from the Pilot could harm smaller exchanges that may be competing by paying large rebates rather than by producing better prices or execution quality.⁹³⁴ As discussed in the Proposal,⁹³⁵ liquidity tends to consolidate. Therefore, if smaller exchanges are unable to pay larger rebates in test stocks, they may lose order flow to larger, more liquid exchanges. To the extent that increased order flow in a security directed to a particular venue encourages broker-dealers to route more orders for that security to the venue, a liquidity externality may develop, making the venue the preferred routing destination for all orders.⁹³⁶ Although these effects would likely last only for the duration of the Pilot, depending on the extent of the liquidity externalities, smaller exchanges could experience long-lasting competitive effects, such as a reduction in trading volume that continues after

the expiration of the Pilot.⁹³⁷ The Pilot also could temporarily discourage entry of new exchanges that might otherwise emerge to take advantage of the maker-taker and taker-maker pricing models.⁹³⁸

While the consolidation of liquidity may benefit market participants, it may also make it difficult for trading centers with low volumes in particular securities to compete with trading centers that represent liquidity centers in these securities.⁹³⁹ In theory, this could lead to consolidation or exit by small exchanges as a result of the Pilot.⁹⁴⁰ However, the Commission believes that either of those events is unlikely because the anticipated revenue shortfall, as discussed above,⁹⁴¹ would be for a limited duration and would not be significant enough to cause this result.

The Commission recognizes that the potential temporary competitive impacts stemming from the Pilot would generally depend on the exposure of each trading center to each Test Group and the Control Group of NMS stocks, because the constraints on fees and rebates apply differently to each group. For instance, if a high portion of an exchange’s volume was derived from stocks in Test Group 2, it may be at a particular competitive disadvantage relative to an exchange that served markets across all groups, because the prohibition on rebates and Linked Pricing applicable to Test Group 2 would apply to a higher proportion of its trading volume. However, the Commission believes that, given its aim of producing representative groups of stocks and ETPs for the purposes of the Pilot, trading centers are not likely to be substantially more exposed to NMS stocks in any one group.

⁹³⁷ One commenter suggested that the effects of the Pilot may be permanent. See NYSE Letter I, at 4, 8.

⁹³⁸ Academic studies suggest a number of new exchanges emerged specifically to take advantage of maker-taker and taker-maker pricing models. See, e.g., Angel, Harris & Spatt, *supra* note 530. However, some commenters suggested that the loss of fee differentiation would lead to an increase in venues as exchanges try to make up for lost revenue through other means. See, e.g., Fidelity Letter, at 8; Cboe Letter I, at 16–17.

⁹³⁹ One commenter said that restricting transaction fees would disproportionately hurt small exchanges because “large exchanges have diversified revenues away from transaction fees.” See Magma Letter, at 2.

⁹⁴⁰ One commenter believed that the loss in fee differentiation could lead to consolidation and fewer venues overall. See Credit Suisse Commentary, at 5.

⁹⁴¹ See *supra* Section IV.C.2.b.i (Loss of Exchanges’ Fee Revenue).

⁹³¹ See *supra* Section IV.D.2.a.

⁹³² See, e.g., Healthy Markets Letter I, at 27 (noting that exchanges use fees collected to pay rebates).

⁹³³ For NMS stocks included in Test Group 2 order flow incentives would be substantially reduced, particularly any new inducements that provide a discount or incentive on one side of the market that is linked to activity on the opposite side of the market.

⁹³⁴ See *supra* Section IV.B.2.a.

⁹³⁵ See the discussion of a liquidity externality in the Proposing Release, *supra* note 2, at 13042.

⁹³⁶ See *id.*

⁹²³ See *supra* Section IV.C.2.b.i.

⁹²⁴ See *id.*

⁹²⁵ See Credit Suisse Commentary, at 4.

⁹²⁶ See *supra* note 823 and accompanying text.

⁹²⁷ See *supra* Section IV.D.2.a.

⁹²⁸ See *supra* Section IV.C.2.b.iv.

⁹²⁹ See *id.*

⁹³⁰ See *supra* Section IV.C.1.b.

c. Competition Between Broker-Dealers

The Pilot also could affect competition between broker-dealers. One commenter believed that, due to differences in broker-dealer business models, any reduction in rebate incentives or other forms of payment for order flow will increase transaction costs, and that large broker-dealers would be better able to adapt to increased trading costs and rebate reductions than small or middle-market broker-dealers.⁹⁴² The commenter believed that the Pilot would disproportionately advantage large broker-dealers who specialize in low touch execution or own ATSs because more customers and order flow would migrate to the largest brokers, and that the “Commission should and is required to undertake a rigorous cost-benefit analysis to justify any policy that favors one group of Brokers over another.”⁹⁴³

The Commission believes that the Pilot could differentially affect small and large broker-dealers, but differences in the potential compliance costs they face make it unclear whether the Pilot will disproportionately advantage large broker-dealers over small or middle-market broker-dealers. Although larger broker-dealers may possess economies of scale which may enable them to adapt better to changes in fees and rebates, they are also more likely to be members of exchanges and subject to the compliance costs of adjusting their systems due to changes in exchange fee and rebate schedules discussed above.⁹⁴⁴ As of December 2017, of the approximately 3,860 broker-dealers registered with the Commission, only 397 are listed as having memberships with at least one exchange and would encompass the set of executing broker-dealers that would be most affected by the Pilot. Therefore, it is likely that many small or middle-market broker-dealers will not have to bear the compliance costs discussed above.⁹⁴⁵

Additionally, since larger broker-dealers are more likely to be subject to these compliance costs, they may need to increase their commission rates more than smaller broker-dealers to compensate for these increased costs. This could potentially offset any advantage that larger broker-dealers may possess in being able to absorb any revenue loss caused by a reduction in payment for order flow, such as by being able to offer smaller increases in commissions compared to smaller

broker-dealers. However, the Commission cannot quantify this difference, because it lacks sufficient data on the differences in commission rates between large and small broker-dealers.⁹⁴⁶

d. Competition Between Issuers

A number of commenters noted that the Commission, in the Proposing Release, did not discuss the competitive effects to issuers (common stocks) from inclusion in various Test Groups of the Pilot.⁹⁴⁷ While the Pilot could potentially affect product market competition between issuers that compete in the same product market by affecting their ability to raise capital,⁹⁴⁸ the Commission does not believe that this is likely to occur. Since the Commission does not believe that the Pilot will have a significant effect on the ability of issuers to raise capital,⁹⁴⁹ the Commission does not believe the Pilot will have a significant effect on product market competition between issuers.

Some commenters argued that the Pilot could inadvertently pick “winners and losers” through the selection of securities to Test Groups.⁹⁵⁰ One commenter believed that issuers in certain Test Groups could become “less attractive investments than control group issuers”⁹⁵¹ while another thought this could “skew the competitive dynamic between issuers and impact the ability of the affected issuers to raise capital.”⁹⁵² They argue that among securities with similar characteristics, securities that can offer higher rebates will attract more liquidity and trading volume at the expense of securities with lower rebates. Several commenters argued that issuers included in the test groups with reduced access fees or rebates would experience wider spreads, which would put them at a

competitive disadvantage compared to peer firms in the control group by making it more expensive for them to engage in secondary offerings or conduct share repurchase programs.⁹⁵³ One commenter argued that this would disproportionately affect “small to medium issuers” where “[l]iquidity rebates can be critical . . . to motivate market makers to support the stock with aggressive and actionable quotations.”⁹⁵⁴ Although some securities may experience changes in liquidity as a result of the Pilot,⁹⁵⁵ as discussed in detail below,⁹⁵⁶ the Commission does not believe that issuers, including small and mid-capitalization issuers, will experience significant increases in the cost of capital as a result of the Pilot.

However, if the Pilot does differentially affect the cost of firms in the same product market to raise capital, it could affect product market competition by making it more difficult for the firms that experienced an increase in capital costs to compete. While the Commission acknowledges that theoretical and empirical studies suggest that an increase in costs of capital can affect product market competition,⁹⁵⁷ the Commission does not believe the Pilot will have such an effect on product market competition between issuers. While the Commission acknowledges that some issuers may observe a widening of spreads and possible reductions in liquidity provision,⁹⁵⁸ as discussed below,⁹⁵⁹ the Commission does not believe that the Pilot will have a significant effect on capital formation for issuers.⁹⁶⁰ Therefore, the Commission does not believe the Pilot will have a significant effect on product market competition between issuers. Furthermore, the Pilot will allow the Commission to obtain data to be able to analyze the impact of

⁹⁴⁶ See *supra* note 805.

⁹⁴⁷ See, e.g., Anixter Letter, at 1; STANY Letter, at 2; NYSE Letter, at 2; Johnson Letter, at 1; Cott Letter, at 1; P&G Letter, at 1; Nasdaq Letter I, at 8–9. One of these commenters “urge[d] the Commission to further analyze and study the potential impact of the Transaction Fee Pilot on issuers and their securities (as well as investors in those securities), including the impact on competition between issuers in the pilot test groups and those in the control group.” See Anixter Letter, at 1. Another commenter argued that the Commission was “treating all issuers the same without consideration for the very significant differences in how the securities of different sized and priced companies trade.” See Nasdaq Letter I, at 8.

⁹⁴⁸ See *infra* Section IV.D.3 (Capital Formation).

⁹⁴⁹ See *id.*

⁹⁵⁰ See Nasdaq Letter I, at 10; Invesco Letter, at 2 (discussing the competitive effects for ETPs).

⁹⁵¹ See NorthWestern Letter, at 2.

⁹⁵² See Ethan Allen Letter, at 1. See also McDermott Letter, at 1; ProAssurance Letter, at 1; Era Letter, at 2; Avangrid Letter, at 1–2.

⁹⁵³ See NYSE Letter I, at 6–7; Apache Letter, at 2; Mastercard Letter, at 2; Era Letter, at 2.

⁹⁵⁴ See Nasdaq Letter I, at 8–9.

⁹⁵⁵ See *supra* Section IV.C.2.b.iv.

⁹⁵⁶ See *infra* Section IV.D.3 (Capital Formation).

⁹⁵⁷ See, e.g., Maksimovic, V. (1995). “Financial Structure and Product Market Competition.” Ch. 27 in *Handbooks in Operations Research and Management Science*, Vol. 9, 887–920 (available at: <https://www.sciencedirect.com/science/article/abs/pii/S0927050705800714>) and Campello, M. (2006). “Debt Financing: Does It Boost or Hurt Firm Performance in Product Markets?” *Journal of Financial Economics*, 82(1), 135–172 (available at: <https://www.sciencedirect.com/science/article/pii/S0304405X05001777>) (hereafter “Campello (2006)”).

⁹⁵⁸ See *supra* Section IV.C.2.b.iv.

⁹⁵⁹ See *infra* Section IV.D.3 (Capital Formation).

⁹⁶⁰ One commenter agreed and argued that “there simply is no evidence that the Pilot will cause any imminent danger to any issuer’s stock price or liquidity.” See Better Markets Letter, at 3.

⁹⁴² See ASA Letter, at 2.

⁹⁴³ *Id.* at 2–3.

⁹⁴⁴ See *supra* Section V.C.2.b.ii (Broker-Dealer Systems Costs).

⁹⁴⁵ See *id.*

changes to fees and rebates and how those changes affect a myriad of issues, including their impact on competition between issuers.

e. Competition Between ETPs

The Pilot may also impact the competitive dynamics between ETPs.⁹⁶¹ Although some ETPs could potentially be harmed by the Pilot's effect on this competition, there is uncertainty regarding the Pilot's effect on the liquidity of ETPs and therefore on competition between ETPs.⁹⁶²

Unlike common stocks, whereby trading and investing in those securities is likely driven by firm-specific characteristics, ETPs with similar investment strategies may be more substitutable. For example, some ETPs may follow the same underlying index, and only differ in expense ratios, trading characteristics, and in some cases, tracking error. Although some of these characteristics may be meaningful distinctions for long-term investors, such as expense ratios, other characteristics, such as trading characteristics, including transaction costs, are likely to be meaningful to market participants that trade rather than invest in some ETPs.⁹⁶³ One concern is that changes in liquidity between similar ETPs in different Pilot groups could have an impact on competition by harming ETPs that experience a decline in liquidity.⁹⁶⁴ A decline in ETP liquidity could affect competition by causing trading volume (demand) to migrate from an ETP that experienced a decline in liquidity to a nearly identical ETP in another Pilot group that might have experienced an improvement in liquidity.⁹⁶⁵ For example, ETPs that are subject to higher rebates may benefit and attract more liquidity and trading volume at the

expense of similar ETPs in different Test Groups that are restricted to offering lower rebates.⁹⁶⁶ A decrease/increase in secondary market demand for an ETP could cause a decrease/increase in the total assets under management of the ETP's sponsor by causing authorized participants to redeem/create creation units of ETP shares in order to take advantage of arbitrage opportunities in the secondary market.⁹⁶⁷ However, one commenter (itself an ETP sponsor) noted that the competitive effects for ETPs would likely be temporary and minimal, and would have little effect on investor behavior; therefore, the benefits of including ETPs in the Pilot outweigh the potential costs of competitive impacts for ETPs.⁹⁶⁸

One commenter stated that these competitive effects are likely to be more challenging for small or less liquid ETPs that rely on "market maker support and require those same firms to provide seed capital (e.g., capital investments)."⁹⁶⁹ These commenters raised concerns that reductions or prohibitions on rebates in certain Test Groups could exacerbate the anticompetitive effects for the small, less liquid ETPs in these programs by causing degradation in liquidity provision for these ETPs.⁹⁷⁰

The Commission acknowledges that the Pilot could potentially alter the competitive dynamics between and demand for similar ETPs that are placed in different Test and Control groups.

⁹⁶⁶ One commenter noted that ETPs in test groups with significant rebate reductions or restrictions could be disadvantaged competitively to similar ETPs not subject to changes to rebates, and because of the nature of ETPs, may lose market share to their competitors. See Nasdaq Letter I, at 8. Many commenters agreed with this argument. See ICI Letter I, at 4; MFS Letter, at 1; Nuveen Letter, at 2; FIA Letter, at 4; SIFMA Letter, at 4-5; Issuer Network Letter I, at 3; Schwab Letter, at 3; Fidelity Letter, at 9; Invesco Letter, at 2; State Street Letter, at 3; Oppenheimer Letter, at 3; Clearpool Letter, at 7-8; Angel Letter I, at 2; STANY Letter, at 4; Healthy Markets Letter I, at 11; Cboe Letter I, at 17; NYSE Letter I, at 7; Morgan Stanley Letter, at 3-4; BlackRock Letter, at 1-2. One commenter believed that the Pilot could "unintentionally advantage ETFs in the lower fee group." Credit Suisse Commentary, at 6.

⁹⁶⁷ See *supra* Section IV.B.2.d (Market for Assets Under Management).

⁹⁶⁸ See Vanguard Letter, at 2. Many commenters believed that ETPs should only be included in the Pilot if an alternative design was implemented for ETPs, such as placing similar ETPs in the same group or rotating ETPs between groups. See *supra* Section II.B.3.b and *infra* Section IV.E.5.h for a summary of these comments and discussions of the costs and benefits of alternative Pilot designs for ETPs.

⁹⁶⁹ See Nasdaq Letter I, at 8.

⁹⁷⁰ See *id.* One commenter noted that 477 ETPs trade less than 2,000 shares per day, while 234 trade between 2,000 and 5,000 shares per day. In aggregate, these ETPs have approximately \$32 billion in AUM, and the Pilot could adversely impact liquidity provision to these names leading to unintended investor harm. See Virtu Letter, at 7.

The Pilot could inadvertently create "winners and losers" among ETPs through both competitive shifts and the potential exit of liquidity providers, and for some ETPs if these costs are severe, could lead to exit by certain ETPs from the market. However, as discussed in detail above,⁹⁷¹ since the Commission does not know *ex ante* how the Pilot will impact the liquidity of ETPs, it is unable to quantify the effects that the Pilot will have on competition between ETPs. One of the goals of the Pilot is to provide the Commission with data so that it can better evaluate these effects.

In addition to affecting ETP competition through changes in ETP liquidity, the Pilot could also affect ETP competition through its effects on ETPs underlying securities. As discussed in detail above,⁹⁷² if the Pilot impacts the liquidity of the underlying securities, it could impact the create-redeem process for ETPs. This could affect the price efficiency of the ETP by impacting the cost to authorized participants of eliminating mispricing by participating in the create-redeem process. For example, if the majority of an ETP's underlying securities are placed in the same Test Group and experience a decline in liquidity, it could cause the deviation between the ETPs price and its NAV to increase, *i.e.*, the price of the ETP could deviate more from the price of its underlying securities. This could cause demand for the ETP to decline and trading volume to migrate to a similar ETP with a lower deviation between its price and NAV, whose underlying securities might not have experienced a decrease in liquidity.⁹⁷³ However, because of the random nature of the assignment of securities to Pilot groups and the fact that similar ETPs may experience similar liquidity changes in their underlying securities, the Commission does not believe that this will have a significant impact on competition between ETPs.

3. Capital Formation

The Commission does not expect the Pilot to have a substantial permanent impact on capital formation because the Pilot is limited in duration and because it is not expected to have a large impact on issuer cost of capital. However, many of the implementation costs associated with the Pilot would require exchanges to expend resources that they may have otherwise invested elsewhere or distributed to shareholders in order to

⁹⁷¹ See *supra* Section IV.C.2.b.iv.

⁹⁷² See *id.*

⁹⁷³ ETPs might not hold all of the securities in the index that they track. ETPs that track similar indexes may hold different underlying securities in their representative portfolios.

⁹⁶¹ A number of commenters stated concerns that the Commission had not fully considered the competitive effects on ETPs resulting from the Pilot. See, e.g., NYSE Letter I, at 7; ICI Letter I, at 4; State Street Letter, at 3; STA Letter, at 4; Schwab Letter, at 3; STANY Letter, at 4; Clearpool Letter, at 7-8; Cboe Letter I, at 17-18; Nuveen Letter, at 1,3; BlackRock Letter, at 1-2; Fidelity Letter, at 9; SIFMA Letter, at 4-5; Credit Suisse Commentary, at 6; Healthy Markets Letter II, at 8; Oppenheimer Letter, at 3; ICI Letter II, at 5; Nasdaq Letter I, at 8.

⁹⁶² See *supra* Section IV.C.2.b.iv.2.

⁹⁶³ For example, three ETFs that track the S&P 500 Index have expense ratios of 9 bps (SPY), 5 bps (IVV), and 4 bps (VOO). On a \$10,000 holding over a year, this results in fees of \$9, \$5, and \$4, respectively, whereas on a 100-share trade, a widening of spreads by one tick would result in a cost of \$1.

⁹⁶⁴ See *supra* Section IV.C.2.b.iv.

⁹⁶⁵ A decline in an ETP's liquidity could also cause demand to migrate to another type of investment vehicle, such as a mutual fund, that follows the same investment strategy.

maintain the List of Pilot Securities and any changes to those lists, as well as the maintenance of the Exchange Transaction Fee Summary and the order routing data.⁹⁷⁴

As discussed above,⁹⁷⁵ the Commission is unable to determine *ex ante* the overall temporary impact of the Pilot on liquidity and total transaction costs, because the Pilot's effects on liquidity could be positive or negative and vary across securities. As a result, it is unclear to what degree the Pilot will temporarily promote or harm capital formation. On one hand, the Pilot could temporarily reduce total transaction costs for many market participants by consolidating liquidity and improving execution quality.⁹⁷⁶ To the extent that such cost reductions are realized, they may, for instance, permit market participants to more efficiently deploy financial resources by reducing the cost of hedging financial risks.⁹⁷⁷ As a result, the Pilot may marginally and temporarily promote capital formation. Improvements in both liquidity and price efficiency could make capital markets more attractive, at least for the duration of the Pilot.

On the other hand, the temporary reduction in rebates to certain Test Groups as a result of the implementation of the Pilot could widen quoted spreads, thereby potentially leading to worse execution prices and subsequently reducing liquidity for the duration of the Pilot.⁹⁷⁸ This would have similar indirect impacts on capital formation but in the opposite direction, by increasing the cost of hedging financial risks.

Potentially, if the Pilot leads to a significant deterioration in liquidity for some listed issuers,⁹⁷⁹ longer term, it could affect capital formation for these securities by increasing the costs for them to raise capital.⁹⁸⁰ Further, the Pilot could lead to a delay by some

issuers to raise additional capital during the Pilot's duration.⁹⁸¹ A number of commenters agreed with these assessments and expressed concern that random assignment to certain Test Groups could adversely affect issuers' ability to raise capital or manage their capital structure, by increasing the cost of secondary offerings or the costs associated with share repurchase programs.⁹⁸²

Several commenters argued that these effects would be worse for small and medium sized companies.⁹⁸³ In theory, if the temporary impacts on liquidity acutely impact some firms, it could lead to the potential exit of these issuers from the capital markets, either through acquisition or delisting. These risks could be greater for smaller issuers, because they may not possess enough capital to ride out negative liquidity shocks. However, the Commission does not believe that this is likely to occur because smaller issuers tend to have high transaction costs relative to fee and rebates.⁹⁸⁴

Alternatively, a number of commenters disagreed and did not think the Pilot would have a significant impact on issuers' ability to raise capital.⁹⁸⁵ The Commission agrees with these commenters. As discussed in detail below, due to the limited magnitude of the effects of the Pilot study, and the uncertain impacts on liquidity, the Commission does not expect the Pilot will have significant

effects on the ability of firms to raise capital.

The Pilot may also affect capital formation through its impact on discretionary accounts. A number of broker-dealers have discretionary agreements with their clients, wherein the broker can transact in the client's account without the client's consent. For the duration of the Pilot, some broker-dealers may alter the composition of their clients' portfolios to trade and hold greater proportions of the accounts in high-rebate NMS stocks (including ETPs) in the Control Group. Such revisions to portfolio composition as a result of the Pilot are not necessarily efficient from an investor's perspective and could have a detrimental impact on capital formation insofar as they increase the riskiness of client portfolios or decrease client portfolios' expected returns.⁹⁸⁶ This behavior would temporarily distort the market for high-rebate stocks and ETPs, creating a higher demand for these securities and potentially leading to an inefficient allocation of capital based on signals that are unrelated to firm fundamentals.

One commenter analyzed secondary offerings from its listed issuers during 2017 and found that lower liquidity was associated with a higher cost of capital.⁹⁸⁷ The Commission points out that the analysis performed by this study merely examines associations between spreads and capital costs and does not establish that wider quoted spreads cause higher costs of capital.⁹⁸⁸ To supplement this comment, Commission staff analyzed the same secondary offerings and found that after controlling for fundamental issuer characteristics, such as size, book-to-market, and analyst coverage, the size of the quoted spread was not positively related to issuers' costs of capital.⁹⁸⁹

⁹⁸⁶ Allocative efficiency in the context of investment choice is optimized when there are no restrictions on the set of investment opportunities available to an investor. See, e.g., Nielsen, N.C. (1976). "The Investment Decision of the Firm under Uncertainty and the Allocative Efficiency of Capital Markets." *Journal of Finance*, Vol. 31(2), 587-602 (available at: <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1540-6261.1976.tb01908.x>) If the Pilot potentially leads some broker-dealers to alter the investment opportunity set to avoid securities that do not pay rebates, then allocative efficiency for those investors would likely be impaired since the opportunity set is restricted.

⁹⁸⁷ See NYSE Letter I, at 3.

⁹⁸⁸ One commenter agreed that there is no evidence that "issuer costs of capital are caused by quoted spreads." See IEX Letter II, at 4.

⁹⁸⁹ Depending on how exchanges measure discounts (a proxy measure for the cost of capital), whether from the bid price or the midpoint, there could be mechanical variation imposed simply by differences on how data vendors measure

⁹⁷⁴ The costs associated with implementation and compliance with the Pilot are discussed in more detail above. See *supra* Section IV.C.2.a.

⁹⁷⁵ See *supra* Section IV.C.2.b.iv.

⁹⁷⁶ See *id.*

⁹⁷⁷ One commenter argues that "the current system increases transaction costs to the public and . . . increases the issuer capital costs." See Larry Harris Letter, at 9.

⁹⁷⁸ See Chacko, G.C., Jurek, J.W., & Stafford, E. (2008). "The Price of Immediacy." *Journal of Finance*, Vol. 63(3), 1253-1290 (available at: <https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1540-6261.2008.01357.x>). According to Chacko et al., liquidity has three important dimensions: Price, quantity, and immediacy. A market for a security is considered "liquid" if an investor can quickly execute a significant quantity at a price at or near fundamental value. See also *supra* Section IV.C.2.b.iv.

⁹⁷⁹ See *supra* Section IV.C.2.b.iv.

⁹⁸⁰ See *supra* Section IV.C.2.b.v.

⁹⁸¹ Another commenter asserted that the Pilot could harm thinly traded stocks and the IPO market. See Nasdaq Letter III, at 9. With respect to thinly traded securities, the Commission notes that the Pilot will exclude NMS stocks that trade less than 30,000 shares per day. The Commission notes that the Pilot will exclude new publicly traded companies whose IPO occurs after the Pilot Securities are selected, and therefore the Pilot should not harm the market for new IPOs. See Section II.C.6. *supra* (discussing the exclusion of certain thinly traded securities); see also Section IV.C.2.b.v. *supra* (discussing the potential impact of the Pilot on issuers).

⁹⁸² See e.g., Nasdaq Letter I, at 2; ASA Letter, at 3; ACCO Letter, at 1; NorthWestern Letter, at 2.; Unifit Letter, at 1-2; McDermott Letter, at 1; Weingarten Letter, at 1; ProAssurance Letter, at 1; SMP Letter, at 1; Halliburton Letter, at 1; Era Letter, at 2; Newpark Letter, at 1; Knight-Swift Letter, at 1; Avangrid Letter, at 1-2; NYSE Letter I, at 3, 6-7, 13-14; e.g., Level Brands Letter, at 1; Johnson Letter, at 1; P&G Letter, at 1; Sensient Letter, at 1; Apache Letter, at 2; Ethan Allen Letter, at 1-2. See also the discussion in *supra* Section IV.C.2.b.v (Impact on Issuers).

⁹⁸³ See Nasdaq Letter I, at 2; ASA Letter, at 4.

⁹⁸⁴ While the Commission acknowledged this possibility in the Proposing Release, it did not suggest that such effects were likely. Rather, the Commission stated that it did not "expect the proposed Pilot to have a substantial permanent impact on capital formation . . ." See Proposing Release, *supra* note 2, at 13068-69.

⁹⁸⁵ See IEX Letter II, at 3-4; Healthy Markets Letter II, at 2; ICI Letter II at 4-5; T. Rowe Price Letter, at 4-5.

The Commission notes that a temporary effect on transaction costs may not have the same impact on cost of capital as a permanent effect on liquidity and does not believe that any temporary increase in transaction costs resulting from the Pilot could be significant enough to affect issuers' costs of capital. Indeed, the experience with the recent Tick Size Pilot provides an example of a temporary change in liquidity that did not affect cost of capital. While several studies found that the Tick Size Pilot increased transaction costs,⁹⁹⁰ the findings of a DERA white paper suggest that the market did not expect the Pilot to affect stock prices of companies in the Test Groups.⁹⁹¹ Specifically, the paper finds that the announcement of the assignment of stocks to the Test Groups and the Control Group did not generate significant abnormal returns for stocks in the Test Groups, either in absolute terms or relative to stocks in the Control Group.⁹⁹² Under the standard assumption that the market's expectations about the effects of the Pilot were correct, this result indicates that the increase in quoted spreads and transaction costs during with the Pilot had no impact on stock prices. Thus, these findings cast doubt on the idea that temporary changes in transaction costs affected the cost of capital of small capitalization companies. In addition, because the Tick Size Pilot enacted a 500% increase in the tick size, that pilot could arguably have a bigger direct

discounts. Staff analyses relied on SDC measures of discounts to approximate issuers' costs of capital, and observed that using the same spread breakpoints, discounts were approximately 3.6% for issuers with spreads below 20 bps, and 7.6% for issuers with spreads above 20 bps, indicating differences in methodologies of how discounts are computed can affect magnitudes. Regardless of the difference in magnitudes of the discounts, low-spread issuers, on average, had lower discounts than high spread issuers, consistent with NYSE's spread-discount relationship. See NYSE Letter I, at 3.

⁹⁹⁰ See e.g., Hu, E., Hughes, P., Ritter, J., Vegella, P., & Zhang, H. (2018). "The Tick Size Pilot Plan and Market Quality." SEC White Paper (available at: https://www.sec.gov/dera/staff-papers/white-papers/dera_wp_tick_size-market_quality).

⁹⁹¹ See Pachare, S. & Rainer, I. (2018). "Does the Tick Size Affect Stock Prices? Evidence from the Tick Size Pilot Announcement of the Test Groups and the Control Group." SEC White Paper (available at: https://www.sec.gov/dera/staff-papers/white-papers/dera_wp_does_the_tick_size_affect_stock_prices). See also fn. 13 in Albuquerque, R.A., Song, S., & Yao, C. (2018). "The Price Effects of Liquidity Shocks: A Study of SEC's Tick Size Experiment." Working Paper (available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3081125), reporting on their finding that the stock prices did not react to the announcement of which stocks were in the pilot.

⁹⁹² The results were similar when they limit the analysis to stocks with pre-Pilot quoted spreads smaller than \$0.05.

impact on transaction costs than the Transaction Fee Pilot, which would reduce rebates by 30% of a tick.

One commenter disagreed and believed that the findings of the DERA white paper were flawed.⁹⁹³ This commenter argued that the DERA study "relies on a selective, narrow, and irrelevant data set" and that "focusing on a few days around the time when stocks were assigned to test groups within the Tick Pilot, and not a materially longer period of time during which the Tick Pilot's quoting and trading restrictions were in effect, is a clear indication that DERA narrowly tailored its study to reach a specific and flawed conclusion."⁹⁹⁴ This commenter stated that it "does not believe that the White Paper supports any conclusion regarding the impact of the Tick Pilot on investors or the potential impact of the Transaction Fee Pilot on issuers."⁹⁹⁵

However, another commenter noted that "DERA's event study is informative to a central criticism" raised by some commenters that "upon implementation of the [Pilot], spreads will widen in stocks chosen for the 'low rebate' or 'no rebate' buckets and that wider spreads will harm issuers of the impacted stocks."⁹⁹⁶ This commenter found the "lack of price impact . . . telling," because "the price of . . . stock is the primary measure" of "potential harm to issuers" ⁹⁹⁷ This commenter explained that, "if liquidity diminishes, or expected returns of the stock decline, this would be reflected in the value of the stock—and no such statistically significant decline in value was found."⁹⁹⁸ The commenter believed that the short duration of DERA event study was appropriate because "markets rapidly incorporate new information" into stock prices.⁹⁹⁹ The Commission agrees with this commenter and believes that the DERA white paper used an appropriate methodology to study how the increase in quoted spreads and transaction costs from the Tick Size Pilot affected the stock prices and cost of capital of firms in the Test groups. The Commission believes that the DERA white paper did not rely on a "selective, narrow, and irrelevant data set" and instead picked the appropriate time period, the few days surrounding publication of the list of which stocks would be included in the test and control groups, to examine how the

market reacted to the information about which stocks would have their spreads widen as a result of the Tick Size Pilot. This approach is standard in the academic literature because information is quickly incorporated into stock prices at the time it is made public. The Commission believes that the DERA white paper is relevant to this Pilot because it examines how a firm's cost of capital is affected by a temporary widening of the firm's spreads, which is a potential effect of this Pilot.¹⁰⁰⁰ As discussed above and noted by the commenter,¹⁰⁰¹ if a firm's cost of capital increased as a result of the wider spreads caused by the Tick Size Pilot, we would expect that stock's price to decline during the announcement of test and control groups.

The Commission recognizes that another paper comes to the opposite conclusion regarding the impact of the Tick Size Pilot on costs of capital, but does not find the paper convincing. This paper compares the stock price reactions of stocks in the test and control groups around the time the Tick Size Pilot was implemented.¹⁰⁰² They find that stocks in the test groups that experienced a decrease in liquidity when the tick size widened also experienced a decrease in prices, relative to stocks in the control group, around the time the Tick Size Pilot was implemented.¹⁰⁰³ However, it is unclear exactly what the return differences documented in the study are measuring. If investors expected that test group stocks would experience a temporary reduction in liquidity during the Tick Size Pilot and that this would make it more costly for those stocks to raise capital, then standard economic assumptions would expect to see a negative stock price reaction for test group stocks around the announcement of the Tick Size Pilot test and control group stocks, not during the time period following the Tick Size Pilot implementation.

Given the results of the DERA study and the uncertainty surrounding the Albuquerque et al (2018) results, combined with the fact that the average trading cost increase, i.e. decrease in liquidity, during the Tick Size Pilot is greater than the expected potential effects on liquidity during the Transaction Fee Pilot, the Commission

¹⁰⁰⁰ See *supra* Section IV.C.2.b.iv.

¹⁰⁰¹ See Verret Letter II, at 2.

¹⁰⁰² See Albuquerque et al. (2018), *supra* note 991.

¹⁰⁰³ The list of stocks assigned to the Tick Size Pilot test and control groups was announced on September 3, 2016. The rollout of the Tick Size Pilot was implemented on a staggered basis over October 2016. See Hu et al. (2018), *supra* note 990.

⁹⁹³ See NYSE Letter V, at 1.

⁹⁹⁴ See *id.* at 2.

⁹⁹⁵ See *id.* at 3.

⁹⁹⁶ See Verret Letter II, at 1.

⁹⁹⁷ See *id.* at 2.

⁹⁹⁸ See *id.*

⁹⁹⁹ See *id.* at 3.

believes that the costs of capital are unlikely to significantly increase for Test Group stocks due to a temporary decrease in liquidity during the Transaction Fee Pilot. Because the Tick Size Pilot was conducted on firms with small market capitalizations, this should also help alleviate concerns for small to mid-capitalization issuers about temporary decreases in liquidity increasing the costs related to raising capital. One commenter agreed that, although some issuers may have temporary widening of spreads over the Pilot duration, any changes to liquidity caused by the Pilot are unlikely to affect the costs to firms when raising capital.¹⁰⁰⁴ Therefore, the Commission does not believe that issuers, including small and mid-capitalization issuers, will experience significant increases in the cost of capital as a result of the Pilot.

E. Alternatives

The Commission considered several alternatives to the Pilot, including: (1) Proceed to propose rule amendments without first conducting a Pilot; (2) expand the Pilot to include off-exchange venues, including ATSS; (3) include a trade-at provision; (4) conduct alternative pilots; and (5) adjust the design of the Pilot (*e.g.*, including a number of alternatives proposed by commenters).

1. Propose Rulemaking Without Conducting a Pilot

Several commenters suggested that the Commission should proceed with rulemaking rather than first conducting the Pilot. For example, as discussed elsewhere in this release,¹⁰⁰⁵ as an alternative to conducting the Pilot, one commenter suggested that the Commission impose a “gradual reduction of the current fee cap across all stocks periodically.”¹⁰⁰⁶ Such an approach would address the concerns raised by a number of commenters, discussed above, about the potential impact on largely identical ETPs and listed issuers that are placed in different test groups, without the added cost and complexity of rotating stratified samples through the Pilot.¹⁰⁰⁷ In addition, such an approach could provide data on successive reductions in the current fee cap, which could be useful to the Commission if it considers future policy making to reduce the Rule 610(c) fee cap.

However, depending on the number of fee caps to be tested, this alternative would increase instability in the markets in terms of the fee regime that markets are subject to. This would occur because the cap would be reduced successively and linearly and each tranche would need to be in place for a sufficient amount of time in order to obtain statistical power. Further, without a control group, researchers would be unable to conduct a differences-in-differences analysis as the data would be subject to the impact of events across time, which would frustrate the ability of researchers to compare groups to one another over time. The Commenter was open to having a control group not subject to the decline in fees, which would allow for identifying causality. However, even with the inclusion of a control group, this alternative would still increase the time in which markets are subject to instability in fees and rebates and the time needed to understand the impact of fees and rebates because at each different fee level the Commission would need to test that fee level for a sufficient time to gain statistical power. Further, including a control group in this alternative could potentially result in different treatment for largely identical ETPs, as in the adopted Pilot, but with an increase in the potential time needed for study.

Alternatively, this commenter suggested that the Commission implement “dynamic, stock specific ticks with transaction fees capped at, for example, 10% of the tick size (*e.g.* \$0.0010 per share if a penny tick; \$0.0050 per share if a nickel tick.)”¹⁰⁰⁸ Another commenter suggested that, rather than pursuing the Pilot, the Commission should amend Rule 610(c) to reduce the access fee cap to \$0.0010 and also conduct “an abbreviated study of the effects of eliminating rebates” similar to the “no-rebate” Test Group.¹⁰⁰⁹ One commenter recommended that the Commission “ban maker-taker and inverted transaction fee pricing as well as all volume-based discounts that are not clearly and directly related to cost savings”¹⁰¹⁰ while another suggested that the Commission enhance the duty of best execution in lieu of a pilot.¹⁰¹¹

Several commenters opined on the potential benefits and reduced costs of these alternatives as compared to proceeding with the Pilot. For example, according to one commenter, a gradual

“walk down” approach would be preferable to the Pilot because it would allow the Commission to “observe order routing behavior changes, while applying the same economics to all stocks uniformly” and would “eliminate concerns about issuers being subject to disparate treatment.”¹⁰¹² According to this commenter, it also would “eliminate[] concerns that the Pilot results will not reflect the actual outcome if such changes are applied more broadly to stocks outside of the Pilot.”¹⁰¹³ Similarly, another commenter noted that it would be “more effective and less damaging to the equities market to strengthen and better articulate the broker-dealers’ Duty of Best Execution” than proceeding with the Pilot, which the commenter believed would impose “tremendous costs” to investors and potentially “upend[] the existing economics and framework around equity executions.”¹⁰¹⁴ Further, one commenter noted that because “there is broad recognition” that the access fee cap should be reduced, there is no need to incur the costs associated with the Pilot and the Commission should simply reduce the fee cap to \$0.0010 to ensure that displayed prices reflect the actual economic costs of an execution, while also allowing exchanges to continue to offer rebates to incentivize liquidity provision if they chose to do so, while also maintaining their net capture rates.¹⁰¹⁵ This commenter believed that lowering the fee cap to \$0.0010 would provide “immediate benefits to the equities markets with respect to price transparency and addressing conflicts of interest”¹⁰¹⁶ and would be “better calibrated with today’s market pricing.”¹⁰¹⁷ Another commenter argued that “the effects of maker-taker and inverted transaction fee pricing on the markets are well understood” and therefore concluded that it was very unlikely that “we will learn anything of value about the economics of exchange transaction fee pricing” from the Pilot.¹⁰¹⁸ Consequently, this commenter believed that the Commission should mandate that the exchanges return to a traditional transaction fee pricing

¹⁰¹² Morgan Stanley Letter, at 2.

¹⁰¹³ *Id.* at 2.

¹⁰¹⁴ Choe Letter I, at 12, 21–22. *See also* Nasdaq Letter I, at 2 (referring to the Pilot as a “risky experiment”).

¹⁰¹⁵ Goldman Sachs Letter, at 1, 3.

¹⁰¹⁶ *Id.* at 1–3.

¹⁰¹⁷ *Id.* at 4.

¹⁰¹⁸ Larry Harris Letter, at 9–11. *See also* Goldman Sachs Letter, at 4 (stating there is “broad support in favor of lowering the Fee Cap today,” and the Pilot “will not yield a different conclusion.”).

¹⁰⁰⁴ *See* IEX Letter II, at 3–4.

¹⁰⁰⁵ *See supra* Section II.C.8(g) and (h) and Section IV.E.4.

¹⁰⁰⁶ Morgan Stanley Letter, at 2.

¹⁰⁰⁷ *See supra* note 104 and accompanying text.

¹⁰⁰⁸ *Id.* at 2–3.

¹⁰⁰⁹ Goldman Sachs Letter, at 1–4.

¹⁰¹⁰ Larry Harris Letter, at 9.

¹⁰¹¹ *See* Nasdaq Letter, at 1, 3.

model, which the commenter believed would not result in much cost to market participants.¹⁰¹⁹

However, other commenters strongly supported the Pilot as a first step because it “should provide data to enable the Commission to determine the impact of transaction-based fees and rebates on order routing behavior, on execution quality and on market quality” and believed the data collected would “support appropriate reforms to U.S. equity market structure.”¹⁰²⁰ Among those who supported conducting the Pilot before considering rulemaking, one commenter noted the lack of information regarding the rebates paid by each exchange to each broker and stated that such lack of disclosures “reinforce the difficulty in assessing the impact of the structure of a[cc]less fees on distorting best execution, conflict[s] of interest and competitiveness of exchange pricing.”¹⁰²¹ Still another commenter opined that the Pilot “is a necessity” to provide a “quantitative approach to which stocks require liquidity support and how much a rebate should be to incent support.”¹⁰²²

The diversity of opinion and lack of consensus among the commenters regarding the impact of fees and rebates on market quality and order routing behavior support the view that further study in this area is warranted before permanently adopting any changes through rulemaking. As discussed above, there was sharp disagreement between commenters about the potential impacts of reductions in fees and rebates, yet there is little data available to evaluate these claims on a broad scale. As discussed above, the Commission believes that there is no need to delay proceeding with the Pilot in order to pursue other potential equity market structure initiatives. Equity market structure issues have been considered for a number of years and, as a result of several initiatives in this area, the Commission has developed the Pilot, which is focused on and is intended to gather empirical evidence on the impact of exchange transaction fees and rebates. Similarly, the Commission does not believe that it needs to complete the Pilot before proceeding to consider all other equity market structure initiatives. The Commission expects that it will continue to evaluate the need for other changes to equity market structure during the pending of the Pilot.

2. Expand Transaction Fee Pilot To Include Non-Exchange Trading Centers

The Transaction Fee Pilot would not require ATSS or other non-exchange trading venues to comply with the limits to transaction fees or rebates imposed by the Pilot. Some commenters believed that non-exchange trading centers should be included in the Pilot and that the representativeness of the data obtained from the Pilot would be impaired by the exclusion of ATSS and other off-exchange trading centers.¹⁰²³ For example, one commenter stated that the Pilot “would not gather any insight into the trading patterns at those centers” because the Commission would be unable to “follow order flow across all trading venues in the market, leaving it with an incomplete picture of the issue it seeks to study.”¹⁰²⁴ Another commenter believed that excluding non-exchange trading centers could skew the results of the Pilot, as broker-dealers could shift order flow away from exchanges in response to the Pilot, thereby limiting the Commission’s understanding of the overall impact of changes to transaction-based fees and rebates.¹⁰²⁵

An alternative design that includes non-exchange trading centers like ATSS would be broader than the Pilot—not only because such a design would include more trading venues, but also because such a design would have to account for the fact that non-exchange trading centers like ATSS use other inducements, besides transaction-based fees and rebates, to incent order flow.¹⁰²⁶ The inclusion of non-exchange trading centers could, therefore, supply information about a more complete set of order routing decisions, increase the representativeness of the results obtained, and provide a deeper understanding regarding the ways in which exogenous shocks to transaction-

based fees and rebates (and other inducements) affect order routing decisions. For example, a pilot that included non-exchange trading centers, and regulated the inducements used by such centers, might impact payment for the internalization of retail order flow, which would allow researchers to evaluate how these inducements affect retail order routing. A pilot that addressed payment for order flow on non-exchange trading centers could, in turn, result in more retail order flow being routed to lit exchanges, which also could increase displayed liquidity and potentially improve price efficiency.

However, the inclusion of non-exchange trading venues may be difficult to implement. First, non-exchange trading venues charge idiosyncratic and individually-negotiated fees to market participants, and often bundle fees for ATS usage with other broker-dealer fees, such that it would be exceptionally difficult to create and then impose a uniform fee regime on such venues.¹⁰²⁷ For example, it is unclear how an ATS that charges an “all in” flat fee for service and does not charge individually for executions would be able to comply with a transaction-based fee cap. To comply with the Pilot’s transaction-based pricing restrictions, non-exchange venues may be required to entirely restructure their customer relationships to move to a transaction-based pricing model for the duration of the Pilot, which would impose notable costs on those venues. Further, any alternative design would address other inducements provided by non-exchange trading centers aside from transaction-based fees and rebates, in order to produce a fully accurate analysis of the impact of fees and inducements on order routing behavior, market quality, and execution quality. Such a design would be much more complex than the current Proposal. Finally, an alternative design that included non-exchange trading centers also would impose costs on such venues that would be higher relative to the costs imposed on exchanges under the current design, because the Pilot would require non-exchange trading venues to track and report more detailed information than is currently required by the

¹⁰²³ See Section II.A.4 for a summary of these comments. Some commenters believed that non-exchange trading centers should only be subject to the rebate prohibitions of the no-rebate Test Group. See, e.g., Capital Group Letter, at 3; AJO Letter, at 1; Nasdaq Letter III, at 9.

¹⁰²⁴ NYSE Letter I, at 9. See also, e.g., Cboe Letter I, at 12, 19; Nasdaq Letter I, at 2, 5; ViableMkts Letter, at 1–2.

¹⁰²⁵ Wellington Letter, at 2. See also, e.g., Oppenheimer Letter, at 3. One commenter also believed that the Pilot could affect the way that securities are traded off-exchange and confound the Commission’s ability to understand the baseline for remuneration occurring off-exchange or the impact that the Pilot has on that baseline. Nasdaq Letter I, at 7. The Commission does not believe that its ability to analyze the impact of changes to transaction-based fees and rebates will be unduly limited, due to information that is now available from Regulation ATS-N and Rule 606.

¹⁰²⁶ See, e.g., Morgan Stanley Letter, at 3 n.5; BIDS Letter, at 1–2; AJO Letter, at 2.

¹⁰²⁷ See, e.g., AJO Letter, at 2–3. It is possible that non-exchange trading venues might respond to the Pilot by choosing to change their existing fee structures to align with the maker-taker (or taker-maker) pricing models employed by exchanges, which could lead to additional costs for such venues. See, e.g., Virtu Letter, at 6; SIFMA Letter, at 5; Clearpool Letter, at 4; Healthy Markets Letter I, at 9–10.

¹⁰¹⁹ *Id.*

¹⁰²⁰ RBC Letter I, at 2.

¹⁰²¹ Spatt Letter, at 4.

¹⁰²² Babelfish Letter, at 3.

Commission.¹⁰²⁸ As discussed above, exchanges are required to file each fee change with the Commission on Form 19b-4 and to disclose the entirety of their schedule of fees on their website, while non-exchanges venues are not subject to those requirements. Thus, including non-exchange trading venues in an alternative version of the Pilot would likely increase the costs of the Pilot because it would require a dramatic shift in the disclosure regime for these trading centers.

Although the Pilot excludes non-exchange trading centers, the Commission will still be able to obtain information regarding the proportion of trades executing on such platforms from several sources. First, several transaction datasets, including trade reporting facility (TRF) data and TAQ data, provide information on off-exchange trades, including ATS trades. Further, FINRA produces periodic (weekly) data on the total shares of NMS securities executed on individual ATSS.¹⁰²⁹ Thus, researchers would obtain information from the Pilot to identify whether exogenous shocks to transaction-based fees on exchanges have an effect on order routing decisions, including whether broker-dealers alter their routing of order to ATSS during the Pilot.

3. Trade-At Test Group

The Commission considered an alternative in which the Transaction Fee Pilot would include a “trade-at” provision in conjunction with the changes to the fees and rebates currently in the Pilot. The trade-at alternative would require that orders be routed to a market with the best displayed price or are executed at a materially improved price.

Some commenters supported including a trade-at subgroup to provide supplemental information to the Commission about how a combination of trade-at provisions coupled with revisions to transaction-based fees and rebates affect broker-dealer order routing decisions.¹⁰³⁰ Some other commenters, however, asserted that

¹⁰²⁸ Although Form ATS-N requires ATSS to provide public disclosures about the different types of fees they charge, along with the ranges of those fees and service bundling, these disclosures do not provide as much information as the fee disclosures that will be required by the Pilot.

¹⁰²⁹ By combining the FINRA volume data executed by ATSS for a given security with other data, such as TAQ, which would provide total share volume for a given security, a researcher would be able to estimate the fraction of ATS trading as a percentage of total trading in NMS securities over the same time period.

¹⁰³⁰ See, e.g., Adorney Letter, at 1; Birch Bay Letter, at 1; NYSE Letter II, at 5.

including a trade-at requirement could compromise the results of the Pilot as it would introduce an additional variable to one or more treatment groups.¹⁰³¹ To address this concern, the Pilot could include separate test subgroups that also include a trade-at requirement, in addition to requirements regarding transaction fees and/or rebates.

Such an approach would require including more stocks in the Pilot. If the amount of securities in each Test Group were too small, the Pilot results would not achieve statistical power. Accordingly, in order to provide information on the impacts of an exogenous shock to transaction fees and rebates while also providing additional information on the effects of a trade-at requirement, the Pilot either would need to increase the number of Pilot securities or add to its duration.

The expected impact on liquidity of the inclusion of a trade-at test group is unclear. The recently concluded Tick Size Pilot included a trade-at test group. The Tick Size Pilot included a trade-at group because exchanges were concerned that, in the current market environment, a significantly larger tick size could induce order flow to go off exchange.¹⁰³² For the Transaction Fee Pilot, commenters were split on whether marketable order flow will be more or less likely to flow to off-exchange trading centers, with some believing that as access fees for some test groups decline, order flow could be drawn back to exchanges. However, in considering the Tick Size Pilot, it is important to note that it only considered the impacts of trade-at when the tick size was increased and only for smaller, less liquid stocks. The effects might not be the same with 1 cent tick size and more liquid stocks that are included in the Pilot. One commenter noted that in the trade-at test group for the Tick Size Pilot, the number of shares displayed at the NBBO increased and quote volatility was reduced in the trade-at test group

¹⁰³¹ See, e.g., See Citadel Letter, at 6; Fidelity Letter, at 10; Citigroup Letter, at 3; SIFMA Letter, at 4; TD Ameritrade Letter, at 7; Virtu Letter, at 5; ICI Letter I, at 2.

¹⁰³² See Tick Size Pilot Approval Order at 27538-42. As discussed above in Section IV.D.2, a number of commenters have expressed similar concerns with respect to the Transaction Fee Pilot, whereby a reduction in rebates could widen spreads and lead to a migration of order flow to off-exchange trading centers. In the Tick Size Pilot, the trade-at provision applied when the tick size was increased and only smaller, less liquid stocks were included in that pilot. The Transaction Fee Pilot, on the other hand, also will include more liquid stocks and does not test the wider tick increments that were the subject of the Tick Size Pilot, so the effects of trade-at may or may not be the same between the two pilots.

relative to the other test groups.¹⁰³³ Nevertheless, analysis of the Tick Size Pilot data does not reveal significant execution quality or market quality effects of a trade-at rule. Specifically, the data suggests there was no change in effective spreads or price efficiency due to the trade-at requirement.¹⁰³⁴ Results from the Tick Size Pilot also suggest that trade-at impacts trade location. Specifically, off-exchange share of trading volume decreased and on-exchange market share increased, particularly at inverted exchanges. However, volume for midpoint crossing off-exchange venues increased, but this could be the result of the midpoint exception to the Tick Size Pilot’s trade-at requirements.¹⁰³⁵ This shift in trading volume may occur because a trade-at provision increases incentives to display prices because off-exchange trading centers would no longer be able to match the best price offered elsewhere, but instead would have to provide significant price improvement or start displaying their quotes at the NBBO. These findings suggest that the inclusion of a trade-at test group may benefit exchanges, which may experience increased trading volumes, but be costly for off-exchange venues, which may lose trading volume.

4. Alternative Pilot

One commenter suggested an alternative to the Pilot that would involve directly lowering the Rule 610(c) access fee cap to \$0.0010 and establishing a moratorium on fee increases for existing market data, connectivity, and co-location services.¹⁰³⁶ The commenter believed its alternative would allow a direct test of the “anachronistic” 610(c) fee cap level and make exchange fees more competitive with non-exchange venues.¹⁰³⁷ In addition, similar to the other alternative discussed directly above, it would impose a lower cap on

¹⁰³³ See Birch Bay Capital Letter, at 1. Other commenters that supported the inclusion of a trade-at test group. See, e.g., C&C Letter, at 1. *But see* Citadel Letter, at 6 (noting that there was no evidence of improvement in market quality in the trade-at test groups in the Tick Size Pilot).

¹⁰³⁴ *Id.* at 990. See also Farley, Ryan and Eric Kelley and Walter Puckett, Dark Trading Volume and Market Quality: A Natural Experiment (April 3, 2018) available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3088715.

¹⁰³⁵ See Comerton-Forde, Carole and Gregoire, Vincent and Zhong, Zhuo, Inverted Fee Structures, Tick Size, and Market Quality (August 10, 2018), Journal of Financial Economics (JFE), Forthcoming, available at SSRN: <https://ssrn.com/abstract=2939012> or <http://dx.doi.org/10.2139/ssrn.2939012>.

¹⁰³⁶ See NYSE Letter III, at 3; see also Issuer Network Letter II, at 4.

¹⁰³⁷ See *id.*

all NMS stocks simultaneously and thereby address the potential competitive impact on largely identical ETPs and listed issuers. The commenter suggested this alternative would reduce the complexity of implementation and would avoid “introducing new classes of restrictions” including prohibition on payment of transaction-based rebates.¹⁰³⁸ Further, in linking transaction fees to market data and connectivity fees, the commenter suggested that its alternative would address commenters’ desire “to reduce their cost to trade” without banning rebates for liquidity provision, which it argued could negatively impact displayed quotes.¹⁰³⁹

However, the combined fee cap and moratorium would not feature a control group. While the commenter suggested the Commission could “use comparisons to the preceding period to evaluate its efficacy,” the absence of a control group could frustrate researchers’ ability to detect changes as the results could be influenced by short-term external events. This alternative also does not directly test the absence of rebates.

Further, the direct link between transaction fees and market data and connectivity fees is unclear in the context of the Pilot’s objectives. In particular, the potential distortions that can accompany fee-and-rebate pricing models are unique to exchange transaction fee-and-rebate pricing models and do not directly result from market data and connectivity services. It is therefore unclear how the moratorium on market data fees would impact the objective of the Pilot to study how rebates and fees affect order routing decisions and market quality.

Finally, the commenter’s suggested moratorium would only apply to “existing” market data and connectivity and would therefore preserve current fee levels for those services and would seem to not restrict an exchange’s ability to offer new and improved market data, connectivity, and co-location services potentially at higher fee levels. While a moratorium on market data and connectivity fees during a transaction fee experiment could be beneficial to the extent it holds steady a separate variable that can have a marginal impact on order routing, those costs are fixed and therefore the impact, if any, would be slight. Further, to the extent that exchanges were free to introduce new

products at different price points, the moratorium could be easily circumvented. Accordingly, with the exception of the moratorium on market data fees, the suggested alternative is substantively similar to the alternative discussed above to not conduct any pilot and instead proceed to immediately lower the 610(c) fee cap.

5. Adjustments to the Transaction Fee Pilot Structure

The alternatives described above provide significant revisions to the approach or the representativeness of the Transaction Fee Pilot. This section complements and expands on the discussion in Section II.C., above, to discuss a number of alternatives and adjustments to the basic structure of the Pilot. These include an alternative time frame for the Pilot duration or the pre- and post-Pilot Periods, a zero access fee test group, alternative access fee caps, and the inclusion of non-displayed liquidity or depth-of-book provisions in Test Group 1.

a. Length of the Core Pilot

The core Pilot would last for two years with an automatic sunset at the end of the first year unless the Commission publishes a notice determining that the Pilot shall continue for up to one additional year.¹⁰⁴⁰ Alternatively, the Pilot could feature an earlier or later Pilot sunset or a longer or shorter Pilot duration. As discussed above in Section II.D., a number of commenters discussed the proposed Pilot duration, with some believing the proposed duration would incentivize participation and disincentivize “waiting out” the Pilot, with others believing that a shorter duration would be sufficient to produce results and still others recommending that the Pilot run for a full two year period with no automatic sunset. Further, one commenter questioned the Commission’s statement that the market reacts quickly to pricing changes implemented by exchanges, but that some market participants might not change their behavior unless the Pilot was in place for at least a year.¹⁰⁴¹

As alternatives to the Pilot’s duration, the Commission considered an earlier Pilot sunset that would shorten the anticipated Pilot duration, reducing the time period during which potential negative (or positive) temporary effects resulting from the Pilot could occur. However, if the anticipated duration of

the Pilot were too short, some broker-dealers could choose to not alter their current order routing behavior and wait out the length of the Pilot, which would limit the usefulness of the information obtained by the Pilot.¹⁰⁴² In other words, in response to the comment noted above, while many market participants may quickly adopt their order routing in response to fee and rebate changes, others may take longer to respond. A shorter anticipated duration also could reduce the usefulness of the information and the benefits provided by the Pilot, if it reduced the statistical power of any analyses, because it would make it more difficult for researchers to detect whether an effect actually exists.¹⁰⁴³

Conversely, as the anticipated Pilot duration increases so too would the costs for exchanges, as this would extend the duration of the changes to their revenue models and the costs of compliance with the Pilot requirements. However, all else being equal, increasing the duration beyond the automatic sunset at one year, or up to the maximum two years, is unlikely to provide any significant increases in the benefits identified above, unless some event occurs during the first year that impacts the Pilot study in a way that potentially could make the results unrepresentative, in which case an extension of the Pilot for additional time (up to two years) could increase the benefits. As discussed in Section IV.C.1.a.i, the Commission believes that the Pilot duration with a one-year sunset would make it economically worthwhile for broker-dealers to alter their order-routing decisions, because it would likely be costly for broker-dealers to sit out the full duration of the Pilot or retain pre-Pilot order routing decisions for its duration. Further, a longer Pilot duration would increase the exposure of market participants to the uncertain outcomes of the pilot in terms of liquidity, trading volume, market

¹⁰⁴² See *infra* Section IV.C.1.a.iii, which discusses the potential limitations associated with pilots, including a discussion that some market participants could choose to not alter their behavior if the Pilot had a short duration.

¹⁰⁴³ To address commenter concerns about the size of the Pilot, the Commission performed a supplemental analysis that refined the power analysis included in the Proposing Release. Based on this refined power analysis, the Commission estimates that it would require a minimum Pilot duration of 12 months to achieve sufficient statistical power to detect whether an effect is actually present; therefore, any Pilot duration shorter than 12 months would have diminished ability to detect the effect of transaction-based fees and rebates on order routing decisions, execution quality, and market quality. See Section IV.C.1.a.ii.(1) and *supra* note 695 for further information on this supplemental analysis.

¹⁰³⁸ See *id.* The commenter also suggested that avoiding this “new class of restrictions” would limit the “likelihood of court challenge” to the Pilot. *Id.*

¹⁰³⁹ See *id.*

¹⁰⁴⁰ See *supra* Section II.D. for a summary and discussion of the commenters discussing the Pilot’s proposed duration.

¹⁰⁴¹ See NYSE Letter I, at 16.

share, competition etc. that are discussed above.

The Commission could alternatively adopt a pilot with a fixed two-year duration. A two-year pilot without the possibility of an automatic sunset at the end of the first year would have the same maximum costs as a pilot with a sunset, but would not have the potential to reduce costs in the event that the sunset occurs. On the other hand, broker-dealers could perceive higher expected costs of not adapting to the Pilot under the alternative because they could expect the sunset to reduce the anticipated duration of the Pilot. However, the Commission believes that broker-dealers that base their order routing decisions on transaction-based fees and rebates will incur sufficient costs from not enacting changes to their order routing decisions in response to the Pilot with an expected one-year sunset such that they are not likely to sit out the Pilot Period; therefore, a mandatory two-year pilot would not likely provide any additional behavioral change that would not already be obtainable from the Pilot.

b. Length of Pre- and Post-Pilot Periods

The Pilot requires a six-month pre-Pilot Period and a six-month post-Pilot Period, which would allow the Commission and the public to compare order routing decisions in the same stocks both with and without the Pilot restrictions as well as across stocks in different test groups. Alternatively, the Commission could adopt shorter pre-Pilot and post-Pilot Periods, which a few commenters recommended.¹⁰⁴⁴ Shorter pre- and post-Pilot Periods would reduce costs to exchanges of having to provide the Exchange Transaction Fee Summary and order routing data. These reduced costs come at the trade-off of shorter horizons for data collection that could lead to reduced statistical power and reduced ability of the Pilot to produce representative results.¹⁰⁴⁵

In particular, a short pre-Pilot Period introduces additional risk that analysis of certain Pilot data may be uninformative. Even if researchers were to wait until the conclusion of the post-Pilot period to begin analysis, they may not be able to identify the effects of the

¹⁰⁴⁴ See IEX Letter I, at 4; FIA Letter, at 4. *But cf.* FIF Letter, at 9; Health Markets Letter I, at 19.

¹⁰⁴⁵ The Commission staff estimates that with the given number of stocks in the Pilot, that the Pilot would need to produce approximately six months of pre and post Pilot data to detect changes unique to ETPs and stocks. The power tests determined the number of days of data that would be required to detect a 10% change in the daily volume of various subgroups of securities for stocks and a 10% change in quoted spreads for ETPs.

Pilot because data obtained from the post-Pilot period could be confounded by information about the Pilot. For example, if exchanges alter their fee structures in the post-Pilot period as a result of the Pilot (rather than revert back to their fee models in effect prior to the Pilot), data from the post-Pilot period likely would be unable to supplement or substitute for data obtained from a shorter pre-Pilot Period, underscoring the importance of a longer pre-Pilot Period. Thus, the value of any analyses obtained from the Pilot may be limited, thereby reducing the information obtained from such analyses for any potential regulatory recommendations.

c. Zero Access Fee Test Group

As discussed above, a few commenters recommended that the Pilot include a zero access fee test group to further test the relationship between exchange fee models and order routing, which would effectively serve to temporarily remove a source of revenue for exchanges entirely from a subset of securities.¹⁰⁴⁶ This approach could produce additional information, such as how order routing behavior and execution quality change in the absence of transaction-based fees (and likely rebates), that could be useful to the Commission to facilitate future policy decisions regarding the transaction-based pricing structures of exchanges.

The inclusion of a zero access fee test group would eliminate the transaction-based fee model for a subset of securities, which could force exchanges to create entirely new revenue models for securities in this test group with uncertain outcomes for both exchanges and market participants. Doing so presents the risk that if coupled to the current Pilot, the inclusion of a zero access fee test group could contaminate the analysis of both the current test groups and the zero access fee test group. This could occur if exchanges determine that it is cheaper to subsidize trading in the zero access fee group with revenue earned from the control group and the other test groups. In this case the inclusion of the zero access fee test group would alter the behavior of the exchanges with regard to all their other securities, which would weaken the exogeneity of the shock imposed by the Pilot for all test groups.

d. Alternative Test Groups

As discussed above, the Pilot will have two test groups: (1) One that caps access fees at \$0.0010 and (2) one that

¹⁰⁴⁶ See, e.g., Healthy Markets Letter I, at 8; OMERS Letter, at 2.

prohibits rebates or Linked Pricing for displayed and non-displayed liquidity and along the entire depth of the limit order book. Alternatively, the Commission could have proposed other test groups with different caps on access fees. For example, the Commission could instead have proposed only caps on access fees (*i.e.*, fees for removing liquidity), similar to those in the EMSAC recommendation,¹⁰⁴⁷ or could have increased the number of test groups to test more gradations in alternative fee caps. As a few commenters suggested, and as discussed above, the Commission also could have included a test group with a higher fee cap level than Rule 610(c) or no cap on fees at all.¹⁰⁴⁸ Further, as discussed above, a few commenters suggested other alternatives, like basis point pricing or pricing based on the tick size.

Many alternatives would have replaced the no-rebate test group with another access fee cap group. These options could provide information to help refine the analysis of the impact of access fees on various market outcomes. However, if the Pilot did not include a no-rebate test group and only studied exogenous shocks to access fees, it would produce more limited information about the role that rebates play in affecting market outcomes. As discussed in more detail above, the Commission believes that it is important to have a test group that specifically focuses on the removal of rebates and the corresponding impact on conflicts of interest, execution quality, and market quality.

An alternative to increase the number of test groups to study the impact of the various levels of access fee on various market outcomes could produce additional refinement to the data currently in the Pilot. However, to produce more gradation in the caps to access fees, would increase the complexity of the Pilot, and potentially increase the implementation costs to account for the additional test groups. Increasing the number of test groups would also increase the number of stocks subject to the pilot thereby increasing the fraction of the market exposed to the uncertain outcomes of the Pilot.

e. Non-Displayed Liquidity and Depth of Book

Only Test Group 2, which eliminates rebates or Linked Pricing, would restrict

¹⁰⁴⁷ The maximum access fee caps under the EMSAC recommendation would be \$0.0020 (Test Group 1), \$0.0010 (Test Group 2), and \$0.0002 (Test Group 3).

¹⁰⁴⁸ See, e.g., Angel Letter II, at 2; Cboe Letter I, at 28

fees or rebates or Linked Pricing in non-displayed liquidity and depth-of-book, though a small number of commenters suggested expanding those conditions to Test Group 1.¹⁰⁴⁹ As discussed in Section II.C., under the Pilot, incentives to move liquidity away from the displayed liquidity or the top-of-book could be created if rebates are not eliminated along the entire depth of the book as well as for displayed and non-displayed liquidity. If an exchange were to offer rebates for those types of orders, it would reduce the benefits of the no-rebate test group as it would inhibit the Commission's ability to collect data on a treatment group in which rebates do not exist and thus cannot impact or potentially distort the markets and market participants.

An alternative could have applied the transaction fee restrictions in Test Group 1 to both non-displayed liquidity and the depth-of-book. However, the Commission believes this is unnecessary. In particular, the Commission does not believe that exchanges would have the incentive to charge higher fees or pay higher rebates for executions against or of non-displayed and depth of book compared to fees and rebates charged against or of top-of book depth in Test Group 1 securities. Unlike the problem associated with exchanges offering rebates (in the no-rebate test group) for these types of orders that could emerge if rebates or Linked Pricing were not prohibited across the entire depth of the limit order book, the Commission does not believe that under the Pilot incentives would emerge for exchanges to charge higher fees to access non-displayed interest or depth-of-book quotes. Charging more for non-displayed liquidity as well as the depth of the limit order book would lead to increased uncertainty for market participants that take liquidity, as they would not be able to control whether their executions are with displayed or non-displayed liquidity and would be uncertain of their fees when they enter their orders. If the fees differed between displayed and non-displayed liquidity, broker-dealers would face cost uncertainty when making routing decisions over what access fees they would incur. From the exchanges' perspective, having differing fees for posting or interacting with displayed and non-displayed liquidity would be burdensome to track and more costly to administer and, to the extent the uncertainty it creates dissuades market participants from routing to their

market, could ultimately cause them to lose order flow.

f. Linked Pricing

Test Group 2 will prohibit rebates and Linked Pricing. As discussed above, a few commenters suggested that the Commission also prohibit exchanges from offering other inducements, including discounts on *non*-transaction fees that are linked to trading volumes in the no-rebate Test Group.¹⁰⁵⁰ While such an approach would have the added benefit of testing a greater absence of exchange-offered inducements, it would further increase costs and add to the complexity and scope of the Pilot. As currently designed, the no-rebate Test Group is intended to test the extent to which exchange rebates introduce potential distortions to execution quality and market quality and introduce conflicts of interest in order routing. Adding more variables to the Pilot will increase its complexity, size, and cost, while potentially reducing benefits by inhibiting the Commission's stated focus on gathering data specifically on the impact of exchange transaction rebates. With more variables, it becomes difficult to isolate the impact of any particular change without dramatically expanding the size, scope, and complexity of the Pilot.

Alternatively, the Commission could instead prohibit only rebates, without also prohibiting Linked Pricing, in Test Group 2. While such an approach would reduce costs and simplify the Pilot design, it could reduce the benefits of Test Group 2. Specifically, one of the aims of Test Group 2 is to examine the impact between take fees (rebates) and make rebates (fees) in current exchange fee-and-rebate pricing models. For example, as discussed above, fees may be set above their equilibrium price (within the current regulatory structure) in order to subsidize rebates. An alternative that prohibits rebates but not the ability of an exchange to cross-subsidize make rebates from take fees (or vice versa) would provide opportunities for exchanges to work around the rebate prohibition thus perpetuating the potential subsidization distortion. Consequently, such an alternative would reduce the benefits of Test Group 2 by reducing the effectiveness of the information received about NMS stocks in the no-rebate Test Group.

Finally, the Commission could ban Linked Pricing for all market participants in Test Group 2, including market makers. This alternative would allow the Commission to study how

markets react in the absence of both rebates and Linked Pricing incentives, whereas the adopted Rule does not allow this analysis. The Commission recognizes that banning Linked Pricing in Test Group 2 may yield different results than under the adopted Rule, which permits an exchange to adopt rules to provide non-rebate Linked Pricing to its registered market makers in consideration for the market maker meeting rules-based market quality metrics. However, the Commission is interested in specifically exploring the effect of eliminating rebates, but continuing to allow Linked Pricing for a narrow, targeted segment of the market, *i.e.*, market makers with specific obligations designed to improve an exchange's market quality without the various effects previously discussed that may be associated with rebates, in order to understand any effects of rebates on liquidity. In so much as this is an alternative that could be considered at the completion of the Pilot, the Commission seeks to test specifically for this scenario.

g. Execution Quality Data

The Pilot does not require the exchanges to produce publicly available information on order execution quality statistics. As an alternative, the Commission could require that the exchanges produce daily order execution quality statistics similar to that required in Appendix B.1 of the Tick Size Pilot Plan. Compared to the Pilot, this alternative could provide information on order-based measures of execution quality such as effective spreads, price improvement, and realized spreads for liquidity taking orders, in addition to the trade-based measures available from public data sources. As noted in the baseline, order-based measures of execution quality from the incorporation of order size and the costs of latency. Exchanges currently have systems in place to produce daily order-based execution quality data, which would limit implementation costs. However, the Commission recognizes that exchanges incur ongoing costs to produce these data.

Unlike for the Tick Size Pilot, the Commission does not believe that daily order-based execution quality statistics are as important for the Transaction Fee Pilot as it was for the Tick Size Pilot and that the benefits for the Transaction Fee Pilot could be marginal. In particular, the Commission believes that trade-based execution quality statistics will be sufficient to measure execution quality for liquidity taking orders and notes that the order routing data to be received by the Commission will contain data that

¹⁰⁴⁹ See Clearpool Letter, at 3–4; Healthy Markets Letter I, at 16.

¹⁰⁵⁰ See RBC Letter I, at 3; MFS Letter, at 2–3.

can facilitate the measurement of execution quality for liquidity providing orders.

h. Excluding or Rotating Securities

As discussed above in Section II.B., some commenters were concerned that the Pilot could introduce unintended adverse competitive effects for ETPs or corporate issuers that were placed in certain test groups if those test groups resulted in negative impacts on the trading characteristics of those securities. Accordingly, some commenters, discussed above, recommended either excluding ETPs from the Pilot, clustering ETPs following similar strategies into a single test group, or rotate ETPs through the various test groups and the control group.¹⁰⁵¹ Other commenters, discussed above, suggested allowing issuers to opt out of the Pilot.¹⁰⁵² The benefits of such an approach would be the avoidance of potential harm or disparate impact on a particular ETP or issuer vis-à-vis its peers and primary competitors. As discussed more fully above, that potential for harm is uncertain at best and commenters held deeply conflicting views with some asserting that the Pilot could cause widespread harm while others argued that its impact will be mostly positive when considering the potential distortions that will be mitigated or alleviated in the absence of exchange rebates or lower fees.

Although there is a potential for temporary competitive effects as a result of the Pilot, outright exclusion of ETPs or clustering like ETPs in the same test group would harm the representativeness of the data produced by the Pilot or the ability of the Pilot to facilitate causal analyses. Exclusion of ETPs, for example, could undermine the ability of the Commission to use the Pilot results to inform future policy making with respect to exchange fees, particularly if ETPs have the potential to respond differently to changes to fees and rebates than do other types of NMS stocks.

Similarly, as discussed above, allowing issuers to opt out of the Pilot could undermine the representativeness of the Pilot's treatment groups and potentially bias the Pilot's results, depending on the number of issuers that opt out and whether some unobservable characteristic is correlated with both an issuer's decision to opt out and market outcomes. In turn, the benefits of the Pilot would be reduced if researchers are less able to draw specific conclusions about the impact of the

Pilot as a result of issuers opting out of the Pilot.

Another alternative solution would be to rotate all stocks and or ETPs through each of the test groups for a given amount of time such that all stocks and ETPs spend the same amount of time in each test group. This methodology would reduce potential costs by mitigating potential competitive effects of the Pilot on issuers by ensuring that all stocks and ETPs receive similar exposure to each test group. Rotation would also have the advantage of allowing many more changes from one test group to another, which would create additional independent observations about the effect of the Pilot on various outcomes, potentially increasing statistical power.

The realization of the benefit of additional statistical power would depend on how broker-dealers react to the changes. If broker-dealers need to adjust after every change, the statistical power could be lower with rotation than without. To the extent that broker-dealers design their order routing algorithms to the test group, then the time needed for broker-dealers to adapt to a set of Pilot securities that changes every few months would be minimal. The broker-dealer would simply replace one list of securities in a given test group with another. In this case there would likely be a period at the beginning of the Pilot where broker-dealers experiment somewhat to optimize their algorithms in which the data on broker dealer behavior would be noisier, but after that initial adjustment, broker-dealers would not need to repeat their experimentation after every rotation. However, to the extent that broker-dealers' order routing algorithms are bespoke to a given security, rotation could decrease the statistical power of the tests because each rotation would include a period of time during which broker-dealers adjust where the data is noisier and harder to extract a signal from.

This alternative, however, is also likely to be more complex and have higher costs than the Pilot. The exchange compliance costs of rotation would be marginally greater than the compliance costs of the Pilot because it would involve additional compliance checks and complexity, but would likely be largely automated. The added complexity for exchanges could be more significant because complexity increases the risk of errors. To the extent that broker-dealers set up their systems to automate the rotation, they, too would have only marginally higher costs with rotation. However, to the extent that broker-dealers' order routing algorithms

are bespoke to a given security, then rotation would be both more costly for broker-dealers who would have to re-optimize their algorithms every time a stock is included or excluded from a given test group.

V. Regulatory Flexibility Analysis

The Regulatory Flexibility Act ("RFA")¹⁰⁵³ requires Federal agencies, in promulgating rules, to consider the impact of those rules on small entities. The Commission certified, pursuant to section 605(b) of the RFA,¹⁰⁵⁴ that, if adopted, Rule 610T would not have a significant impact on a substantial number of small entities.¹⁰⁵⁵

The Commission solicited comments regarding this certification and received 1 comment.¹⁰⁵⁶ The commenter stated that "the Commission is obligated under the RFA to adequately address the Proposal's costs to small-capitalization issuers covered under the statute."¹⁰⁵⁷ The commenter cited *Aeronautical Repair Station Ass'n v. FAA* as support for its assertion that the RFA requires the Commission to take into account costs to small-capitalization issuers as they are "third-party entities incur[ing] downstream costs."¹⁰⁵⁸ The Commission believes the commenter misconstrues the legal finding in the case to which it cited, as the case confirms the general premise that the RFA analysis shall focus on the impact of a rule on a substantial number of small entities that are "directly affected and therefore regulated by," in other words subject to, such rule's requirements.¹⁰⁵⁹ For purposes of the Commission rulemaking in connection with the RFA, Rule 610T, by its terms, applies only to national securities exchanges registered with the Commission under Section 6 of the Exchange Act.¹⁰⁶⁰

¹⁰⁵³ 5 U.S.C. 601 *et seq.*

¹⁰⁵⁴ 5 U.S.C. 605(b).

¹⁰⁵⁵ The Pilot is discussed in detail in Sections I and II, above. We discuss the potential economic consequences, including the estimated compliance costs and burdens, of the Pilot in Section IV (Economic Analysis) and Section III (Paperwork Reduction Act) above.

¹⁰⁵⁶ See NYSE Letter I, at 13–14.

¹⁰⁵⁷ *Id.* at 14, n.50.

¹⁰⁵⁸ See *id.* (citing 494 F.3d 161, 177 (D.C. Cir. 2007)).

¹⁰⁵⁹ See *Aeronautical Repair Station Ass'n v. FAA*, 494 F.3d 161, 177 (D.C. Cir. 2007) (further stating that the RFA "requires that the agency conduct the relevant analysis or certify 'no impact' for those small businesses that are 'subject to' the regulation, that is, those to which the regulation 'will apply.'").

¹⁰⁶⁰ See *supra* Sections III (Paperwork Reduction Act) and IV (Economic Analysis) (discussing, among other things, the current market environment and compliance obligations for national securities exchanges).

¹⁰⁵¹ See *supra* Section II.B.

¹⁰⁵² See *id.*

With regard to a national securities exchange, the Commission's definition of a small entity is an exchange that has been exempt from the reporting requirements of 17 CFR 242.601 (Rule 601 of Regulation NMS), and is not affiliated with any person (other than a natural person) that is not a small business or small organization.¹⁰⁶¹ None of the national securities exchanges registered under Section 6 of the Exchange Act that would be subject to the Pilot are "small entities" for purposes of the RFA. In particular, none of the equities exchanges are exempt from Rule 601 of Regulation NMS. Accordingly, the proposed rule will not apply to any "small entities." Therefore, for the foregoing reasons, the Commission again certifies that Rule 610T will not have a significant economic impact on a substantial number of small entities for purposes of the RFA.

VI. Statutory Authority and Text of the Rule Amendments

Pursuant to the Exchange Act, and particularly Sections 3(b), 5, 6, 11A, 15, 17, and 23(a) thereof, 15 U.S.C. 78c, 78e, 78f, 78k-1, 78o, 78q, and 78w(a), the Commission amends title 17 of the Code of Federal Regulations in the manner set forth below.

List of Subjects

17 CFR Part 200

Administrative practice and procedure, Authority delegations (Government agencies), Organization and functions (Government agencies).

17 CFR Part 242

Brokers, Reporting and recordkeeping requirements, Securities.

For the reasons set out in the preamble, the Commission amends title 17, chapter II of the Code of Federal Regulations as follows:

PART 200—ORGANIZATION; CONDUCT AND ETHICS; AND INFORMATION AND REQUESTS

■ 1. The authority citation for part 200 continues to read in part as follows:

Authority: 15 U.S.C. 77c, 77o, 77s, 77z-3, 77sss, 78d, 78d-1, 78d-2, 78o-4, 78w, 78ll(d), 78mm, 80a-37, 80b-11, 7202, and 7211 *et seq.*, unless otherwise noted.

* * * * *

■ 2. Amend § 200.30-3 by adding (a)(84) to read as follows:

§ 200.30-3 Delegation of authority to Director of Division of Trading and Markets.

* * * * *

(a) * * *

(84) To issue notices pursuant to 17 CFR 242.610T(b)(1)(i) and (c) (Rule 610T(b)(1)(i) and (c)).

* * * * *

PART 242—REGULATIONS M, SHO, ATS, AC, NMS AND SBSR AND CUSTOMER MARGIN REQUIREMENTS FOR SECURITY FUTURES

■ 3. The authority citation for part 242 continues to read as follows:

Authority: 15 U.S.C. 77g, 77q(a), 77s(a), 78b, 78c, 78g(c)(2), 78i(a), 78j, 78k-1(c), 78l, 78m, 78n, 78o(b), 78o(c), 78o(g), 78q(a), 78q(b), 78q(h), 78w(a), 78dd-1, 78mm, 80a-23, 80a-29, and 80a-37.

■ 4. Add § 242.610T to read as follows:

§ 242.610T Equity transaction fee pilot.

(a) *Pilot pricing restrictions.*

Notwithstanding § 242.610(c), on a pilot basis for the period specified in paragraph (c) of this section, in connection with a transaction in an NMS stock, a national securities exchange shall not:

(1) For *Test Group 1*, impose, or permit to be imposed, any fee or fees for the display of, or execution against, the displayed best bid or best offer of such market that exceed or accumulate to more than \$0.0010 per share;

(2) For *Test Group 2*, provide to any person, or permit to be provided to any person, a rebate or other remuneration in connection with an execution, or offer, or permit to be offered, any linked pricing that provides a discount or incentive on transaction fees applicable to removing (providing) liquidity that is linked to providing (removing) liquidity, except to the extent the exchange has a rule to provide non-rebate linked pricing to its registered market makers in consideration for meeting market quality metrics; and

(3) For the *Control Group*, impose, or permit to be imposed, any fee or fees in contravention of the limits specified in § 242.610(c).

(b) *Pilot securities*—(1) *Initial List of Pilot Securities.* (i) The Commission shall designate by notice the initial List of Pilot Securities, and shall assign each Pilot Security to one Test Group or the Control Group. Further, the Commission may designate by notice the assignment of NMS stocks that are interlisted on a Canadian securities exchange to Test Group 2 or the Control Group.

(ii) For purposes of this section, "Pilot Securities" means the NMS stocks designated by the Commission on the initial List of Pilot Securities pursuant to paragraph (b)(1)(i) of this section and any successors to such NMS stocks. At the time of selection by the

Commission, an NMS stock must have a minimum share price of \$2 to be included in the Pilot and must have an unlimited duration or a duration beyond the end of the post-Pilot Period. In addition, an NMS stock must have an average daily volume of 30,000 shares or more to be included in the Pilot. If the share price of a Pilot Security in one of the Test Groups or the Control Group closes below \$1 at the end of a trading day, it shall be removed from the Pilot.

(iii) For purposes of this section, "primary listing exchange" means the national securities exchange on which the NMS stock is listed. If an NMS stock is listed on more than one national securities exchange upon which the NMS stock has been listed the longest shall be the primary listing exchange.

(2) *Pilot Securities Exchange Lists.* (i) After the Commission selects the initial List of Pilot Securities and prior to the beginning of trading on the first day of the Pilot Period each primary listing exchange shall publicly post on its website downloadable files containing a list, in pipe-delimited ASCII format, of the Pilot Securities for which the exchange serves as the primary listing exchange. Each primary listing exchange shall maintain and update this list as necessary prior to the beginning of trading on each business day that the U.S. equities markets are open for trading through the end of the post-Pilot Period.

(ii) The Pilot Securities Exchange Lists shall contain the following fields:

- (A) Ticker Symbol;
- (B) Security Name;
- (C) Primary Listing Exchange;
- (D) Security Type:
 - (1) Common Stock;
 - (2) ETP;
 - (3) Preferred Stock;
 - (4) Warrant;
 - (5) Closed-End Fund;
 - (6) Structured Product;
 - (7) ADR; and
 - (8) Other;
- (E) Pilot Group:
 - (1) Control Group;
 - (2) Test Group 1; and
 - (3) Test Group 2;
- (F) Stratum Code; and
- (G) Date the Entry Was Last Updated.

(3) *Pilot Securities Change Lists.* (i) Prior to the beginning of trading on each trading day the U.S. equities markets are open for trading throughout the end of the post-Pilot Period, each primary listing exchange shall publicly post on its website downloadable files containing a Pilot Securities Change List, in pipe-delimited ASCII format, that lists each separate change applicable to any Pilot Securities for

¹⁰⁶¹ See 17 CFR 240.0-10(e).

which it serves or has served as the primary listing exchange. The Pilot Securities Change List will provide a cumulative list of all changes to the Pilot Securities that the primary listing exchange has made to the Pilot Securities Exchange List published pursuant to paragraph (b)(2) of this section.

(ii) In addition to the fields required for the Pilot Securities Exchange List, the Pilot Securities Change Lists shall contain the following fields:

- (A) New Ticker Symbol (if applicable);
- (B) New Security Name (if applicable);
- (C) Deleted Date (if applicable);
- (D) Date Security Closed Below \$1 (if applicable);
- (E) Effective Date of Change; and
- (F) Reason for the Change.

(4) *Posting requirement.* All information publicly posted in downloadable files pursuant to paragraphs (b)(2) and (3) of this section shall be and remain freely and persistently available and easily accessible by the general public on the primary listing exchange's website for a period of not less than five years from the conclusion of the post-Pilot Period. In addition, the information shall be presented in a manner that facilitates access by machines without encumbrance, and shall not be subject to any restrictions, including restrictions on access, retrieval, distribution and reuse.

(c) *Pilot duration.* (1) The Pilot shall include:

- (i) A six-month "pre-Pilot Period;"
- (ii) A two-year "Pilot Period" with an automatic sunset at the end of the first year unless, no later than thirty days prior to that time, the Commission publishes a notice that the Pilot shall continue for up to one additional year; and
- (iii) A six-month "post-Pilot Period."

(2) The Commission shall designate by notice the commencement and termination dates of the pre-Pilot Period, Pilot Period, and post-Pilot Period, including any suspension of the one-year sunset of the Pilot Period.

(d) *Order routing datasets.* Throughout the duration of the Pilot, including the pre-Pilot Period and post-Pilot Period, each national securities exchange that facilitates trading in NMS stocks shall prepare and transmit to the Commission a file, in pipe-delimited ASCII format, no later than the last day of each month, containing sets of order routing data, for the prior month, in accordance with the specifications in paragraphs (d)(1) and (2) of this section. For the pre-Pilot Period, order routing

datasets shall include each NMS stock. For the Pilot Period and post-Pilot Period, order routing datasets shall include each Pilot Security. Each national securities exchange shall treat the order routing datasets as regulatory information and shall not access or use that information for any commercial or non-regulatory purpose.

(1) Dataset of daily volume statistics, with field names as the first record and a consistent naming convention that indicates the exchange and date of the file, that include the following specifications of liquidity-providing orders by security and separating orders by order designation (exchanges may exclude auction orders) and order capacity:

- (i) Code identifying the submitting exchange.
- (ii) Eight-digit code identifying the date of the calendar day of trading in the format "yyyymmdd."
- (iii) Symbol assigned to an NMS stock (including ETPs) under the national market system plan to which the consolidated best bid and offer for such a security are disseminated.
- (iv) The broker-dealer's CRD number and MPID.

(v) Order type code:
 (A) Inside-the-quote orders;
 (B) At-the-quote limit orders; and
 (C) Near-the-quote limit orders.

(vi) Order size codes:
 (A) <100 share bucket;
 (B) 100–499 share bucket;
 (C) 500–1,999 share bucket;
 (D) 2,000–4,999 share bucket;
 (E) 5,000–9,999 share bucket; and
 (F) ≥10,000 share bucket.

(vii) Number of orders received.
 (viii) Cumulative number of shares of orders received.

(ix) Cumulative number of shares of orders cancelled prior to execution.

(x) Cumulative number of shares of orders executed at receiving market center.

(xi) Cumulative number of shares of orders routed to another execution venue.

(xii) Cumulative number of shares of orders executed within:

- (A) 0 to < 100 microseconds of order receipt;
- (B) 100 microseconds to < 100 milliseconds of order receipt;
- (C) 100 milliseconds to < 1 second of order receipt;
- (D) 1 second to < 30 seconds of order receipt;
- (E) 30 seconds to < 60 seconds of order receipt;
- (F) 60 seconds to < 5 minutes of order receipt;
- (G) 5 minutes to < 30 minutes of order receipt; and

(H) ≥ 30 minutes of order receipt.

(2) Dataset of daily volume statistics, with field names as the first record and a consistent naming convention that indicates the exchange and date of the file, that include the following specifications of liquidity-taking orders by security and separating orders by order designation (exchanges may exclude auction orders) and order capacity:

(i) Code identifying the submitting exchange.

(ii) Eight-digit code identifying the date of the calendar day of trading in the format "yyyymmdd."

(iii) Symbol assigned to an NMS stock (including ETPs) under the national market system plan to which the consolidated best bid and offer for such a security are disseminated.

(iv) The broker-dealer's CRD number and MPID.

(v) Order type code:
 (A) Market orders; and
 (B) Marketable limit orders.

(vi) Order size codes:
 (A) <100 share bucket;
 (B) 100–499 share bucket;
 (C) 500–1,999 share bucket;
 (D) 2,000–4,999 share bucket;
 (E) 5,000–9,999 share bucket; and
 (F) ≥10,000 share bucket.

(vii) Number of orders received.

(viii) Cumulative number of shares of orders received.

(ix) Cumulative number of shares of orders cancelled prior to execution.

(x) Cumulative number of shares of orders executed at receiving market center.

(xi) Cumulative number of shares of orders routed to another execution venue.

(e) *Exchange Transaction Fee Summary.* Throughout the duration of the Pilot, including the pre-Pilot Period and post-Pilot Period, each national securities exchange that facilitates trading in NMS stocks shall publicly post on its website downloadable files containing information relating to transaction fees and rebates and changes thereto (applicable to securities having a price equal to or greater than \$1). Each national securities exchange shall post its initial Exchange Transaction Fee Summary prior to the start of trading on the first day of the pre-Pilot Period and update its Exchange Transaction Fee Summary on a monthly basis within 10 business days of the first day of each calendar month, to reflect data collected for the prior month. The information prescribed by this section shall be made available using the most recent version of the XML schema published on the Commission's website. All information publicly posted pursuant to this

paragraph (e) shall be and remain freely and persistently available and easily accessible on the national securities exchange's website for a period of not less than five years from the conclusion of the post-Pilot Period. In addition, the information shall be presented in a manner that facilitates access by machines without encumbrance, and shall not be subject to any restrictions, including restrictions on access, retrieval, distribution, and reuse. The Exchange Transaction Fee Summary shall contain the following fields:

- (1) Exchange Name;
- (2) Record Type Indicator:
 - (i) Reported Fee is the Monthly Average;
 - (ii) Reported Fee is the Median; and
 - (iii) Reported Fee is the Spot Monthly;
- (3) Participant Type:
 - (i) Registered Market Maker; and
 - (ii) All Others;
- (4) Pilot Group:
 - (i) Control Group;
 - (ii) Test Group 1; and
 - (iii) Test Group 2;
- (5) Applicability to Displayed and Non-Displayed Interest:
 - (i) Displayed only;
 - (ii) Non-displayed only; and
 - (iii) Both displayed and non-displayed;
- (6) Applicability to Top and Depth of Book Interest:
 - (i) Top of book only;
 - (ii) Depth of book only; and
 - (iii) Both top and depth of book;
- (7) Effective Date of Fee or Rebate;
- (8) End Date of Currently Reported Fee or Rebate (if applicable);
- (9) Month and Year of the monthly realized reported average and median per share fees and rebates;
- (10) Pre/Post Fee Changes Indicator (if applicable) denoting implementation of a new fee or rebate on a day other than the first day of the month;
 - (11) Base and Top Tier Fee or Rebate:
 - (i) Take (to remove):
 - (A) Base Fee/Rebate reflecting the standard amount assessed or rebated before any applicable discounts, tiers, caps, or other incentives are applied; and
 - (B) Top Tier Fee/Rebate reflecting the amount assessed or rebated after any applicable discounts, tiers, caps, or other incentives are applied; and
 - (ii) Make (to provide):
 - (A) Base Fee/Rebate reflecting the standard amount assessed or rebated before any applicable discounts, tiers, caps, or other incentives are applied; and
 - (B) Top Tier Fee/Rebate reflecting the amount assessed or rebated after any applicable discounts, tiers, caps, or other incentives are applied;

(12) Average Take Fee (Rebate)/ Average Make Rebate (Fee), by Participant Type, Test Group, Displayed/Non-Displayed, and Top/Depth of Book; and

(13) Median Take Fee (Rebate)/ Median Make Fee (Rebate), by Participant Type, Test Group, Displayed/Non-Displayed, and Top/Depth of Book.

By the Commission.

Dated: December 19, 2018.

Brent J. Fields,
Secretary.

Note: The following Appendix will not appear in the Code of Federal Regulations.

Appendix A

Key to Comment Letters Cited in Proposed Transaction Fee Pilot for NMS Stocks (File No. S7-05-18):

1. E-mail from David Adorney, C & C Trading LLC, to Commission, dated March 15, 2018 (“**Adorney E-mail**”).
2. Letter from Peter L. Swan, Professor of Finance, School of Banking and Finance, UNSW Sydney Business School, to Brent J. Fields, Secretary, Commission, dated March 26, 2018 (“**Swan Letter**”).
3. Letter from O. Mason Hawkins, CFA, Chairman & CEO, et al., Southeastern Asset Management, Inc., et al., to Brent J. Fields, Secretary, Commission, dated April 6, 2018 (“**Joint Asset Managers Letter**”).
4. Letter from Adam D. Clark-Joseph, University of Illinois at Urbana-Champaign, to Brent J. Fields, Secretary, Commission, dated April 9, 2018 (“**Clark-Joseph Letter**”).
5. Letter from Brent Woods, Chief Executive Officer, and Joseph Scafidi, Director of Trading, Brandes Investment Partners, to Brent J. Fields, Secretary, Commission, dated April 10, 2018 (“**Brandes Letter**”).
6. Letter from Sal Arnuk and Joe Saluzzi, Partners, Co-Founders and Co-Heads of Equity Trading, Themis Trading LLC, to Brent J. Fields, Secretary, Commission, dated April 27, 2018 (“**Themis Trading Letter I**”).
7. Presentation from the Institutional Equity Division, Morgan Stanley, to the Division of Trading and Markets, Commission, dated May 1, 2018 (“**Morgan Stanley Presentation**”).
8. E-mail from Tim Quast, President, Modern Networks IR LLC, to Brett Redfearn, Director, Division of Trading and Markets, Commission,

dated May 2, 2018 (“**ModernIR E-mail**”).

9. Letter from Sean D. Paylor, Trader, AJO, L.P., to Brent J. Fields, Secretary, Commission, dated May 7, 2018 (“**AJO Letter**”).
10. Letter from Tim Quast, President & Founder, Modern Networks IR LLC, to Brent J. Fields, Secretary, Commission, dated May 9, 2018 (“**ModernIR Letter**”).
11. Letter from Jeffrey P. Mahoney, General Counsel, Council of Institutional Investors, to Brent J. Fields, Secretary, Commission, dated May 10, 2018 (“**CII Letter**”).
12. Letter from Kelvin To, Founder & President, Data Boiler Technologies, LLC, to Brent J. Fields, Secretary, Commission, dated May 14, 2018 (“**Data Boiler Letter**”).
13. Letter from Chris Barnard to Commission, dated May 14, 2018 (“**Barnard Letter**”).
14. Letter from David Mechner, Chief Executive Officer, Pragma Securities, to Brent J. Fields, Secretary, Commission, dated May 14, 2018 (“**Pragma Letter**”).
15. Letter from Stuart J. Kaswell, Executive Vice President & Managing Director, General Counsel, Managed Funds Association, to Brent J. Fields, Secretary, Commission, dated May 15, 2018 (“**MFA Letter**”).
16. Letter from Timothy J. Mahoney, Chief Executive Officer, BIDS Trading L.P., to Brent J. Fields, Secretary, Commission, dated May 15, 2018 (“**BIDS Letter**”).
17. Letter from Brent Robertson, Managing Director, Trading, and Rob Gouley, Principal, Trading, Ontario Municipal Employees Retirement System Administration Corporation, to Brent J. Fields, Secretary, Commission, dated May 15, 2018 (“**OMERS Letter**”).
18. Letter from Marc Lipson, Robert F. Vandell Research Professor, Professor of Business Administration, University of Virginia School, Darden School of Business, to Commission, dated May 15, 2018 (“**Lipson Letter**”).
19. Letter from Anthony W. Godonis, Principal, Director of Trading, Copeland Capital Management, LLC, to Brent J. Fields, Secretary, Commission, dated May 18, 2018 (“**Copeland Letter**”).
20. Letter from George Hessler, CEO, Magma Trading, to Brent J. Fields, Secretary, Commission, dated May 18, 2018 (“**Magma Letter**”).
21. Letter from Eric Swanson, CEO, XTX Markets LLC, to Brent J. Fields,

- Secretary, Commission, dated May 22, 2018 (“**XTX Letter**”).
22. Letter from Douglas A. Cifu, Chief Executive Officer, Virtu Financial Inc., to Brent J. Fields, Secretary, Commission, dated May 23, 2018 (“**Virtu Letter**”).
23. Letter from Susan M. Olson, General Counsel, Investment Company Institute, to Brent J. Fields, Secretary, Commission, dated May 23, 2018 (“**ICI Letter I**”).
24. Letter from Mary E. Keefe, Managing Director, Regulatory Affairs, Nuveen, LLC, to Brent J. Fields, Secretary, Commission, dated May 23, 2018 (“**Nuveen Letter**”).
25. Letter from Thomas K. Lee, Executive Director & CIO, et al., New York State Teachers’ Retirement System, to Brent J. Fields, Secretary, Commission, dated May 23, 2018 (“**NYSTRS Letter**”).
26. Letter from Hubert De Jesus, Global Head of Market Structure and Electronic Trading, and Joanne Medero, U.S. Head of Global Public Policy, BlackRock, Inc., to Brent J. Fields, Secretary, Commission, dated May 23, 2018 (“**BlackRock Letter**”).
27. Letter from Frank L. Jobert, Jr., Executive Director, Louisiana Trustee Education Council, to Brent J. Fields, Secretary, Commission, dated May 23, 2018 (“**LATEC Letter**”).
28. Letter from Joanna Mallers, Secretary, FIA Principal Traders Group, to Brent J. Fields, Secretary, Commission, dated May 24, 2018 (“**FIA Letter**”).
29. Letter from Theodore R. Lazo, Managing Director & Associate General Counsel, Securities Industry and Financial Markets Association, to Brent J. Fields, Secretary, Commission, dated May 24, 2018 (“**SIFMA Letter**”).
30. Letter from Patrick J. Healy, Founder & CEO, Issuer Network, to Brent J. Fields, Secretary, Commission, dated May 24, 2018 (“**Issuer Network Letter I**”).
31. Letter from Linda M. Giordano, Co-Founder & CEO, and Jeffrey M. Alexander, Co-Founder & President, Babelfish Analytics, Inc., to Brent J. Fields, Secretary, Commission, dated May 24, 2018 (“**Babelfish Letter**”).
32. Letter from Dennis M. Kelleher, President & CEO, et al., Better Markets, Inc., to Brent J. Fields, Secretary, Commission, dated May 24, 2018 (“**Better Markets Letter**”).
33. Letter from Rich Steiner, Electronic Trading Strategist, RBC Capital Markets, to Brent Fields, Secretary, Commission, dated May 24, 2018 (“**RBC Letter I**”).
34. Letter from William H. Hebert, Managing Director, Financial Information Forum, to Brent J. Fields, Secretary, Commission, dated May 24, 2018 (“**FIF Letter**”).
35. Letter from Paul M. Russo, Managing Director, Goldman Sachs & Co. LLC, to Brent J. Fields, Secretary, Commission, dated May 24, 2018 (“**Goldman Sachs Letter**”).
36. Letter from Tyler Gellash, Executive Director, Healthy Markets Association, to Brent J. Fields, Secretary, Commission, dated May 24, 2018 (“**Healthy Markets Letter I**”).
37. Letter from Jason Clague, Executive Vice President, Operational Services, Charles Schwab & Co., Inc., to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**Schwab Letter**”).
38. Letter from Joseph Brennan, Principal & Global Head of Equity Investment Group, Vanguard, to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**Vanguard Letter**”).
39. Letter from Marc R. Bryant, Deputy General Counsel, Fidelity Investments, to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**Fidelity Letter**”).
40. Letter from Stephen John Berger, Managing Director, Government & Regulatory Policy, Citadel Securities, to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**Citadel Letter**”).
41. Letter from Kevin Cronin, Global Head of Trading, Invesco Ltd., to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**Invesco Letter**”).
42. Letter from Micah Hauptman, Financial Services Counsel, Consumer Federation of America, to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**CFA Letter**”).
43. Letter from Heidi W. Hardin, General Counsel, MFS Investment Management, to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**MFS Letter**”).
44. Letter from Timothy J. Coyne, Global Head of ETF Capital Markets, and Nathaniel N. Everts, Head of Trading, Americas, State Street Global Advisors, to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**State Street Letter**”).
45. Letter from Dennis Simmons, Executive Director, Committee on Investment of Employee Benefit Access, to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**CIEBA Letter**”).
46. Letter from Lisa Mahon Lynch, Director, Trading & Counterparty Services, Wellington Management Company LLP, to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**Wellington Letter**”).
47. Letter from Kevin Duggan, Managing Director, Execution & Treasury, Capital Markets, Ontario Teachers’ Pension Plan, et al., to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**Joint Pension Plan Letter**”).¹⁰⁶²
48. Letter from Tim Gately, Managing Director, Head of Americas Equities, Citigroup Global Markets Inc., to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**Citi Letter**”).
49. Letter from Michael Jacejko, Birch Bay Capital, LLC, to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**Birch Bay Letter**”).
50. Letter from Cynthia Lo Bessette, General Counsel & Executive Vice President, OFI Global Asset Management, Inc., et al., OppenheimerFunds, Inc., to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**Oppenheimer Letter**”).
51. Letter from Ray Ross, Chief Technology Officer, Clearpool Group, to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**Clearpool Letter**”).
52. Letter from James J. Angel, Associate Professor of Finance, Georgetown University, McDonough School of Business, to Commission, dated May 25, 2018 (“**Angel Letter I**”).
53. Letter from Chester Spatt, Former Chief Economist, Commission, to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**Spatt Letter**”).
54. Letter from Joseph Kinahan, Managing Director, Client Advocacy & Market Structure, TD Ameritrade, Inc., to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**TD Ameritrade Letter**”).
55. Letter from Edward S. Knight, Executive Vice President & Global Chief Legal & Policy Officer, Nasdaq, Inc., to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**Nasdaq Letter I**”).
56. Letter from Edward T. Tilly, Chairman & Chief Executive Officer,

¹⁰⁶² The Commission notes that it separately received a copy of a signatory page already attached to this letter from Karl Polen, Chief Investment Officer, Arizona State Retirement System, dated May 21, 2018. For purposes of this summary, the copy has not been counted as a separate letter or comment.

- Cboe Global Markets, Inc., to Brent J. Fields, Secretary, Commission, dated May 25, 2018 (“**Cboe Letter I**”).
57. Letter from Matt D. Lyons, Global Equity Trading Manager, and Peter D. Stutsman, U.S. Regional Equity Trading Manager, The Capital Group Companies, to Brent J. Fields, Secretary, Commission, dated May 30, 2018 (“**Capital Group Letter**”).
58. Letter from Mike Rask, Chairman of the Board, and James Toes, President & CEO, Security Traders Association, to Brent J. Fields, Secretary, Commission, dated May 31, 2018 (“**STA Letter**”).
59. Letter from Alan Harris, to Commission, dated May 31, 2018 (“**Harris Letter**”).
60. Letter from Elizabeth K. King, General Counsel & Corporate Secretary, NYSE Group, Inc., to Brent J. Fields, Secretary, Commission, dated May 31, 2018 (“**NYSE Letter I**”).
61. Letter from Kimberly Unger, CEO & Executive Director, The Security Traders Association of New York, Inc., to Brent J. Fields, Secretary, Commission, dated June 1, 2018 (“**STANY Letter**”).
62. Letter from John Ramsay, Chief Market Policy Officer, Investors Exchange LLC, to Brent J. Fields, Secretary, Commission, dated May 30, 2018 (“**IEX Letter I**”).
63. Market Commentary by Victor Lin, Credit Suisse, dated June 4, 2018 (“**Credit Suisse Commentary**”).
64. Letter from Rajesh Sharma, Corporate Secretary, Apache Corporation, to Brent J. Fields, Secretary, Commission, dated June 7, 2018 (“**Apache Letter**”).
65. Letter from “Danny Mulson” to Commission, dated June 7, 2018 (“**Mulson Letter I**”).
66. Letter from J.W. Verret, Associate Professor of Law, George Mason University, Antonin Scalia Law School, to Brent J. Fields, Secretary, Commission, dated June 11, 2018 (“**Verret Letter I**”).
67. Letter from James D. Rollins III, Chairman & Chief Executive Officer, BancorpSouth Bank, to Brent J. Fields, Secretary, Commission, dated June 11, 2018 (“**BancorpSouth Letter**”).
68. Letter from Jonathan A. Clark, Chief Executive Officer, and James C. Dolan, Chief Compliance Officer, Luminex Trading & Analytics LLC, to Brent J. Fields, Secretary, Commission, dated June 12, 2018 (“**Luminex Letter**”).
69. Letter from Mehmet Kinak, Vice President—Global Head of Systematic Trading & Market Structure, and Jonathan Siegel, Vice President—Senior Legal Counsel (Legislative & Regulatory Affairs), T. Rowe Price, to Brent J. Fields, Secretary, Commission, dated June 12, 2018 (“**T. Rowe Price Letter**”).
70. Letter from Jon R. Moeller, Vice Chairman & Chief Financial Officer, The Procter & Gamble Company, to Brent J. Fields, Secretary, Commission, dated June 13, 2018 (“**P&G Letter**”).
71. Letter from William P. Neuberger, Managing Director, Global Co-Head of Morgan Stanley Electronic Trading, and Andrew F. Silverman, Managing Director, Global Co-Head of Morgan Stanley Electronic Trading, Morgan Stanley & Co. LLC, to Brent J. Fields, Secretary, Commission, dated June 14, 2018 (“**Morgan Stanley Letter**”).
72. Letter from Larry Harris, Fred V. Keenan Chair in Finance, USC Marshall School of Business, to Brent J. Fields, Secretary, Commission, dated June 15, 2018 (“**Larry Harris Letter**”).
73. Letter from Keith Neumeyer, President & CEO, First Majestic Silver Corp., to Brent J. Fields, Secretary, Commission, dated June 19, 2018 (“**First Majestic Letter**”).
74. Letter from “Avarice Pleonexia” to Commission, dated June 20, 2018 (“**Pleonexia Letter**”).
75. Letter from John M. Freeman, Executive Vice President, Chief Legal Officer & Corporate Secretary, McDermott, to Brent J. Fields, Secretary, Commission, dated June 21, 2018 (“**McDermott Letter**”).
76. Letter from Janet McGinness, Corporate Secretary, Mastercard, Inc., to Brent J. Fields, Secretary, Commission, dated June 21, 2018 (“**Mastercard Letter**”).
77. Letter from Mark Elliott, Chief Financial Officer, Level Brands, Inc., to Brent J. Fields, Secretary, Commission, dated June 21, 2018 (“**Level Brands Letter**”).
78. Letter from Geir Øivind Nygård, Chief Investment Officer Asset Strategies, and Simon Enrich, Head of Market Structure Strategies, Norges Bank Investment Management, to Brent J. Fields, Secretary, Commission, dated June 21, 2018 (“**Norges Letter**”).
79. Letter from Neal V. Fenwick, Executive Vice President & Chief Financial Officer, ACCO Brands, Inc., to Brent J. Fields, Secretary, Commission, dated June 21, 2018 (“**ACCO Letter**”).
80. Letter from Thomas R. Kubera, Chief Accounting Officer & Interim Chief Financial Officer, SIFCO Industries, Inc., to Brent J. Fields, Secretary, Commission, dated June 21, 2018 (“**SIFCO Letter**”).
81. Letter from J.A. to Brent J. Fields, Secretary, Commission, dated June 22, 2018 (“**JA Letter I**”).
82. Letter from Timothy P. Olson, Senior Corporate Counsel & Corporate Secretary, NorthWestern Corporation, to Brent J. Fields, Secretary, Commission, dated June 22, 2018 (“**NorthWestern Letter**”).
83. Letter from Eric D. Koster, General Counsel & Secretary, Ethan Allen Interiors, Inc., to Brent J. Fields, Secretary, Commission, dated June 22, 2018 (“**Ethan Allen Letter**”).
84. Letter from Mark H. Collin, Senior Vice President, Chief Financial Officer & Treasurer, Unifit Corporation, to Brent J. Fields, Secretary, Commission, dated June 22, 2018 (“**Unifit Corporation**”).
85. Letter from Michael R. Peterson, Vice President, Corporate Secretary, & Associate General Counsel, to Brent J. Fields, Secretary, Commission, dated June 22, 2018 (“**Johnson Letter**”).
86. Letter from “Anonymous Anonymous” to Commission, dated June 22, 2018 (“**Anonymous Letter I**”).
87. Letter from Stephen C. Richter, Executive Vice President & CFO, Weingarten Realty, to Brent J. Fields, Secretary, Commission, dated June 22, 2018 (“**Weingarten Letter**”).
88. Letter from Richard L. Travis, Jr., Chief Financial Officer, Ennis, Inc., to Brent J. Fields, Secretary, Commission, dated June 22, 2018 (“**Ennis Letter**”).
89. Letter from Bryan H. Fairbanks, Chief Financial Officer, Trex Company, to Brent J. Fields, Secretary, Commission, dated June 22, 2018 (“**Trex Letter**”).
90. Letter from John J. Manning, Vice President, General Counsel & Secretary, Sensient Technologies Corporation, to Brent J. Fields, Secretary, Commission, dated June 25, 2018 (“**Sensient Letter**”).
91. Letter from John Christofilos, Senior Vice-President & Chief Trading Officer, AGF Investments Inc., to Brent J. Fields, Secretary, Commission, dated June 25, 2018 (“**AGF Letter**”).
92. Letter from Dean Shigemura, Vice Chairman & Chief Financial Officer, Bank of Hawaii Corporation, to Brent J. Fields, Secretary,

- Commission, dated June 25, 2018 (“**Hawaii Letter**”).
93. Letter from Jerry Fowden, Chief Executive Officer, Cott Corporation, to Brent J. Fields, Secretary, Commission, dated June 26, 2018 (“**Cott Letter**”).
94. Letter from Adam F. Wergeles, EVP & General Counsel, Leaf Group Ltd., to Brent J. Fields, Secretary, Commission, dated June 26, 2018 (“**Leaf Letter**”).
95. Letter from Haim Bodek, Managing Principal, and Stanislav Dolgoplov, Chief Regulatory Officer, Decimus Capital Markets, LLC, to Brent J. Fields, Secretary, Commission, dated June 26, 2018 (“**Decimus Letter**”).
96. Letter from Michael Sherman, Senior Vice President & General Counsel, Genesis Healthcare, Inc., to Brent J. Fields, Secretary, Commission, dated June 26, 2018 (“**Genesis Letter**”).
97. Letter from “Anonymous Anonymous” to Commission, dated June 27, 2018 (“**Anonymous Letter II**”).
98. Letter from Michael J. Schewel, Vice-President, General Counsel & Secretary, Tredegar Corporation, to Brent J. Fields, Secretary, Commission, dated June 27, 2018 (“**Tredegar Letter**”).
99. Letter from Nicholas C. Taylor, Chairman & CEO, Mexco Energy Corporation, to Brent J. Fields, Secretary, Commission, dated June 27, 2018 (“**Mexco Letter**”).
100. Letter from John Ramsay, Chief Market Policy Officer, Investors Exchange LLC, to Brent J. Fields, Secretary, Commission, dated June 27, 2018 (“**IEX Letter II**”).
101. Presentation from Security Traders Association to Commission, dated June 28, 2018 (“**STA Presentation**”).
102. Letter from Timothy W. Gorman, Executive Vice President & Chief Financial Officer, Energizer Holdings, Inc., to Brent J. Fields, Secretary, Commission, dated June 28, 2018 (“**Energizer Letter**”).
103. Letter from Christopher A. Iacovella, Chief Executive Officer, American Securities Association, to Brent J. Fields, Secretary, Commission, dated June 28, 2018 (“**ASA Letter**”).
104. Letter from W. Stancil Starnes, Chairman, President & Chief Executive Officer, ProAssurance Corporation, to Brent J. Fields, Secretary, Commission, dated June 29, 2018 (“**ProAssurance Letter**”).
105. Letter from Isabel Janci, Vice President, Investor Relations, The Home Depot, to Brent J. Field[s], Secretary, Commission, dated June 29, 2018 (“**Home Depot Letter**”).
106. Letter from Eric P. Sills, CEO & President, Standard Motor Products, Inc., to Brent J. Fields, Secretary, Commission, dated July 2, 2018 (“**SMP Letter**”).
107. Letter from Christopher T. Weber, Executive Vice President & Chief Financial Officer, Halliburton, to Brent J. Fields, Secretary, Commission, dated July 2, 2018 (“**Halliburton Letter**”).
108. Letter from Jennifer D. Whalen, Senior Vice President & Chief Financial Officer, Era Group Inc., to Brent J. Fields, Secretary, Commission, dated July 2, 2018 (“**Era Letter**”).
109. Letter from David M. Weisberger, Head of Equities, ViableMkts, to Brent J. Fields, Secretary, Commission, dated July 2, 2018 (“**ViableMkts Letter**”).
110. Letter from John S. Fischer, General Counsel, Natural Grocers by Vitamin Cottage, Inc., to Brent J. Fields, Secretary, Commission, dated July 3, 2018 (“**Natural Grocers Letter**”).
111. Letter from Mark J. Airola, Senior Vice President, General Counsel, Chief Administrative Officer & Corporate Secretary, Newpark Resources, Inc., to Brent J. Fields, Secretary, Commission, dated July 3, 2018 (“**Newpark Letter**”).
112. Letter from Jenny H. Parker, Senior Vice President—Finance, Secretary & Treasurer, Haverty Furniture Companies, Inc., to Brent J. Fields, Secretary, Commission, dated July 3, 2018 (“**Haverty Letter**”).
113. Letter from Adam W. Miller, Chief Financial Officer & Treasurer, Knight-Swift Transportation Holdings Inc., to Brent J. Fields, Secretary, Commission, dated July 5, 2018 (“**Knight-Swift Letter**”).
114. Letter from Tyler Gellasch, Executive Director, Healthy Markets Association, to Brent J. Fields, Secretary, Commission, dated July 6, 2018 (“**Healthy Markets Letter II**”).
115. Letter from R. Dale Lynch, Executive Vice President—Chief Financial Officer, Federal Agricultural Mortgage Corporation, to Brent J. Fields, Secretary, Commission, dated July 9, 2018 (“**Farmer Mac Letter**”).
116. Letter from Elizabeth K. King, General Counsel & Corporate Secretary, New York Stock Exchange, to Brent J. Fields, Secretary, Commission, dated July 10, 2018 (“**NYSE Letter II**”).
117. Letter from “Danny Mulson” to Commission, dated July 10, 2018 (“**Mulson Letter II**”).
118. Letter from Maria Trainor, Vice President, General Counsel & Secretary, Ampco-Pittsburgh Corporation, to Brent J. Fields, Secretary, Commission, dated July 11, 2018 (“**Ampco-Pittsburgh Letter**”).
119. Letter from Ted A. Dosch, Executive Vice President—Finance & Chief Financial Officer, Anixter International Inc., to Brent J. Fields, Secretary, Commission, dated July 13, 2018 (“**Anixter Letter**”).
120. Letter from John K. Lines, SVP/ Secretary & General Counsel, National HealthCare Corporation, to Brent J. Fields, Secretary, Commission, dated July 16, 2018 (“**NHC Letter**”).
121. E-mail from Patrick Healy, Founder & CEO, Issuer Network, to David Shillman, Commission, dated July 17, 2018 (“**Issuer Network E-mail**”).
122. Letter from R. Scott Mahoney, Senior Vice President—General Counsel & Secretary, AVANGRID, Inc., to Brent J. Fields, Secretary, Commission, dated July 18, 2018 (“**Avangrid Letter**”).
123. Letter from J.A. to Brent J. Fields, Secretary, Commission, dated July 19, 2018 (“**JA Letter II**”).
124. Letter from Ruairidh Ross, Deputy General Counsel & Assistant Secretary, HP Inc., to Brent J. Fields, Secretary, Commission, dated July 31, 2018 (“**HP Letter**”).
125. Letter from Glenn E. Tynan, Vice President & Chief Financial Officer, Curtiss-Wright Corporation, to Brent J. Fields, Secretary, Commission, dated August 3, 2018 (“**Curtiss-Wright Letter**”).
126. Letter from James J. Angel, Associate Professor of Finance, Georgetown University, McDonough School of Business, to Commission, dated August 3, 2018 (“**Angel Letter II**”).
127. Letter from John Ramsay, Chief Market Policy Officer, Investors Exchange LLC, to Brent J. Fields, Secretary, Commission, dated August 8, 2018 (“**IEX Letter III**”).
128. Letter from Fiona Reynolds, Chief Executive Officer, Principles for Responsible Investment, to Brent J. Fields, Secretary, Commission, dated August 15, 2018 (“**PRI Letter**”).
129. Letter from Walter K. Compton, Executive Vice President & General Counsel, Murphy Oil Corporation, to Brent J. Fields, Secretary,

- Commission, dated August 15, 2018 (“**Murphy Letter**”).
130. Letter from Sal Arnuk & Joe Saluzzi, Partners, Co-Founders & Co-Heads of Equity Trading, Themis Trading LLC, to Brent J. Fields, Secretary, Commission, dated August 16, 2018 (“**Themis Trading Letter II**”).
131. Letter from Jeffrey S. Davis, Nasdaq, Inc., to Brent J. Fields, Secretary, Commission, dated August 31, 2018 (“**Nasdaq Letter II**”).
132. Recommendation of the Investor Advisory Committee, dated September 13, 2018 (“**IAC Recommendation**”).
133. Letter from Sanda E. O’Connor, Chief Regulatory Affairs Officer, JPMorgan Chase & Co., to Brent J. Fields, Secretary, Commission, dated September 14, 2018 (“**JPMorgan Letter**”).
134. Letter from Anonymous Anonymous to Commission, dated September 21, 2018 (“**Anonymous Letter III**”).
135. Letter from John Ramsay, Chief Market Policy Officer, Investors Exchange LLC, to Brent J. Fields, Secretary, Commission, dated September 24, 2018 (“**IEX Letter IV**”).
136. Letter from Chris Concannon, President & Chief Operating Officer, Cboe Global Markets, Inc., to Brent J. Fields, Secretary, Commission, dated September 28, 2018 (“**Cboe Letter II**”).
137. Letter from Susan M. Olson, General Counsel, Investment Company Institute, to Brent J. Fields, Secretary, Commission, dated October 1, 2018 (“**ICI Letter II**”).
138. Letter from Katya Malinova, Mackenzie Investments Chair in Evidence-Based Investment Management, DeGroote School of Business, McMaster University, *et al.*, to Brent J. Fields, Secretary, Commission, dated October 1, 2018 (“**CSA Letter**”).
139. Letter from “Richard P. Grasso,” “Grasso Plumbing LLC,” to Brent J. Fields, Secretary, Commission, dated October 1, 2018 (“**Grasso Letter**”).
140. Letter from Ira S. Lederman, W.R. Berkley Corporation, to Brent J. Fields, Secretary, Commission, dated October 2, 2018 (“**Berkley Letter**”).
141. Letter from Stacey Cunningham, President, New York Stock Exchange, to Brent J. Fields, Secretary, Commission, dated October 2, 2018 (“**NYSE Letter III**”).
142. Letter from Rich Steiner, Electronic Trading Strategist, RBC Capital Markets, to Brent Fields, Secretary, Commission, dated October 16, 2018 (“**RBC Letter II**”).
143. Letter from Elizabeth K. King, General Counsel & Corporate Secretary, NYSE Group, to Brent J. Fields, Secretary, Commission, dated November 9, 2018 (“**NYSE Letter IV**”).
144. Letter from Elizabeth K. King, General Counsel & Corporate Secretary, NYSE Group, Inc., to Brent J. Fields, Secretary, Commission, dated November 20, 2018 (“**NYSE Letter V**”).
145. Letter from J.A. to Brent J. Fields, Secretary, Commission, dated December 3, 2018 (“**JA Letter III**”).
146. Letter from J.W. Verret to Brent J. Fields, Secretary, Commission, dated December 4, 2018 (“**Verret Letter II**”).
147. Letter from Patrick J. Healy, Founder & CEO, Issuer Network, to Brent J. Fields, Secretary, Commission, dated December 14, 2018 (“**Issuer Network Letter II**”).
148. Letter from Jeffrey S. Davis, Vice President & Deputy General Counsel, Nasdaq, Inc., to Brent J. Fields, Secretary, Commission, dated December 17, 2018 (“**Nasdaq Letter III**”).

Note: The following Exhibit will not appear in the Code of Federal Regulations.

Exhibit 1: Data definitions for the Exchange Transaction Fee Summary

The table below represents the data model for the reporting requirements of an Exchange Transaction Fee Summary. This data model reflects the disclosures required by 17 CFR 242.610T(e) and the logical representation of those disclosures to a corresponding XML element. The Commission’s XML schema is the formal electronic representation of this data model.

- **Concept**—the information content as described in 17 CFR 242.610T(e) items 1 through 13.
- **Element**—a name for the XML element.
- **Type**—the XML data type, either a list of possible values or a general type such as “number”.
- **Spot, Monthly**—How the element appears in a record of that type.
 - **R**—Required. The XML file is not valid unless this element is present.
 - **NA**—Not applicable. The element may appear in the record but its value is not to be used.
 - **O**—Optional. The XML file is valid without that element; whether it appears for a particular SRO, record type, test group, etc., depends on the actual fee being described. XML validation by itself cannot determine this.
- **When Absent**—If the element is absent, its value is interpreted as if it had been present with the value shown.
- **Definition**—Text to be included in the XML definition file (“schema”).

Concept	Element	Type	Spot	Monthly	When absent	Definition
Exchange	exch	Non-empty Text	R	R		A required unique code to identify each exchange in the Transaction Fee Pilot.
Record Type.	rt	S or M	R	R		A required record type indicator. M, if the fee type reported is the monthly realized fee (average or median fee); S, if the fee type reported is a spot fee schedule (base or top tier fee).
Participant Type.	ptcpt	MM, Other or Blank	O	O	Blank	MM, if the fees are for market makers, or else Other. Required for spot records if the exchange charged market makers and others different base and top tier fees. Required for monthly fee records if the exchange charged different average or median fees or pays different average or median fees. Otherwise blank or absent.
Pilot Group.	grp	1, 2, or C	R	R		A required indicator that identifies the test or control group during the Pilot and post-Pilot Period. 1, 2—Test Groups 1, 2; C—Control group.

Concept	Element	Type	Spot	Monthly	When absent	Definition
Displayed	disp	D, N, or B	R	R		D—Displayed, N—Not displayed, B—Both. For spot fee type records, if the fees are the same between displayed and non-displayed liquidity, then the exchange may report both in a single “B” record. For monthly records, this should be segmented into the average and median fee per share for displayed liquidity, and the average and median fee for non-displayed liquidity unless there are no differences between the average and median fees for displayed and non-displayed liquidity, in which case the exchange can report the average and median fee in a single “B” record.
Top/Depth	topOrDepth	T, D, or B	R	R		T—Fees for top-of-book liquidity; D—Fees for depth-of-book liquidity; B—Both. For spot records, if the fees are the same between top-of-book and depth-of-book liquidity, then the exchange may report both fees in a single “B” record. For monthly records, if there are no differences between the fees for top-of-book and depth-of-book liquidity, then the exchange may include only the average and median fees in a single “B” record.
Start Date	start	YYYY-MM-DD	R	O		The start date element must be present for a spot fee record, and the end element cannot appear alone. The effective date for any fee changes. This should correspond to the effective date referenced in the Form 19b-4 fee filings submitted to the Commission. This is needed in a monthly record only if fees changed on a day other than the first of the month; otherwise blank or absent.
End Date	end	YYYY-MM-DD or Blank	O	O	Blank	The last date that a given fee is viable prior to any fee changes. This column will be blank unless a mid-month change to fees is made. This should correspond to the last date that a given fee is applicable prior to the effective date of the new fee reflected in Form 19b-4 fee filings submitted to the Commission to capture any revisions to transaction-based fees and rebates. This is needed in a monthly record only if fees changed on a day other than the first of the month.
Month and Year.	YearMonth	YYYY-MM	NA	R		The year and month of the monthly realized reported average and median per share fees.
Pre/Post ..	preOrPost	1, 2, or Blank	O	O	Blank	An indicator variable needed only if the exchange changed fees on a day other than the first day of the month. Blank—there were no fee changes other than on the first day of the month. 1—The average and median are the pre-change average and median for the part of the month prior to the change. 2—The average and median are the post-change average and median for the part of the month after the change.
Base Taker Fee.	baseTakeFee	Number	R	NA		The Base Taker Fee is the standard per share fee assessed or rebate offered before any applicable discounts, tiers, caps, or other incentives are applied. Fees have a positive sign; rebates have a negative sign.
Top Tier Taker Fee.	topTierTakeFee	Number	R	NA		The Top Tier Taker Fee is the per share fee assessed or rebate offered after all applicable discounts, tiers, caps, or other incentives are applied. Fees have a positive sign; rebates have a negative sign.
Average Taker Fee.	avgTakeFee	Number	NA	R		The monthly average realized Taker fee assessed or rebate offered per share by category (<i>i.e.</i> , test group, participant type, displayed vs. non-displayed, and top-of-book vs. depth-of-book). Fees have a positive sign; rebates have a negative sign.
Median Taker Fee.	medianTakeFee	Number	NA	R		The monthly median realized Taker fee assessed or rebate offered per share by category (<i>i.e.</i> , test group, participant type, displayed vs. non-displayed, and top-of-book vs. depth-of-book), across broker-dealers. Fees have a positive sign; rebates have a negative sign.
Base Maker Fee.	baseMakeFee	Number	R	NA		The Base Maker Fee is the standard per share fee assessed or rebate offered before any applicable discounts, tiers, caps, or other incentives are applied. Fees have a positive sign; rebates have a negative sign.
Top Tier Maker Fee.	topTierFee	Number	R	NA		The Top Tier Maker Fee is the per share fee assessed or rebate offered all applicable discounts, tiers, caps, or other incentives are applied per share. Fees have a positive sign; rebates have a negative sign.
Average Maker Fee.	avgMakeFee	Number	NA	R		The monthly average realized Maker fee assessed or rebate offered per share by category (<i>i.e.</i> , test group, participant type, displayed vs. non-displayed, and top-of-book vs. depth-of-book). Fees have a positive sign; rebates have a negative sign.

Concept	Element	Type	Spot	Monthly	When absent	Definition
Median Maker Fee.	medianMakeFee	Number	NA	R		The monthly median realized Maker fee assessed or rebate offered per share by category (<i>i.e.</i> , test group, participant type, displayed vs. non-displayed, or top-of-book vs. depth-of-book), across broker-dealers. Fees have a positive sign; rebates have a negative sign.

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