Required fields are shown with yellow backgrounds and asterisks.

Page 1 of * 94

SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549
Form 19b-4

File No. * SR 2024 - * 016
Amendment No. (req. for Amendments *)

Filing by The Nasdaq Stock Market LLC

Pursuant to Rule 19b-4 under the Securities Exchange Act of 1934

Initial *	Amendment *	Withdrawal	Section 19(b)(2) *	Section 19(b)(3)(A) *	Section 19(b)(3)(B) *
✓				✓	

Pilot	Extension of Time Period for Commission Action *	Date Expires *

Rule

19b-4(f)(1)	19b-4(f)(4)
✓ 19b-4(f)(2)	19b-4(f)(5)
19b-4(f)(3)	19b-4(f)(6)

Notice of proposed change pursuant to the Payment, Clearing, and Settlement Act of 2010

Section 806(e)(1) *

Section 806(e)(2) *

Security-Based Swap Submission pursuant to the Securities Exchange Act of 1934
Section 3C(b)(2) *

Exhibit 2 Sent As Paper Document

Exhibit 3 Sent As Paper Document

Description

Provide a brief description of the action (limit 250 characters, required when Initial is checked *).

A proposal to offer members that maintain a minimum trading volume lower fees for specified market data and connectivity products.

Contact Information

Provide the name, telephone number, and e-mail address of the person on the staff of the self-regulatory organization prepared to respond to questions and comments on the action.

First Name * Daniel Last Name * Cantu

Title * AVP Principal Associate General Counsel

E-mail * Daniel.Cantu@Nasdaq.com

Telephone * (301) 978-8469 Fax

Signature

Pursuant to the requirements of the Securities Exchange of 1934, The Nasdaq Stock Market LLC has duly caused this filing to be signed on its behalf by the undersigned thereunto duly authorized.

Date 03/22/2024

By John Zecca
(Name *)

(Title *) EVP and Chief Legal Officer

NOTE: Clicking the signature block at right will initiate digitally signing the form. A digital signature is as legally binding as a physical signature, and once signed, this form cannot be changed.

John A. Zecca Date: 2024.03.22 09:51:31 -04'00'

Required fields are shown with yellow backgrounds and astericks.

SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

For complete Form 19b-4 instructions please refer to the EFFS website.

Form 19b-4 Information *

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SR-NASDAQ-2024-016 19b-4.docx

The self-regulatory organization must provide all required information, presented in a clear and comprehensible manner, to enable the public to provide meaningful comment on the proposal and for the Commission to determine whether the proposal is consistent with the Act and applicable rules and regulations under the Act.

Exhibit 1 - Notice of Proposed Rule Change *

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SR-NASDAQ-2024-016 Exhibit 1.docx

The Notice section of this Form 19b-4 must comply with the guidelines for publication in the Federal Register as well as any requirements for electronic filing as published by the Commission (if applicable). The Office of the Federal Register (OFR) offers guidance on Federal Register publication requirements in the Federal Register Document Drafting Handbook, October 1998 Revision. For example, all references to the federal securities laws must include the corresponding cite to the United States Code in a footnote. All references to SEC rules must include the corresponding cite to the Code of Federal Regulations in a footnote. All references to Securities Exchange Act Releases must include the release number, release date, Federal Register cite, Federal Register date, and corresponding file number (e.g., SR-[SRO]-xx-xx). A material failure to comply with these guidelines will result in the proposed rule change being deemed not properly filed. See also Rule 0-3 under the Act (17 CFR 240.0-3)

Exhibit 1A - Notice of Proposed Rule Change, Security-Based Swap Submission, or Advanced Notice by Clearing Agencies *

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The Notice section of this Form 19b-4 must comply with the guidelines for publication in the Federal Register as well as any requirements for electronic filing as published by the Commission (if applicable). The Office of the Federal Register (OFR) offers guidance on Federal Register publication requirements in the Federal Register Document Drafting Handbook, October 1998 Revision. For example, all references to the federal securities laws must include the corresponding cite to the United States Code in a footnote. All references to SEC rules must include the corresponding cite to the Code of Federal Regulations in a footnote. All references to Securities Exchange Act Releases must include the release number, release date, Federal Register cite, Federal Register date, and corresponding file number (e.g., SR-[SRO]-xx-xx). A material failure to comply with these guidelines will result in the proposed rule change being deemed not properly filed. See also Rule 0-3 under the Act (17 CFR 240.0-3)

Exhibit 2- Notices, Written Comments, Transcripts, Other Communications

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Copies of notices, written comments, transcripts, other communications. If such documents cannot be filed electronically in accordance with Instruction F, they shall be filed in accordance with Instruction G.

☐ Exhibit Sent As Paper Document

Exhibit 3 - Form, Report, or Questionnaire

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SR-NASDAQ-2024-016 Exhibit 3.docx

Copies of any form, report, or questionnaire that the self-regulatory organization proposes to use to help implement or operate the proposed rule change, or that is referred to by the proposed rule change.

☐ Exhibit Sent As Paper Document

Exhibit 4 - Marked Copies

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The full text shall be marked, in any convenient manner, to indicate additions to and deletions from the immediately preceding filing. The purpose of Exhibit 4 is to permit the staff to identify immediately the changes made from the text of the rule with which it has been working.

Exhibit 5 - Proposed Rule Text

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SR-NASDAQ-2024-016 Exhibit 5.docx

The self-regulatory organization may choose to attach as Exhibit 5 proposed changes to rule text in place of providing it in Item I and which may otherwise be more easily readable if provided separately from Form 19b-4. Exhibit 5 shall be considered part of the proposed rule change

Partial Amendment

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If the self-regulatory organization is amending only part of the text of a lengthy proposed rule change, it may, with the Commission's permission, file only those portions of the text of the proposed rule change in which changes are being made if the filing (i.e. partial amendment) is clearly understandable on its face. Such partial amendment shall be clearly identified and marked to show deletions and additions.

1. Text of the Proposed Rule Change

(a) The Nasdaq Stock Market LLC ("Nasdaq" or "Exchange"), pursuant to Section 19(b)(1) of the Securities Exchange Act of 1934 ("Act")[1] and Rule 19b-4 thereunder,[2] is filing with the Securities and Exchange Commission ("SEC" or "Commission") a proposal to encourage members to contribute liquidity to the Exchange by offering those that maintain a particular minimum trading volume lower fees for specified market data and connectivity products.

While these amendments are effective upon filing, the Exchange has designated the proposed amendments to be operative on September 1, 2024.

A notice of the proposed rule change for publication in the Federal Register is attached as Exhibit 1.

The text of the proposed rule change is attached as Exhibit 5.

(b) Not applicable.

(c) Not applicable.

2. Procedures of the Self-Regulatory Organization

The proposed rule change was approved by senior management of the Exchange pursuant to authority delegated by the Board of Directors (the "Board"). Exchange staff will advise the Board of any action taken pursuant to delegated authority. No other action is necessary for the filing of the rule change.

Questions and comments on the proposed rule change may be directed to:

Daniel A. Cantu
AVP, Principal Associate General Counsel
Nasdaq, Inc.

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1 15 U.S.C. § 78s(b)(1).

2 17 CFR 240.19b-4.

(301) 978-8469

3. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

a. Purpose

The purpose of the proposed rule change is to reward firms that meet a minimum average daily displayed volume with lower fees for Non-Display Usage and the Exchange's 40Gb and 10Gb Ultra high-speed connection to the Exchange.[3]

Non-Display Usage

Non-Display Usage is any method of accessing Nasdaq U.S. information that involves access or use by a machine or automated device without access or use of a display by a natural person. Examples of Non-Display Usage include, but are not limited to:

- Automated trading;
- Automated order/quote generation and/or order/quote pegging;
- Price referencing for use in algorithmic trading;
- Price referencing for use in smart order routing;
- Program trading and high frequency trading;
- Order verification;
- Automated surveillance programs;
- Risk management;
- Automatic order cancellation, or automatic error discovery;

[3] This proposal was initially filed on March 6, 2024, as SR-Nasdaq-2024-011. On March 20, 2024, that filing was withdrawn and replaced with SR-Nasdaq-2024-015. On March 22, 2024, SR-Nasdaq-2024-015 was withdrawn and replaced with the instant filing due to a technical error.

- Clearing and settlement activities;
- Account maintenance (e.g., controlling margin for a customer account); and
- "Hot" disaster recovery.

Although either top-of-book or depth-of-book data can be used for Non-Display Usage, the proposal modifies fees for depth-of-book data only.[4]

Non-Display fees are currently assessed on a per-subscriber[5] or per-firm basis. Monthly fees are $375 per Subscriber for 1-39 subscribers; $15,000 per firm for 40-99 subscribers; $30,000 per firm for 100-249 subscribers; and $75,000 per firm for 250 or more subscribers.

Under the proposed rule change, a member firm that meets the minimum ADV threshold discussed below would continue to pay those fees.

Firms that do not meet the minimum ADV threshold, however, as well as non-member firms, would pay the new monthly fees of $500 per subscriber for 1-39 subscribers; $20,000 per firm for 40-99 subscribers; $40,000 per firm for 100-249 subscribers; and $100,000 per firm for 250 or more subscribers.

Fiber Connections to the Exchange (40Gb and 10Gb Ultra)

Nasdaq offers customers the opportunity to co-locate their servers and equipment within the Nasdaq Data Center,[6] allowing participants an opportunity to reduce latency

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4 See Equity 7, Section 123 (Nasdaq Depth-of-Book data).

5 "Subscriber" is defined as a device or computer terminal or an automated service which is entitled to receive information.

6 See Nasdaq Co-Location (CoLo) Services, available at https://www.nasdaqtrader.com/trader.aspx?id=colo; Stock Exchange Data Center & Trading, available at https://www.nasdaq.com/solutions/nasdaq-co-location.

and network complexity. Nasdaq offers a variety of connectivity options to fit a firm's specific networking needs, including the high-speed 40Gb and 10Gb Ultra networks.

All of Nasdaq's colocation and connectivity options offer customers access to any or all Nasdaq exchanges through a single connection.[7] For example, a firm that is a member of all six Nasdaq exchanges that purchases services in the Nasdaq Data Center such as a 40G fiber connection, cabinet space, cooling fans, and patch cables only purchases these products or services once to use them for all six Nasdaq exchanges.

Nasdaq currently charges members an ongoing monthly fee of $21,100 for the 40Gb fiber connection and $15,825 for the 10Gb Ultra connection to the Nasdaq exchanges. Under the proposed rule change, a firm that meets the minimum ADV threshold would continue to pay those fees.

Member firms that do not meet the minimum ADV threshold discussed below, as well as non-member firms, would pay the new monthly fee of $23,700 for the 40Gb fiber connection and $17,800 for the 10Gb Ultra connection.

Minimum ADV

The proposal introduces the new term "Minimum ADV," which will mean the introduction by a member of at least one million shares of added executed displayed liquidity on average per trading day in all securities through one or more of the member's market participant identifiers ("MPIDs") on the Nasdaq Market Center. Average daily volume is calculated as the total volume of shares executed for all added displayed orders in all securities during the trading month divided by the number of trading days in that

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7 See Securities Exchange Act Release No. 84571 (November 9, 2018), 83 FR 57758 (November 16, 2018) (SR-Nasdaq-2018-086),

month, averaged over the six-month period preceding the billing month, or the date the firm became a member, whichever is shorter. New members will be deemed to meet the Minimum ADV for the first month of operation. Minimum ADV excludes sponsored access by a member on behalf of a third party. The minimum ADV threshold was designed to be accessible to all members to promote wide engagement with the Exchange.

Nasdaq does not expect any member to be disadvantaged by the proposal. Nasdaq is a maker-taker platform and, as such, offers rebates to members that offer displayed liquidity. With these rebates, no member should have any difficulty posting and executing sufficient displayed liquidity to meet the ADV threshold. The threshold is, moreover, set at a level that Nasdaq believes any member—even smaller members—should be able to meet without significant effort. Because the threshold applies to displayed liquidity only, the proposal should not impact the Best Execution obligations of any member. If all members were to meet this threshold, the proposal would add an incremental 60-80 million shares to Nasdaq's accessible liquidity.

Non-members that, by definition, do not post displayed liquidity to the market would pay the higher fees. This is because the non-members do not directly contribute order flow to the Exchange, but nevertheless benefit from that order flow through tighter spreads, better prices, and the other advantages of a more liquid platform, as discussed in further detail under Statutory Basis.

The Proposal Will Promote Competition Among Trading Venues

Exchanges, like all trading venues, compete as platforms. All elements of the platform—trade executions, market data, connectivity, membership, and listings—

operate in concert. Trade executions increase the value of market data; market data functions as an advertisement for on-exchange trading; listings increase the value of trade executions and market data; and greater liquidity on the exchange enhances the value of ports and colocation services.

As discussed under Statutory Basis, we have attached a data-based analysis demonstrating how platform competition works entitled "How Exchanges Compete: An Economic Analysis of Platform Competition" as Exhibit 3. The paper explains that exchanges are multi-sided platforms, whose value is dependent on attracting users to multiple sides of the platform. Issuers need investors, and every trade requires two sides to trade. To make its platform attractive to multiple constituencies, an exchange must consider inter-side externalities, meaning demand for one set of platform services depends on the demand for other services.

This proposal is designed to promote competition by providing an incentive for members to provide liquidity (therefore attracting investors and increasing the overall value of the platform) through charging lower fees for other platform services (i.e., market data and connectivity). This will lead to more displayed liquidity on the Exchange, enhancing and enriching the market data distributed to the industry, which then increases the amount of interest in the platform. This will also enable the Exchange to offer investors a more robust, lower cost-trading experience through tighter spreads and more efficient trading as discussed in Exhibit 3, placing it in a better competitive position relative to other exchanges and trading venues.[8]

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[8] To the degree that the additional liquidity is moved from off-exchange venues to on-exchange platforms, overall market transparency will improve as well.

b. Statutory Basis

The Exchange believes that its proposal is consistent with Section 6(b) of the Act,[9] in general, and furthers the objectives of Sections 6(b)(4) and 6(b)(5) of the Act,[10] in particular, in that it provides for the equitable allocation of reasonable dues, fees, and other charges among members and issuers and other persons using any facility, and is not designed to permit unfair discrimination between customers, issuers, brokers, or dealers.

Fees Produced in a Competitive Environment are an Equitable Allocation of Reasonable Dues, Fees, and Other Charges.

Reliance on competitive solutions is fundamental to the Act. Where significant competitive forces constrain fees, fee levels meet the Act's standard for the "equitable allocation of reasonable dues, fees, and other charges among members and issuers and other persons using its facilities,"[11] unless there is a substantial countervailing basis to find that a fee does not meet some other requirement of the Act.[12] Evidence of platform competition demonstrates that each exchange product is sold in a competitive environment, and its fees will be an equitable allocation of reasonable dues, fees, and other charges, provided that nothing about the product or its fee structure impairs competition.[13]

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9 15 U.S.C. § 78f(b).

10 15 U.S.C. §§ 78f(b)(4) and (5).

11 See 15 U.S.C. § 78f(b)(4).

12 See U.S. Securities and Exchange Commission, "Staff Guidance on SRO Rule filings Relating to Fees" (May 21, 2019), available at https://www.sec.gov/tm/staff-guidance-sro-rule-filings-fees ("Fee Guidance") ("If significant competitive forces constrain the fee at issue, fee levels will be presumed to be fair and reasonable, and the inquiry is whether there is a substantial countervailing basis to find that the fee terms nevertheless fail to meet an applicable requirement of the Exchange Act (e.g., that fees are equitably allocated, not unfairly discriminatory, and not an undue burden on competition).").

13 Nothing in the Act requires proof of product-by-product competition.

Congress directed the Commission to "rely on 'competition, whenever possible, in meeting its regulatory responsibilities for overseeing the SROs and the national market system.'"[14] Following this mandate, the Commission and the courts have repeatedly expressed their preference for competition over regulatory intervention to determine prices, products, and services in the securities markets.

In Regulation NMS, the Commission highlighted the importance of market forces in determining prices and SRO revenues and recognized that regulation of the national market system "has been remarkably successful in promoting market competition in its broader forms that are most important to investors and listed companies."[15]

As a result, the Commission has long relied on competitive forces to determine whether a fee proposal is equitable, fair, reasonable, and not unreasonably or unfairly discriminatory. In 2008, the Commission explained that "[i]f competitive forces are operative, the self-interest of the exchanges themselves will work powerfully to constrain unreasonable or unfair behavior."[16] In 2019, Commission Staff reaffirmed that "[i]f significant competitive forces constrain the fee at issue, fee levels will be presumed to be fair and reasonable . . . ."[17]

Accordingly, "the existence of significant competition provides a substantial basis for finding that the terms of an exchange's fee proposal are equitable, fair, reasonable,

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14 NetCoalition v. SEC, 715 F.3d 342, 534-35 (D.C. Cir. 2013); see also H.R. Rep. No. 94-229 at 92 (1975) ("[I]t is the intent of the conferees that the national market system evolve through the interplay of competitive forces as unnecessary regulatory restrictions are removed.").

15 See Securities Exchange Act Release No. 51808 (June 9, 2005), 70 FR 37496, 37499 (June 29, 2005) ("Regulation NMS Adopting Release").

16 See Securities Exchange Act Release No. 59039 (December 2, 2008), 73 Fed. Reg. 74,770 (December 9, 2008) (SR-NYSEArca-2006-21).

17 See Fee Guidance, supra n.10.

and not unreasonably or unfairly discriminatory."[18] Consistent with the Commission's longstanding focus on competition, Commission Staff have indicated that they would only look at factors outside of the competitive market if a "proposal lacks persuasive evidence that the proposed fee is constrained by significant competitive forces."[19]

Nothing in the Act Requires an Examination of Fees in Isolation

The Act mandates the "equitable allocation of reasonable dues, fees, and other charges among members and issuers and other persons using its facilities."[20] This provision refers generally to "reasonable dues, fees, and other charges" as a whole, not individual fees. Nothing in the Act requires the individual examination of specific

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18 See id.

19 See id. In the Fee Guidance, the Staff indicated that "[w]hen reviewing rule filing proposals . . . [it] is mindful of recent opinions by the D.C. Circuit," including Susquehanna International Group, LLP v. SEC, 866 F.3d 442 (D.C. Cir. 2017). However, the D.C. Circuit's decision in Susquehanna is irrelevant to the Commission's review of immediately effective SRO fee filings. Susquehanna involved the Commission's approval of a rule proposed under Section 19(b)(2) of the Act, not its evaluation of whether to temporarily suspend an SRO's immediately effective fee filing under Section 19(b)(3). A comparison of Sections 19(b)(2) and 19(b)(3) of the Act makes clear that the Commission is not required to undertake the same independent review, and make the same findings and determinations, for Section 19(b)(3) filings that it must for Section 19(b)(2) filings. In particular, Section 19(b)(2) requires the Commission to "find[ ] that [a] proposed rule change is consistent with the" Act before approving the rule. 15 U.S.C. § 78s(b)(2)(C)(i). Section 19(b)(3), by contrast, imbues the Commission with discretion, stating that it "may temporarily suspend" an immediately effective rule filing where "it appears to the Commission that such action is necessary or appropriate." As the Supreme Court has explained, statutes stating that an agency "may"—but need not—take certain action are "written in the language of permission and discretion." S. Ry. Co. v. Seaboard Allied Milling, 442 U.S. 444, 455 (1979); see also Crooker v. SEC, 161 F.2d 944, 949 (1st Cir. 1947) (per curiam). The "contrast" between Sections 19(b)(2) and 19(b)(3), the Commission itself has explained, "reflects the fundamental difference in the way Congress intended for different types of rules to be treated." Brief of Respondent SEC, NetCoalition v. SEC, 715 F.3d 342 (D.C. Cir. 2013) (Nos. 10-1421 et al.); see also id. at 42-43 ("[W]hile the Commission's authority to suspend a fee under Subsection (3)(C) is permissive, its duties under Subsection (2) are stated in mandatory terms."). Thus, neither Susquehanna, nor Section 19(b)(3) of the Act, requires the Commission to make independent findings that an immediately effective SRO fee filing such as this one is consistent with the Act. To the degree that the Susquehanna decision is applicable to any Commission action, however, the court held that the Commission is required to "itself find or determine" that a proposal meets statutory requirements, explaining that the Commission is "obligated to make an independent review" of an SRO's proposal, and not rely solely on the work of the SRO. See 866 F.3d at 446.

20 See 15 U.S.C. § 78f(b)(4).

product fees in isolation. Provided that a proposed rule change does not in and of itself undermine competition, evidence of platform competition is sufficient to show that the product operates in a competitive environment.

A determination of whether a proposal permits unfair discrimination between customers, issuers, brokers, or dealers remains a separate product-specific inquiry.

The Commission Has Recognized that Exchanges Are Subject to Significant Competitive Forces in the Market for Order Flow.

The fact that the market for order flow is competitive has long been recognized by the courts. In NetCoalition v. Securities and Exchange Commission, the D.C. Circuit stated, "[n]o one disputes that competition for order flow is 'fierce.' . . . As the SEC explained, '[i]n the U.S. national market system, buyers and sellers of securities, and the broker-dealers that act as their order-routing agents, have a wide range of choices of where to route orders for execution'; [and] 'no exchange can afford to take its market share percentages for granted' because 'no exchange possesses a monopoly, regulatory or otherwise, in the execution of order flow from broker dealers.'"[21]

All Exchange Products are Subject to Competition—Not Just Those Directly Related to Order Flow

As discussed more fully in our analysis, "How Exchanges Compete: An Economic Analysis of Platform Competition" (Exhibit 3), competition is not limited to order flow. Data shows that the combination of explicit all-in costs to trade and other implicit costs has largely equalized the cost to trade across venues.[22] This is a function of

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[21] See NetCoalition, 615 F.3d at 539 (D.C. Cir. 2010) (quoting Securities Exchange Act Release No. 59039 (December 2, 2008), 73 FR 74770, 74782-83 (December 9, 2008) (SR-NYSEArca-2006-21)).

[22] Competition across platforms constrains platform fees and results in "all-in" costs becoming equal across platforms. The Staff Guidance on SRO Rule Filings Relating to Fees, however, states that platform competition requires that the "overall *return* of the platform, rather than the *return* of any

the fact that, if the all-in cost to the user of interacting with an exchange exceeds market price, customers can and do shift their purchases and trading activity to other exchanges, and therefore the exchange must adjust one or more of its fees to attract customers.

This conclusion is particularly striking given that different exchanges engage in a variety of business models and offer an array of pricing options to appeal to different customer types. The largest exchanges operate maker-taker platforms, offering rebates to attract trading liquidity, which allows them to maintain actionable quotes with high liquidity and offer high-quality market data. The negative price charged to liquidity providers through rebates is part of the platform because it serves to create features attractive to other participants, including oftentimes tight spreads, actionable and lit quotes, and more valuable market data.

Inverted venues, in contrast, have the opposite price structure—liquidity providers pay to add liquidity, while liquidity takers earn a rebate. These platforms offer less liquidity, but better queue priority, faster fills, and lower effective spreads for investors. There are a wide range of other pricing models and product offerings among the dozens of lit and unlit trading venues that compete in the marketplace in addition to these examples.

The different strategies among exchanges also manifest in the pricing of other services, such as market data and connectivity. Some exchanges charge for such

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particular fees charged to a type of customer, . . . be used to assess the competitiveness of the platform's market," and that "[a]n SRO that wishes to rely on total platform theory must provide evidence demonstrating that competitive forces are sufficient to constrain the SRO's aggregate return across the platform." See Fee Guidance, supra n.10 (emphasis added). We do not know, and cannot determine, whether returns (as opposed to fees) are equalized across platforms, because we do not have detailed cost information from other exchanges. An analysis of returns, however, is unnecessary to show that competition constrains fees given that, as we demonstrate below, platform competition can be demonstrated solely by examining costs to users.

services, while others charge little or nothing (typically because the exchange is new or has little liquidity), just as some exchanges charge a fee per trade, while others pay rebates.

In assessing competition for exchange services, we must consider not only explicit costs, such as fees for trading, market data, and connectivity, but also the *implicit* costs of trading on an exchange. The realized spread, or markout, captures the implicit cost to trade on a platform.

The concept of markout was created by market makers trying to capture the spread while providing a two-sided (bid and offer) market. For market makers, being filled on the bid or the offer can cause a loss if the fill changes market prices. For example, a fill on a market maker's bid just as the stock price falls results in a "virtual loss," because the market maker has a long position with a new bid lower than the fill.

Negative markouts can be beneficial. For example, if an institutional investor is working a large buy order, negative markouts represent fills as the market falls, allowing later orders to be placed sooner, and likely at a better price, reducing the opportunity costs as well as explicit cost of building the position.

Data suggests that market participants employ sophisticated analytic tools to weigh the cost of immediate liquidity and lower opportunity costs against better spread capture (lower markouts) and explicit trading costs. As discussed in greater detail in Exhibit 3, the venues with the highest explicit costs—typically inverted and fee-fee venues—have the lowest implicit costs from markouts and vice versa. Higher positive markouts mean more spread capture, but those venues also tend to have the highest explicit costs, and provide the least liquidity, and positive externalities, to the market.

Considering both the explicit costs charged by exchanges for their various joint products and the implicit costs incurred by traders to trade on various exchanges, the data show that all-in trading costs across exchanges are largely equalized, regardless of different trading strategies offered by each platform for each individual service.

As such, platform competition has resulted in a competitive environment in the market for exchange services, in which trading platforms are constrained by other platforms' offerings, taking into consideration the all-in cost of interacting with the platform. This constraint is a natural consequence of competition and demonstrates that no exchange platform can charge excessive fees and expect to remain competitive, thereby constraining fees on all products sold as part of the platform. The existence of platform-level competition also explains why some consumers route orders to the exchange with the highest explicit trading costs even though other exchanges offer free or a net rebate for trading.[23]

Exchanges Compete at Both the Platform and Product Level

Exchange customers are differentiated in the value they place on the different products offered by exchanges and in their willingness to pay for those products. This occurs both on a firm-wide and a transaction basis; for example, individual customers "multi-home" on various platforms, and are thus able to route different trades to different platforms to take advantage of favorable economics offered on a trade-to-trade basis.

Exchanges compete by offering differentiated packages of pricing and products to attract different categories of customer. As in any competitive market, consumers will

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[23] Empirical evidence also shows that market data is more valuable from exchanges with more liquidity. Many customers decide not to take data from smaller markets, even though they are free or much lower cost than larger markets.

"vote with their feet," incentivizing platforms to supply an array of pricing and product offerings that suit diverse consumer needs far more effectively than a uniform, one-size-fits-some rigid product offering. If an exchange's pricing for a particular product gets out of line, such that its total return is boosted above competitive levels, market forces will discipline that approach because competing exchanges will quickly attract customer volume through more attractive all-in trading costs.

In addition, if a particular package of pricing and products is not attractive to a sufficient volume of customers in a particular category, those customers may elect not to purchase the service. This is why exchanges compete at a product level, as well as based on all-in trading costs.

Exchanges Compete with Off-Exchange Trading Platforms in Addition to Other Exchanges

As the SEC recently noted in its market infrastructure proposal,[24] the number of transactions completed on non-exchange venues has been growing. Allowing exchanges to compete as platforms will help exchanges compete against non-exchange venues, and, to the degree order flow is shifted from non-exchange to exchange venues, overall market transparency will improve.[25]

Exchanges have a unique role to play in market transparency because they publish an array of pre- and post-trade data that non-exchange venues, almost entirely, do not. Greater transparency benefits non-exchange venues by enabling them to provide more

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24 See Regulation NMS: Minimum Pricing Increments, Access Fees, and Transparency of Better Price Orders, Securities Exchange Act Release No. 96494 (File No. S7-30-22), available at https://www.sec.gov/rules/proposed/2022/34-96494.pdf.

25 Non-exchange venues rely on market data distributed by exchanges to set prices. Greater transparency allows both exchange and non-exchange venues to operate more effectively and efficiently.

accurate pricing to their customers, and by helping such venues set their own prices, benchmark, analyze the total cost of ownership, and assess their own trading strategies.

Allowing exchanges to compete effectively as platforms has other positive network effects. Larger trading platforms offer lower average trading costs. As trading platforms attract more liquidity, bid-ask spreads tighten, search costs fall (by limiting the number of venues that a customer needs to check to assess the market), and connection costs decrease, as customers have no need to connect to all venues.[26] The whole is therefore greater (in the sense that it is more efficient) than the sum of the parts.

This is not to say that smaller established trading platforms do not have a role to play. They provide specialized services that cater to individual customer needs. These specialized services help the smaller exchanges grow by driving liquidity to their platforms, and, if they are successful, achieve the economies of scale that benefit the larger enterprises. Because the total costs of interacting with an exchange are roughly equal, smaller exchanges offset higher trading costs with lower connectivity, market data, or other fees. While the mix of fees will change as exchanges grow, the all-in cost of interacting with the exchange remains roughly the same.

Acknowledging that exchanges compete as platforms and approving fees expeditiously on that basis will improve the ability of exchanges to compete against non-exchange venues, and, to the degree order flow is shifted to exchanges, both transparency and efficiency will improve.

The Proposed Fees Are Equitable and Reasonable Because They Will Be Subject to Competition.

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[26] In addition, Nasdaq's experience shows that fewer customers connect with smaller trading venues than with larger venues.

This proposal offers member firms an incentive to display liquidity through lower non-display and connectivity fees. The intent is to generate a "virtuous cycle," in which the proposed fee structure will attract more liquidity to the Exchange, making it a more attractive trading venue, and thereby attracting more liquidity.

Incentive programs have been widely adopted by exchanges, and are reasonable, equitable, and non-discriminatory because they are open on an equal basis to similarly situated members and provide additional benefits or discounts that are reasonably related to the value to an exchange's market quality and activity.[27]

The proposal will contribute to market quality because it will help bring new order flow to the Exchange. Greater displayed liquidity on the Exchange offers investors deeper, more liquid markets and execution opportunities.

Increased order flow benefits investors by deepening the Exchange's liquidity pool, potentially providing greater execution incentives and opportunities, offering additional flexibility for all investors to enjoy cost savings, supporting the quality of price discovery, promoting market transparency, and lowering spreads between bids and offers and thereby lowering investor costs. To the degree that liquidity is attracted from dark

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[27] See, e.g., Securities Exchange Act Release No. 92493 (July 26, 2021), 86 FR 41129 (July 30, 2021) (SR-CboeEDGX-2021-034) (proposal to provide discount to new members that meet certain volume thresholds, noting that "relative volume-based incentives and discounts have been widely adopted by exchanges . . . and are reasonable, equitable and non-discriminatory because they are open on an equal basis to similarly situated members and provide additional benefits or discounts that are reasonably related to (i) the value to an exchange's market quality and (ii) associated higher levels of market activity . . . .") (not suspended by Commission); see also Securities Exchange Act Release No. 53790 (May 11, 2006), 71 FR 28738 (May 17, 2006) (SR-Phlx-2006-04) ("The Commission recognizes that volume-based discounts of fees are not uncommon, and where the discount can be applied objectively, it is consistent with Rule 603. For the same reasons noted above, the Commission believes that the fee structure meets the standard in section 6(b)(4) of the Act in that the proposed rule change provides for the equitable allocation of reasonable dues, fees, and other charges among the Exchange's members and issuers and other persons using its facilities.").

venues, that liquidity also increases transparency for the market overall, providing investors with more information about market trends.

The proposal will help members that meet the minimum ADV threshold maintain lower costs and will benefit them through the many positive externalities associated with a more liquid exchange.

The competition among exchanges as trading platforms, as well as the competition between exchanges and alternative trading venues, constrain exchanges from charging excessive fees for any exchange products, including trading, listings, ports, and market data. Indeed, the fees that arise from the competition among trading platforms may be too low because they fail to reflect the benefits to the market as a whole of exchange products and services, allowing other venues to free-ride on these investments by the exchange platforms, increasing fragmentation and search costs.

As long as total returns are constrained by competitive forces—as demonstrated in detail by the report provided as Exhibit 3—there is no regulatory basis to be concerned with pricing of particular elements offered on a platform. Indeed, regulatory constraints in this environment are likely to *reduce* consumer welfare by constraining certain exchanges from offering packages of pricing and products that would be attractive to certain sets of consumers, thus impeding competition with venues that are not subject to the same regulatory limitations and reducing the benefits of competition to customers.

The Proposal Is Not Unfairly Discriminatory.

The proposal is not unfairly discriminatory. Non-Display Usage and the Exchange's 40Gb and 10Gb Ultra high-speed connections will be offered to all members and non-members on like terms. It is also not unfair to charge more to firms that do not directly contribute order flow to the Exchange, but nevertheless benefit from that order

flow through tighter spreads, better prices, and the other advantages of a more liquid platform.

Specifically, the proposal is not unfairly discriminatory with respect to either members or non-members.

With respect to members, all members that meet the ADV threshold will be charged lower fees. With respect to smaller members, Nasdaq offers rebates to members that offer displayed liquidity. With these rebates, any member—even smaller members—should have the ability to post sufficient displayed liquidity to meet the ADV threshold.

The proposal is not unfairly discriminatory with respect to non-members broker-dealers, which include brokers routing trades through members and off-exchange trading platforms that use exchange data to execute trades, because they have the option of becoming members to obtain lower fees under the proposal, and because they realize the benefits of higher liquidity—including tighter spreads and better prices—and it is not unfair discrimination to charge a higher fee for that benefit.

The proposal is not unfairly discriminatory with respect to non-member firms that are not broker-dealers, such as market data vendors and index providers, because they also benefit from the value that the additional liquidity generated by this proposal will provide to the trading platform. As noted above, incentivizing higher levels of liquidity enhances and enriches the market data distributed to the industry, and increases the overall value of platform. It is not unfair for such parties to pay a higher fee to reflect the greater value of the platform.

Discounts for specific categories of market participants are well-established; examples include non-professional fees, broker-dealer enterprise licenses, and a media enterprise license.[28]

For all of the foregoing reasons, the Exchange believes that the proposal is consistent with the Act.

4. Self-Regulatory Organization's Statement on Burden on Competition

In accordance with Section 6(b)(8) of the Act,[29] the Exchange believes that the proposed rule change will not impose any burden on competition that is not necessary or appropriate in furtherance of the purposes of the Act.

Rather, as discussed above, the Exchange believes that the proposed changes would increase competition by attracting additional liquidity to the Exchange, which the Exchange believes will enhance market quality, thereby promoting market depth, price discovery, and transparency and enhancing order execution opportunities for member organizations. As a result, the Exchange believes that the proposed change furthers the Commission's goal in adopting Regulation NMS of fostering integrated competition among orders, which promotes "more efficient pricing of individual stocks for all types of orders, large and small."[30]

Intra-market Competition. Nothing in the proposal burdens intra-market competition (the competition among consumers of exchange data) because the proposed

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28 See, e.g., The Nasdaq Stock Market, Price List – U.S. Equities, available at http://www.nasdaqtrader.com/Trader.aspx?id=DPUSData (providing discounts for Non-Professional subscribers for Nasdaq TotalView and other market data products, enterprise licenses for broker-dealers for multiple market data products, and a digital media enterprise license for Nasdaq Basic).

29 15 U.S.C. § 78f(b)(8).

30 Securities Exchange Act Release No. 51808, 70 FR 37496, 37498-99 (June 29, 2005) (Regulation NMS).

fee structure would be available to all similarly situated market participants, and, as such, the proposed change would not impose a disparate burden on different market participants.

Intermarket Competition. Nothing in the proposal burdens intermarket competition (the competition among self-regulatory organizations) because competitors are free to modify their own fees in response.

As previously discussed, the Exchange operates in a highly competitive market. Members have numerous alternative venues that they may participate on and direct their order flow to, including other equities exchanges, off-exchange venues, and alternative trading systems. Participants can readily choose to send their orders to other exchange and off-exchange venues if they deem fee levels at those other venues to be more favorable. In such an environment, the Exchange must continually adjust its fees and rebates to remain competitive with other exchanges and with off-exchange venues.

5. Self-Regulatory Organization's Statement on Comments on the Proposed Rule Change Received from Members, Participants, or Others

No written comments were either solicited or received.

6. Extension of Time Period for Commission Action

Not applicable.

7. Basis for Summary Effectiveness Pursuant to Section 19(b)(3) or for Accelerated Effectiveness Pursuant to Section 19(b)(2)

Pursuant to Section 19(b)(3)(A)(ii) of the Act,[31] the Exchange has designated this proposal as establishing or changing a due, fee, or other charge imposed by the self-

[31] 15 U.S.C. § 78s(b)(3)(A)(ii).

regulatory organization on any person, whether or not the person is a member of the self-regulatory organization, which renders the proposed rule change effective upon filing.

At any time within 60 days of the filing of the proposed rule change, the Commission summarily may temporarily suspend such rule change if it appears to the Commission that such action is: (i) necessary or appropriate in the public interest; (ii) for the protection of investors; or (iii) otherwise in furtherance of the purposes of the Act. If the Commission takes such action, the Commission shall institute proceedings to determine whether the proposed rule should be approved or disapproved.

8. Proposed Rule Change Based on Rules of Another Self-Regulatory Organization or of the Commission

Not applicable.

9. Security-Based Swap Submissions Filed Pursuant to Section 3C of the Act

Not applicable.

10. Advance Notices Filed Pursuant to Section 806(e) of the Payment, Clearing and Settlement Supervision Act

Not applicable.

11. Exhibits

1. Notice of Proposed Rule Change for publication in the Federal Register.

3. Copies of any form, report or questionnaire that the Exchange proposes to use to help implement or operate the proposed rule change, or that is referred to in the proposed rule change.

5. Text of the proposed rule change.

EXHIBIT 1

SECURITIES AND EXCHANGE COMMISSION
(Release No. ; File No. SR-NASDAQ-2024-016)

March __, 2024

Self-Regulatory Organizations; The Nasdaq Stock Market LLC; Notice of Filing and Immediate Effectiveness of Proposed Rule Change to Encourage Members to Contribute Liquidity to the Exchange by Offering those that Maintain a Particular Minimum Trading Volume Lower Fees for Specified Market Data and Connectivity Products

Pursuant to Section 19(b)(1) of the Securities Exchange Act of 1934 ("Act")[1], and Rule 19b-4 thereunder,[2] notice is hereby given that on March 22, 2024, The Nasdaq Stock Market LLC ("Nasdaq" or "Exchange") filed with the Securities and Exchange Commission ("SEC" or "Commission") the proposed rule change as described in Items I, II, and III, below, which Items have been prepared by the Exchange. The Commission is publishing this notice to solicit comments on the proposed rule change from interested persons.

I. Self-Regulatory Organization's Statement of the Terms of Substance of the Proposed Rule Change

The Exchange proposes to encourage members to contribute liquidity to the Exchange by offering those that maintain a particular minimum trading volume lower fees for specified market data and connectivity products.

While these amendments are effective upon filing, the Exchange has designated the proposed amendments to be operative on September 1, 2024.

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1 15 U.S.C. 78s(b)(1).

2 17 CFR 240.19b-4.

The text of the proposed rule change is available on the Exchange's Website at https://listingcenter.nasdaq.com/rulebook/nasdaq/rules, at the principal office of the Exchange, and at the Commission's Public Reference Room.

II. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

In its filing with the Commission, the Exchange included statements concerning the purpose of and basis for the proposed rule change and discussed any comments it received on the proposed rule change. The text of these statements may be examined at the places specified in Item IV below. The Exchange has prepared summaries, set forth in sections A, B, and C below, of the most significant aspects of such statements.

A. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

1. Purpose

The purpose of the proposed rule change is to reward firms that meet a minimum average daily displayed volume with lower fees for Non-Display Usage and the Exchange's 40Gb and 10Gb Ultra high-speed connection to the Exchange.[3]

Non-Display Usage

Non-Display Usage is any method of accessing Nasdaq U.S. information that involves access or use by a machine or automated device without access or use of a display by a natural person. Examples of Non-Display Usage include, but are not limited to:

[3] This proposal was initially filed on March 6, 2024, as SR-Nasdaq-2024-011. On March 20, 2024, that filing was withdrawn and replaced with SR-Nasdaq-2024-015. On March 22, 2024, SR-Nasdaq-2024-015 was withdrawn and replaced with the instant filing due to a technical error.

- Automated trading;
- Automated order/quote generation and/or order/quote pegging;
- Price referencing for use in algorithmic trading;
- Price referencing for use in smart order routing;
- Program trading and high frequency trading;
- Order verification;
- Automated surveillance programs;
- Risk management;
- Automatic order cancellation, or automatic error discovery;
- Clearing and settlement activities;
- Account maintenance (e.g., controlling margin for a customer account); and
- "Hot" disaster recovery.

Although either top-of-book or depth-of-book data can be used for Non-Display Usage, the proposal modifies fees for depth-of-book data only.[4]

Non-Display fees are currently assessed on a per-subscriber[5] or per-firm basis. Monthly fees are $375 per Subscriber for 1-39 subscribers; $15,000 per firm for 40-99 subscribers; $30,000 per firm for 100-249 subscribers; and $75,000 per firm for 250 or more subscribers.

Under the proposed rule change, a member firm that meets the minimum ADV threshold discussed below would continue to pay those fees.

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4 See Equity 7, Section 123 (Nasdaq Depth-of-Book data).

5 "Subscriber" is defined as a device or computer terminal or an automated service which is entitled to receive information.

Firms that do not meet the minimum ADV threshold, however, as well as non-member firms, would pay the new monthly fees of $500 per subscriber for 1-39 subscribers; $20,000 per firm for 40-99 subscribers; $40,000 per firm for 100-249 subscribers; and $100,000 per firm for 250 or more subscribers.

Fiber Connections to the Exchange (40Gb and 10Gb Ultra)

Nasdaq offers customers the opportunity to co-locate their servers and equipment within the Nasdaq Data Center,[6] allowing participants an opportunity to reduce latency and network complexity. Nasdaq offers a variety of connectivity options to fit a firm's specific networking needs, including the high-speed 40Gb and 10Gb Ultra networks.

All of Nasdaq's colocation and connectivity options offer customers access to any or all Nasdaq exchanges through a single connection.[7] For example, a firm that is a member of all six Nasdaq exchanges that purchases services in the Nasdaq Data Center such as a 40G fiber connection, cabinet space, cooling fans, and patch cables only purchases these products or services once to use them for all six Nasdaq exchanges.

Nasdaq currently charges members an ongoing monthly fee of $21,100 for the 40Gb fiber connection and $15,825 for the 10Gb Ultra connection to the Nasdaq exchanges. Under the proposed rule change, a firm that meets the minimum ADV threshold would continue to pay those fees.

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6 See Nasdaq Co-Location (CoLo) Services, available at https://www.nasdaqtrader.com/trader.aspx?id=colo; Stock Exchange Data Center & Trading, available at https://www.nasdaq.com/solutions/nasdaq-co-location.

7 See Securities Exchange Act Release No. 84571 (November 9, 2018), 83 FR 57758 (November 16, 2018) (SR-Nasdaq-2018-086),

Member firms that do not meet the minimum ADV threshold discussed below, as well as non-member firms, would pay the new monthly fee of $23,700 for the 40Gb fiber connection and $17,800 for the 10Gb Ultra connection.

Minimum ADV

The proposal introduces the new term "Minimum ADV," which will mean the introduction by a member of at least one million shares of added executed displayed liquidity on average per trading day in all securities through one or more of the member's market participant identifiers ("MPIDs") on the Nasdaq Market Center. Average daily volume is calculated as the total volume of shares executed for all added displayed orders in all securities during the trading month divided by the number of trading days in that month, averaged over the six-month period preceding the billing month, or the date the firm became a member, whichever is shorter. New members will be deemed to meet the Minimum ADV for the first month of operation. Minimum ADV excludes sponsored access by a member on behalf of a third party. The minimum ADV threshold was designed to be accessible to all members to promote wide engagement with the Exchange.

Nasdaq does not expect any member to be disadvantaged by the proposal. Nasdaq is a maker-taker platform and, as such, offers rebates to members that offer displayed liquidity. With these rebates, no member should have any difficulty posting and executing sufficient displayed liquidity to meet the ADV threshold. The threshold is, moreover, set at a level that Nasdaq believes any member—even smaller members—should be able to meet without significant effort. Because the threshold applies to displayed liquidity only, the proposal should not impact the Best Execution obligations of

any member. If all members were to meet this threshold, the proposal would add an incremental 60-80 million shares to Nasdaq's accessible liquidity.

Non-members that, by definition, do not post displayed liquidity to the market would pay the higher fees. This is because the non-members do not directly contribute order flow to the Exchange, but nevertheless benefit from that order flow through tighter spreads, better prices, and the other advantages of a more liquid platform, as discussed in further detail under Statutory Basis.

The Proposal Will Promote Competition Among Trading Venues

Exchanges, like all trading venues, compete as platforms. All elements of the platform—trade executions, market data, connectivity, membership, and listings—operate in concert. Trade executions increase the value of market data; market data functions as an advertisement for on-exchange trading; listings increase the value of trade executions and market data; and greater liquidity on the exchange enhances the value of ports and colocation services.

As discussed under Statutory Basis, we have attached a data-based analysis demonstrating how platform competition works entitled "How Exchanges Compete: An Economic Analysis of Platform Competition" as Exhibit 3. The paper explains that exchanges are multi-sided platforms, whose value is dependent on attracting users to multiple sides of the platform. Issuers need investors, and every trade requires two sides to trade. To make its platform attractive to multiple constituencies, an exchange must consider inter-side externalities, meaning demand for one set of platform services depends on the demand for other services.

This proposal is designed to promote competition by providing an incentive for members to provide liquidity (therefore attracting investors and increasing the overall value of the platform) through charging lower fees for other platform services (i.e., market data and connectivity). This will lead to more displayed liquidity on the Exchange, enhancing and enriching the market data distributed to the industry, which then increases the amount of interest in the platform. This will also enable the Exchange to offer investors a more robust, lower cost-trading experience through tighter spreads and more efficient trading as discussed in Exhibit 3, placing it in a better competitive position relative to other exchanges and trading venues.[8]

2. Statutory Basis

The Exchange believes that its proposal is consistent with Section 6(b) of the Act,[9] in general, and furthers the objectives of Sections 6(b)(4) and 6(b)(5) of the Act,[10] in particular, in that it provides for the equitable allocation of reasonable dues, fees, and other charges among members and issuers and other persons using any facility, and is not designed to permit unfair discrimination between customers, issuers, brokers, or dealers.

Fees Produced in a Competitive Environment are an Equitable Allocation of Reasonable Dues, Fees, and Other Charges.

Reliance on competitive solutions is fundamental to the Act. Where significant competitive forces constrain fees, fee levels meet the Act's standard for the "equitable allocation of reasonable dues, fees, and other charges among members and issuers and

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8 To the degree that the additional liquidity is moved from off-exchange venues to on-exchange platforms, overall market transparency will improve as well.

9 15 U.S.C. § 78f(b).

10 15 U.S.C. §§ 78f(b)(4) and (5).

other persons using its facilities,"[11] unless there is a substantial countervailing basis to find that a fee does not meet some other requirement of the Act.[12] Evidence of platform competition demonstrates that each exchange product is sold in a competitive environment, and its fees will be an equitable allocation of reasonable dues, fees, and other charges, provided that nothing about the product or its fee structure impairs competition.[13]

Congress directed the Commission to "rely on 'competition, whenever possible, in meeting its regulatory responsibilities for overseeing the SROs and the national market system.'"[14] Following this mandate, the Commission and the courts have repeatedly expressed their preference for competition over regulatory intervention to determine prices, products, and services in the securities markets.

In Regulation NMS, the Commission highlighted the importance of market forces in determining prices and SRO revenues and recognized that regulation of the national market system "has been remarkably successful in promoting market competition in its broader forms that are most important to investors and listed companies."[15]

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11 See 15 U.S.C. § 78f(b)(4).

12 See U.S. Securities and Exchange Commission, "Staff Guidance on SRO Rule filings Relating to Fees" (May 21, 2019), available at https://www.sec.gov/tm/staff-guidance-sro-rule-filings-fees ("Fee Guidance") ("If significant competitive forces constrain the fee at issue, fee levels will be presumed to be fair and reasonable, and the inquiry is whether there is a substantial countervailing basis to find that the fee terms nevertheless fail to meet an applicable requirement of the Exchange Act (e.g., that fees are equitably allocated, not unfairly discriminatory, and not an undue burden on competition).").

13 Nothing in the Act requires proof of product-by-product competition.

14 NetCoalition v. SEC, 715 F.3d 342, 534-35 (D.C. Cir. 2013); see also H.R. Rep. No. 94-229 at 92 (1975) ("[I]t is the intent of the conferees that the national market system evolve through the interplay of competitive forces as unnecessary regulatory restrictions are removed.").

15 See Securities Exchange Act Release No. 51808 (June 9, 2005), 70 FR 37496, 37499 (June 29, 2005) ("Regulation NMS Adopting Release").

As a result, the Commission has long relied on competitive forces to determine whether a fee proposal is equitable, fair, reasonable, and not unreasonably or unfairly discriminatory. In 2008, the Commission explained that "[i]f competitive forces are operative, the self-interest of the exchanges themselves will work powerfully to constrain unreasonable or unfair behavior."[16] In 2019, Commission Staff reaffirmed that "[i]f significant competitive forces constrain the fee at issue, fee levels will be presumed to be fair and reasonable . . . ."[17]

Accordingly, "the existence of significant competition provides a substantial basis for finding that the terms of an exchange's fee proposal are equitable, fair, reasonable, and not unreasonably or unfairly discriminatory."[18] Consistent with the Commission's longstanding focus on competition, Commission Staff have indicated that they would only look at factors outside of the competitive market if a "proposal lacks persuasive evidence that the proposed fee is constrained by significant competitive forces."[19]

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16 See Securities Exchange Act Release No. 59039 (December 2, 2008), 73 Fed. Reg. 74,770 (December 9, 2008) (SR-NYSEArca-2006-21).

17 See Fee Guidance, supra n.10.

18 See id.

19 See id. In the Fee Guidance, the Staff indicated that "[w]hen reviewing rule filing proposals . . . [it] is mindful of recent opinions by the D.C. Circuit," including Susquehanna International Group, LLP v. SEC, 866 F.3d 442 (D.C. Cir. 2017). However, the D.C. Circuit's decision in Susquehanna is irrelevant to the Commission's review of immediately effective SRO fee filings. Susquehanna involved the Commission's approval of a rule proposed under Section 19(b)(2) of the Act, not its evaluation of whether to temporarily suspend an SRO's immediately effective fee filing under Section 19(b)(3). A comparison of Sections 19(b)(2) and 19(b)(3) of the Act makes clear that the Commission is not required to undertake the same independent review, and make the same findings and determinations, for Section 19(b)(3) filings that it must for Section 19(b)(2) filings. In particular, Section 19(b)(2) requires the Commission to "find[ ] that [a] proposed rule change is consistent with the" Act before approving the rule. 15 U.S.C. § 78s(b)(2)(C)(i). Section 19(b)(3), by contrast, imbues the Commission with discretion, stating that it "may temporarily suspend" an immediately effective rule filing where "it appears to the Commission that such action is necessary or appropriate." As the Supreme Court has explained, statutes stating that an agency "may"—but need not—take certain action are "written in the language of permission and discretion." S. Ry. Co. v. Seaboard Allied Milling, 442 U.S. 444, 455 (1979); see also Crooker v. SEC, 161 F.2d 944, 949 (1st Cir. 1947) (per curiam). The "contrast" between Sections 19(b)(2) and 19(b)(3), the Commission itself has explained, "reflects the fundamental difference in the way

Nothing in the Act Requires an Examination of Fees in Isolation

The Act mandates the "equitable allocation of reasonable dues, fees, and other charges among members and issuers and other persons using its facilities."[20] This provision refers generally to "reasonable dues, fees, and other charges" as a whole, not individual fees. Nothing in the Act requires the individual examination of specific product fees in isolation. Provided that a proposed rule change does not in and of itself undermine competition, evidence of platform competition is sufficient to show that the product operates in a competitive environment.

A determination of whether a proposal permits unfair discrimination between customers, issuers, brokers, or dealers remains a separate product-specific inquiry.

The Commission Has Recognized that Exchanges Are Subject to Significant Competitive Forces in the Market for Order Flow.

The fact that the market for order flow is competitive has long been recognized by the courts. In NetCoalition v. Securities and Exchange Commission, the D.C. Circuit stated, "[n]o one disputes that competition for order flow is 'fierce.' . . . As the SEC explained, '[i]n the U.S. national market system, buyers and sellers of securities, and the broker-dealers that act as their order-routing agents, have a wide range of choices of where to route orders for execution'; [and] 'no exchange can afford to take its market

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Congress intended for different types of rules to be treated." Brief of Respondent SEC, NetCoalition v. SEC, 715 F.3d 342 (D.C. Cir. 2013) (Nos. 10-1421 et al.); see also id. at 42-43 ("[W]hile the Commission's authority to suspend a fee under Subsection (3)(C) is permissive, its duties under Subsection (2) are stated in mandatory terms."). Thus, neither Susquehanna, nor Section 19(b)(3) of the Act, requires the Commission to make independent findings that an immediately effective SRO fee filing such as this one is consistent with the Act. To the degree that the Susquehanna decision is applicable to any Commission action, however, the court held that the Commission is required to "itself find or determine" that a proposal meets statutory requirements, explaining that the Commission is "obligated to make an independent review" of an SRO's proposal, and not rely solely on the work of the SRO. See 866 F.3d at 446

[20] See 15 U.S.C. § 78f(b)(4).

share percentages for granted' because 'no exchange possesses a monopoly, regulatory or otherwise, in the execution of order flow from broker dealers.'"[21]

All Exchange Products are Subject to Competition—Not Just Those Directly Related to Order Flow

As discussed more fully in our analysis, "How Exchanges Compete: An Economic Analysis of Platform Competition" (Exhibit 3), competition is not limited to order flow. Data shows that the combination of explicit all-in costs to trade and other implicit costs has largely equalized the cost to trade across venues.[22] This is a function of the fact that, if the all-in cost to the user of interacting with an exchange exceeds market price, customers can and do shift their purchases and trading activity to other exchanges, and therefore the exchange must adjust one or more of its fees to attract customers.

This conclusion is particularly striking given that different exchanges engage in a variety of business models and offer an array of pricing options to appeal to different customer types. The largest exchanges operate maker-taker platforms, offering rebates to attract trading liquidity, which allows them to maintain actionable quotes with high liquidity and offer high-quality market data. The negative price charged to liquidity providers through rebates is part of the platform because it serves to create features

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21 See NetCoalition, 615 F.3d at 539 (D.C. Cir. 2010) (quoting Securities Exchange Act Release No. 59039 (December 2, 2008), 73 FR 74770, 74782-83 (December 9, 2008) (SR-NYSEArca-2006-21)).

22 Competition across platforms constrains platform fees and results in "all-in" costs becoming equal across platforms. The Staff Guidance on SRO Rule Filings Relating to Fees, however, states that platform competition requires that the "overall *return* of the platform, rather than the *return* of any particular fees charged to a type of customer, . . . be used to assess the competitiveness of the platform's market," and that "[a]n SRO that wishes to rely on total platform theory must provide evidence demonstrating that competitive forces are sufficient to constrain the SRO's aggregate return across the platform." See Fee Guidance, supra n.10 (emphasis added). We do not know, and cannot determine, whether returns (as opposed to fees) are equalized across platforms, because we do not have detailed cost information from other exchanges. An analysis of returns, however, is unnecessary to show that competition constrains fees given that, as we demonstrate below, platform competition can be demonstrated solely by examining costs to users.

attractive to other participants, including oftentimes tight spreads, actionable and lit quotes, and more valuable market data.

Inverted venues, in contrast, have the opposite price structure—liquidity providers pay to add liquidity, while liquidity takers earn a rebate. These platforms offer less liquidity, but better queue priority, faster fills, and lower effective spreads for investors. There are a wide range of other pricing models and product offerings among the dozens of lit and unlit trading venues that compete in the marketplace in addition to these examples.

The different strategies among exchanges also manifest in the pricing of other services, such as market data and connectivity. Some exchanges charge for such services, while others charge little or nothing (typically because the exchange is new or has little liquidity), just as some exchanges charge a fee per trade, while others pay rebates.

In assessing competition for exchange services, we must consider not only explicit costs, such as fees for trading, market data, and connectivity, but also the *implicit* costs of trading on an exchange. The realized spread, or markout, captures the implicit cost to trade on a platform.

The concept of markout was created by market makers trying to capture the spread while providing a two-sided (bid and offer) market. For market makers, being filled on the bid or the offer can cause a loss if the fill changes market prices. For example, a fill on a market maker's bid just as the stock price falls results in a "virtual loss," because the market maker has a long position with a new bid lower than the fill.

Negative markouts can be beneficial. For example, if an institutional investor is working a large buy order, negative markouts represent fills as the market falls, allowing later orders to be placed sooner, and likely at a better price, reducing the opportunity costs as well as explicit cost of building the position.

Data suggests that market participants employ sophisticated analytic tools to weigh the cost of immediate liquidity and lower opportunity costs against better spread capture (lower markouts) and explicit trading costs. As discussed in greater detail in Exhibit 3, the venues with the highest explicit costs—typically inverted and fee-fee venues—have the lowest implicit costs from markouts and vice versa. Higher positive markouts mean more spread capture, but those venues also tend to have the highest explicit costs, and provide the least liquidity, and positive externalities, to the market.

Considering both the explicit costs charged by exchanges for their various joint products and the implicit costs incurred by traders to trade on various exchanges, the data show that all-in trading costs across exchanges are largely equalized, regardless of different trading strategies offered by each platform for each individual service.

As such, platform competition has resulted in a competitive environment in the market for exchange services, in which trading platforms are constrained by other platforms' offerings, taking into consideration the all-in cost of interacting with the platform. This constraint is a natural consequence of competition and demonstrates that no exchange platform can charge excessive fees and expect to remain competitive, thereby constraining fees on all products sold as part of the platform. The existence of platform-level competition also explains why some consumers route orders to the

exchange with the highest explicit trading costs even though other exchanges offer free or a net rebate for trading.[23]

Exchanges Compete at Both the Platform and Product Level

Exchange customers are differentiated in the value they place on the different products offered by exchanges and in their willingness to pay for those products. This occurs both on a firm-wide and a transaction basis; for example, individual customers "multi-home" on various platforms, and are thus able to route different trades to different platforms to take advantage of favorable economics offered on a trade-to-trade basis.

Exchanges compete by offering differentiated packages of pricing and products to attract different categories of customer. As in any competitive market, consumers will "vote with their feet," incentivizing platforms to supply an array of pricing and product offerings that suit diverse consumer needs far more effectively than a uniform, one-size-fits-some rigid product offering. If an exchange's pricing for a particular product gets out of line, such that its total return is boosted above competitive levels, market forces will discipline that approach because competing exchanges will quickly attract customer volume through more attractive all-in trading costs.

In addition, if a particular package of pricing and products is not attractive to a sufficient volume of customers in a particular category, those customers may elect not to purchase the service. This is why exchanges compete at a product level, as well as based on all-in trading costs.

Exchanges Compete with Off-Exchange Trading Platforms in Addition to Other Exchanges

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[23] Empirical evidence also shows that market data is more valuable from exchanges with more liquidity. Many customers decide not to take data from smaller markets, even though they are free or much lower cost than larger markets.

As the SEC recently noted in its market infrastructure proposal,[24] the number of transactions completed on non-exchange venues has been growing. Allowing exchanges to compete as platforms will help exchanges compete against non-exchange venues, and, to the degree order flow is shifted from non-exchange to exchange venues, overall market transparency will improve.[25]

Exchanges have a unique role to play in market transparency because they publish an array of pre- and post-trade data that non-exchange venues, almost entirely, do not. Greater transparency benefits non-exchange venues by enabling them to provide more accurate pricing to their customers, and by helping such venues set their own prices, benchmark, analyze the total cost of ownership, and assess their own trading strategies.

Allowing exchanges to compete effectively as platforms has other positive network effects. Larger trading platforms offer lower average trading costs. As trading platforms attract more liquidity, bid-ask spreads tighten, search costs fall (by limiting the number of venues that a customer needs to check to assess the market), and connection costs decrease, as customers have no need to connect to all venues.[26] The whole is therefore greater (in the sense that it is more efficient) than the sum of the parts.

This is not to say that smaller established trading platforms do not have a role to play. They provide specialized services that cater to individual customer needs. These

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24 See Regulation NMS: Minimum Pricing Increments, Access Fees, and Transparency of Better Price Orders, Securities Exchange Act Release No. 96494 (File No. S7-30-22), available at https://www.sec.gov/rules/proposed/2022/34-96494.pdf.

25 Non-exchange venues rely on market data distributed by exchanges to set prices. Greater transparency allows both exchange and non-exchange venues to operate more effectively and efficiently.

26 In addition, Nasdaq's experience shows that fewer customers connect with smaller trading venues than with larger venues.

specialized services help the smaller exchanges grow by driving liquidity to their platforms, and, if they are successful, achieve the economies of scale that benefit the larger enterprises. Because the total costs of interacting with an exchange are roughly equal, smaller exchanges offset higher trading costs with lower connectivity, market data, or other fees. While the mix of fees will change as exchanges grow, the all-in cost of interacting with the exchange remains roughly the same.

Acknowledging that exchanges compete as platforms and approving fees expeditiously on that basis will improve the ability of exchanges to compete against non-exchange venues, and, to the degree order flow is shifted to exchanges, both transparency and efficiency will improve.

The Proposed Fees Are Equitable and Reasonable Because They Will Be Subject to Competition.

This proposal offers member firms an incentive to display liquidity through lower non-display and connectivity fees. The intent is to generate a "virtuous cycle," in which the proposed fee structure will attract more liquidity to the Exchange, making it a more attractive trading venue, and thereby attracting more liquidity.

Incentive programs have been widely adopted by exchanges, and are reasonable, equitable, and non-discriminatory because they are open on an equal basis to similarly situated members and provide additional benefits or discounts that are reasonably related to the value to an exchange's market quality and activity.[27]

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[27] See, e.g., Securities Exchange Act Release No. 92493 (July 26, 2021), 86 FR 41129 (July 30, 2021) (SR-CboeEDGX-2021-034) (proposal to provide discount to new members that meet certain volume thresholds, noting that "relative volume-based incentives and discounts have been widely adopted by exchanges . . . and are reasonable, equitable and non-discriminatory because they are open on an equal basis to similarly situated members and provide additional benefits or discounts that are reasonably related to (i) the value to an exchange's market quality and (ii) associated higher levels of market activity . . . .") (not suspended by Commission); see also Securities Exchange Act Release No. 53790 (May 11, 2006), 71 FR 28738 (May 17, 2006) (SR-

The proposal will contribute to market quality because it will help bring new order flow to the Exchange. Greater displayed liquidity on the Exchange offers investors deeper, more liquid markets and execution opportunities.

Increased order flow benefits investors by deepening the Exchange's liquidity pool, potentially providing greater execution incentives and opportunities, offering additional flexibility for all investors to enjoy cost savings, supporting the quality of price discovery, promoting market transparency, and lowering spreads between bids and offers and thereby lowering investor costs. To the degree that liquidity is attracted from dark venues, that liquidity also increases transparency for the market overall, providing investors with more information about market trends.

The proposal will help members that meet the minimum ADV threshold maintain lower costs and will benefit them through the many positive externalities associated with a more liquid exchange.

The competition among exchanges as trading platforms, as well as the competition between exchanges and alternative trading venues, constrain exchanges from charging excessive fees for any exchange products, including trading, listings, ports, and market data. Indeed, the fees that arise from the competition among trading platforms may be too low because they fail to reflect the benefits to the market as a whole of exchange products and services, allowing other venues to free-ride on these investments by the exchange platforms, increasing fragmentation and search costs.

Phlx-2006-04) ("The Commission recognizes that volume-based discounts of fees are not uncommon, and where the discount can be applied objectively, it is consistent with Rule 603. For the same reasons noted above, the Commission believes that the fee structure meets the standard in section 6(b)(4) of the Act in that the proposed rule change provides for the equitable allocation of reasonable dues, fees, and other charges among the Exchange's members and issuers and other persons using its facilities.").

As long as total returns are constrained by competitive forces—as demonstrated in detail by the report provided as Exhibit 3—there is no regulatory basis to be concerned with pricing of particular elements offered on a platform. Indeed, regulatory constraints in this environment are likely to *reduce* consumer welfare by constraining certain exchanges from offering packages of pricing and products that would be attractive to certain sets of consumers, thus impeding competition with venues that are not subject to the same regulatory limitations and reducing the benefits of competition to customers.

The Proposal Is Not Unfairly Discriminatory.

The proposal is not unfairly discriminatory. Non-Display Usage and the Exchange's 40Gb and 10Gb Ultra high-speed connections will be offered to all members and non-members on like terms. It is also not unfair to charge more to firms that do not directly contribute order flow to the Exchange, but nevertheless benefit from that order flow through tighter spreads, better prices, and the other advantages of a more liquid platform.

Specifically, the proposal is not unfairly discriminatory with respect to either members or non-members.

With respect to members, all members that meet the ADV threshold will be charged lower fees. With respect to smaller members, Nasdaq offers rebates to members that offer displayed liquidity. With these rebates, any member—even smaller members—should have the ability to post sufficient displayed liquidity to meet the ADV threshold.

The proposal is not unfairly discriminatory with respect to non-members broker-dealers, which include brokers routing trades through members and off-exchange trading platforms that use exchange data to execute trades, because they have the option of

becoming members to obtain lower fees under the proposal, and because they realize the benefits of higher liquidity—including tighter spreads and better prices—and it is not unfair discrimination to charge a higher fee for that benefit.

The proposal is not unfairly discriminatory with respect to non-member firms that are not broker-dealers, such as market data vendors and index providers, because they also benefit from the value that the additional liquidity generated by this proposal will provide to the trading platform. As noted above, incentivizing higher levels of liquidity enhances and enriches the market data distributed to the industry, and increases the overall value of platform. It is not unfair for such parties to pay a higher fee to reflect the greater value of the platform.

Discounts for specific categories of market participants are well-established; examples include non-professional fees, broker-dealer enterprise licenses, and a media enterprise license.[28]

For all of the foregoing reasons, the Exchange believes that the proposal is consistent with the Act.

B. Self-Regulatory Organization's Statement on Burden on Competition

In accordance with Section 6(b)(8) of the Act,[29] the Exchange believes that the proposed rule change will not impose any burden on competition that is not necessary or appropriate in furtherance of the purposes of the Act.

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28 See, e.g., The Nasdaq Stock Market, Price List – U.S. Equities, available at http://www.nasdaqtrader.com/Trader.aspx?id=DPUSData (providing discounts for Non-Professional subscribers for Nasdaq TotalView and other market data products, enterprise licenses for broker-dealers for multiple market data products, and a digital media enterprise license for Nasdaq Basic).

29 15 U.S.C. § 78f(b)(8).

Rather, as discussed above, the Exchange believes that the proposed changes would increase competition by attracting additional liquidity to the Exchange, which the Exchange believes will enhance market quality, thereby promoting market depth, price discovery, and transparency and enhancing order execution opportunities for member organizations. As a result, the Exchange believes that the proposed change furthers the Commission's goal in adopting Regulation NMS of fostering integrated competition among orders, which promotes "more efficient pricing of individual stocks for all types of orders, large and small."[30]

Intra-market Competition. Nothing in the proposal burdens intra-market competition (the competition among consumers of exchange data) because the proposed fee structure would be available to all similarly situated market participants, and, as such, the proposed change would not impose a disparate burden on different market participants.

Intermarket Competition. Nothing in the proposal burdens intermarket competition (the competition among self-regulatory organizations) because competitors are free to modify their own fees in response.

As previously discussed, the Exchange operates in a highly competitive market. Members have numerous alternative venues that they may participate on and direct their order flow to, including other equities exchanges, off-exchange venues, and alternative trading systems. Participants can readily choose to send their orders to other exchange and off-exchange venues if they deem fee levels at those other venues to be more

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30 Securities Exchange Act Release No. 51808, 70 FR 37496, 37498-99 (June 29, 2005) (Regulation NMS).

favorable. In such an environment, the Exchange must continually adjust its fees and rebates to remain competitive with other exchanges and with off-exchange venues.

C. Self-Regulatory Organization's Statement on Comments on the Proposed Rule Change Received from Members, Participants, or Others

No written comments were either solicited or received.

III. Date of Effectiveness of the Proposed Rule Change and Timing for Commission Action

The foregoing rule change has become effective pursuant to Section 19(b)(3)(A)(ii) of the Act.[31]

At any time within 60 days of the filing of the proposed rule change, the Commission summarily may temporarily suspend such rule change if it appears to the Commission that such action is: (i) necessary or appropriate in the public interest; (ii) for the protection of investors; or (iii) otherwise in furtherance of the purposes of the Act. If the Commission takes such action, the Commission shall institute proceedings to determine whether the proposed rule should be approved or disapproved.

IV. Solicitation of Comments

Interested persons are invited to submit written data, views and arguments concerning the foregoing, including whether the proposed rule change is consistent with the Act. Comments may be submitted by any of the following methods:

Electronic Comments:

- Use the Commission's internet comment form (https://www.sec.gov/rules/sro.shtml); or
- Send an email to rule-comments@sec.gov. Please include file number

[31] 15 U.S.C. 78s(b)(3)(A)(ii).

SR-NASDAQ-2024-016 on the subject line.

Paper Comments:

- Send paper comments in triplicate to Secretary, Securities and Exchange Commission, 100 F Street NE, Washington, DC 20549-1090.

All submissions should refer to file number SR-NASDAQ-2024-016. This file number should be included on the subject line if email is used. To help the Commission process and review your comments more efficiently, please use only one method. The Commission will post all comments on the Commission's internet website (https://www.sec.gov/rules/sro.shtml). Copies of the submission, all subsequent amendments, all written statements with respect to the proposed rule change that are filed with the Commission, and all written communications relating to the proposed rule change between the Commission and any person, other than those that may be withheld from the public in accordance with the provisions of 5 U.S.C. 552, will be available for website viewing and printing in the Commission's Public Reference Room, 100 F Street NE, Washington, DC 20549, on official business days between the hours of 10 a.m. and 3 p.m. Copies of the filing also will be available for inspection and copying at the principal office of the Exchange. Do not include personal identifiable information in submissions; you should submit only information that you wish to make available publicly. We may redact in part or withhold entirely from publication submitted material that is obscene or subject to copyright protection. All submissions should refer to file number SR-NASDAQ-2024-016 and should be submitted on or before [INSERT DATE 21 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

For the Commission, by the Division of Trading and Markets, pursuant to

delegated authority.[32]

Sherry R. Haywood,

Assistant Secretary.

[32] 17 CFR 200.30-3(a)(12).

EXHIBIT 3

HOW EXCHANGES COMPETE:
AN ECONOMIC ANALYSIS OF PLATFORM COMPETITION

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February 2024

Content

1 Executive Summary

Exchanges compete as platforms against each other and off-exchange venues. Platforms are markets that facilitate interactions among multiple parties. The value of a platform is derived from inter-side externalities, or network effects, with the presence of participants on one side attracting participation on the other.[1] They often feature joint products, which are multiple products or services that are generated by the same production technology and therefore share the same costs.

Exchanges are quintessential platforms.

Exchanges exhibit the network effects characteristic of platforms: trade executions increase the value of market data; market data functions as advertisement for on-exchange trading; listings increase the value of trade executions and market data; and greater liquidity on the exchange enhances the value of ports and colocation services.

Why does this matter?

Competitive markets improve product quality, broaden consumer options, foster innovation and maintain lower prices. These benefits are available to equity market participants because the data shows that the market for exchange services is competitive. Because the market is competitive, the best regulatory framework for the delivery of exchange services—which collectively channel investors into productive opportunities that fuel capital formation and economic growth—is one that fosters competition.

As such, this paper is not just about the Exchange Act, or even economic theory. It is about creating a market structure that is best at supporting capital formation and economic growth through lower cost, higher quality, and more innovative on-exchange trading.

Platforms deliver exchange services efficiently and effectively—and thereby fuel capital formation and economic growth—because, when it comes to platforms, 1+1 is greater than 2.

Platforms in general, and exchange platforms in particular, exhibit positive network effects. Larger trading platforms offer lower trading costs. As trading platforms attract more liquidity, bid-ask spreads tighten, search costs fall (by limiting the number of venues that a customer needs to check to assess the market), and connection costs decrease, as customers have no need to connect to all venues.[2] The whole is therefore greater (in the sense that it is more efficient) than the sum of the parts.

This is not to say that smaller trading platforms do not have a role to play. They provide specialized services that cater to individual customer needs. These specialized services help the smaller exchanges grow by driving liquidity to their platforms, and, if they are successful,

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1 See Joost Rietveld and Melissa A. Schilling, "Platform Competition: A Systematic and Interdisciplinary Review of the Literature," (November 27, 2020), available at https://journals.sagepub.com/doi/full/10.1177/0149206320969791.

2 Nasdaq's experience shows that fewer customers connect with smaller trading venues than with larger venues.

achieve the economies of scale that benefit the larger enterprises. Because the total costs of interacting with an exchange are roughly equal, smaller exchanges offset higher trading costs with lower connectivity, market data, or other fees. While the mix of fees will change as exchanges grow, the all-in cost of interacting with the exchange remain roughly the same.

The network benefits of exchange platforms go beyond what is expected from platform theory alone. Exchanges have a unique role to play in market transparency because they publish an array of pre- and post-trade data that non-exchange venues, for the most part, do not. Non-exchange venues benefit from transparency by using published market data to set their own prices and assess their own trading strategies.

As the SEC recently noted in its market infrastructure proposal,[3] the number of transactions completed in non-exchange venues has been growing. Allowing exchanges to compete as platforms means that they will be better able to compete against non-exchange venues, and, to the degree order flow is shifted from non-exchange to exchange venues, overall market transparency is improved.[4] Moving liquidity onto lit venues helps non-exchange venues by enabling them to provide more accurate pricing to their customers, and play their own role in capital formation more efficiently and effectively.

Competition works as an effective system of fee regulation because, as we show in this paper, significant competitive forces constrain combined fees across all exchange products and services, and no exchange is able to provide services that cost more to use than any other in the aggregate.[5] *Although different exchanges have very different fee models for their products and services—and fees for specific services may differ markedly across venues—the "all-in" cost of interacting with an exchange is largely equalized across trading venues*.

This is because not all customers need to purchase all exchange services. In the case of market data, for example, while broker-dealers engaging in on-exchange trading have more of a need of multiple data feeds than other users, they still have the opportunity to route order flow to non-exchange venues that offer price improvement. More importantly, many market data customers are not broker-dealers and therefore are not governed by the same regulatory obligations. For example, non-exchange venues purchase market data to set internal bids and offers; investors purchase data to understand the state of the market generally; media companies purchase data to

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3 See Regulation NMS: Minimum Pricing Increments, Access Fees, and Transparency of Better Price Orders, Securities Exchange Act Release No. 96494 (File No. S7-30-22), available at https://www.sec.gov/rules/proposed/2022/34-96494.pdf.

4 Non-exchange venues rely on market data distributed by exchanges to set prices. Greater transparency allows both exchange and non-exchange venues to operate more effectively and efficiently.

5 The Exchange Act mandates the "equitable allocation of reasonable dues, fees, and other charges among members and issuers and other persons using its facilities." See 15 U.S.C. § 78f(b)(4). The language of this provision requires examination of the fee schedule as a whole, referring generally to "reasonable dues, fees, and other charges." Nothing in the Act requires the individual examination of specific product fees in isolation. Provided that a proposed rule change does not in and of itself undermine competition, evidence of platform competition is sufficient to show that the product operates in a competitive environment. A determination of whether a proposal permits unfair discrimination between customers, issuers, brokers or dealers would remain a separate product-specific inquiry.

report financial news. Not all of these customers need to purchase market data from all venues; purchasing products from one venue or a subset of venues is enough. As many proprietary market data products are substitutes, such products compete directly, adding to platform competition and therefore enhancing the overall competitive environment among exchange venues.[6] As long as a sufficient number of customers can choose a different venue, exchanges are constrained from charging excessive fees.[7]

Tailoring fees to the customer's use case, needs and willingness to pay is fairer than cost-based fees or those based on some other criteria. In general, exchanges offer specialized fees in the form of discounts from a standard fee. Examples of such discounts include non-professional fees, media enterprise licenses, and broker-dealer enterprise licenses. Offering discounts to specific classes of customers allow for broader dissemination of information, and provide customer discounts commensurate with the customer's ability to pay.

Reliance on competitive solutions is fundamental to the Exchange Act. Where significant competitive forces constrain fees, fee levels meet the Exchange Act standard for the "equitable allocation of reasonable dues, fees, and other charges among members and issuers and other persons using its facilities,"[8] unless there is a substantial countervailing basis to find that a fee does not meet some other requirement of the Act.[9] As we demonstrate herein, competition exists at a platform level. Evidence of platform competition demonstrates a competitive environment for each product sold as part of the array of trading platform services, provided that nothing about the product or its fee structure impairs competition.[10]

Moreover, the "cost-based" fee analysis suggested in the SEC Staff Guidelines as a possible alternative to a competitive analysis may not be feasible. As discussed below, exchange platforms produce joint products. Economic theory suggests, however, that there are no objective

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6 To be clear, the existence of platform competition does not preclude competition at the product level. Top of book data from various exchanges (i.e., bids and offers and last sale information) are close substitutes, and, as such, compete directly at the product level. The existence of this type of product-level competition does not preclude the existence of platform competition, but rather enhances the overall competitive environment.

7 To use an analogy from FTC merger guidelines: "The loss of competition may not matter if a sufficient number of customers are likely to switch to products or services sold by other companies if the merged company tried to increase its prices." Federal Trade Commission, Mergers, available at https://www.ftc.gov/advice-guidance/competition-guidance/guide-antitrust-laws/mergers/markets.

8 See 15 U.S.C. § 78f(b)(4).

9 See SEC, Staff Guidance on SRO Rule Filings Related to Fees (May 21, 2019) at n. 34, available at https://www.sec.gov/tm/staff-guidance-sro-rule-filings-fees ("If significant competitive forces constrain the fee at issue, fee levels will be presumed to be fair and reasonable, and the inquiry is whether there is a substantial countervailing basis to find that the fee terms nevertheless fail to meet an applicable requirement of the Exchange Act (e.g., that fees are equitably allocated, not unfairly discriminatory, and not an undue burden on competition).")

10 Nothing in the Exchange Act requires proof of product-by-product competition.

criteria to allocate costs across joint products, and any cost allocation would therefore be arbitrary.[11]

Further, fee caps eliminate incentives to invest and innovate, inevitably harming consumers, even when those fee caps are aimed at only a single product or subset of products. Moreover, regulating fees for a single product (or subset of products) would most likely not change the "all-in" cost of interacting with an exchange, and therefore any benefit to the customer is unclear.

For all of these reasons, competitive forces create a better and more efficient market structure that incentivizes innovation and efficiency better than any cost-based system of regulation.

What is the evidence that platform competition works?

The combination of explicit all-in costs to trade and other implicit costs has largely equalized the cost to trade across venues.[12] This is a function of the fact that, if the ***all-in*** cost to the user of interacting with an exchange—taking into account the amount of liquidity of the exchange—exceeds market price, customers cease to buy the services of that exchange, and therefore the exchange must adjust one or more of its fees to attract customers. As such, platform competition has resulted in a competitive equilibrium in the market for exchange services, in which trading platforms are essentially price takers, taking into account the all-in cost of interacting with the platform. This competitive equilibrium is a natural consequence of competition, and demonstrates that no exchange platform can charge excessive fees and expect to remain competitive, thereby constraining fees on all products sold as part of the platform. The existence of platform-level competition also explains why some consumers route orders to the exchange with the highest explicit trading costs even though other exchanges offer free or a net-rebate for trading.[13]

The economic concept of platform competition has been recognized by both the SEC and the courts. SEC Staff Guidance published in 2019 acknowledged that platform competition can constrain aggregate returns, regardless of the pricing of individual products, and that platforms

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11 Current fees for connectivity, transactions, data and other joint products are based on the value of the service, and are not cost-based.

12 Competition across platforms constrains platform fees, and results in "all-in" costs becoming equal across platforms. The Staff Guidance on SRO Rule Filings Relating to Fees, however, states that platform theory requires that the "overall *return* of the platform, rather than the *return* of any particular fees charged to a type of customer, . . . be used to assess the competitiveness of the platform's market" (emphasis added), and states that "[a]n SRO that wishes to rely on total platform theory must provide evidence demonstrating that competitive forces are sufficient to constrain the SRO's aggregate return across the platform." See "Staff Guidance on SRO Rule Filings Relating to Fees." *SEC,* 21 May 2019, https://www.sec.gov/tm/staff-guidance-sro-rule-filings-fees. ("Staff Guidance on SRO Fees"). We do not know, and cannot determine, whether returns are equalized across platforms, because we do not have detailed cost information from other exchanges. An analysis of returns, however, is unnecessary to show that competition constrains fees given that, as we demonstrate below, platform competition can be demonstrated solely by examining costs to users.

13 Empirical evidence also shows that market data is more valuable from exchanges with more liquidity. Many customers decide not to take data from smaller markets, even though they are free or much lower cost than larger markets.

often have joint products.[14] The Supreme Court in *Ohio v. American Express Co.*[15] recognized that, as platforms facilitate transactions between two or more sides of a market, their value is dependent on attracting users to both sides of the platform (i.e., network effects). Fees cannot be analyzed from only one side, but rather must be considered within the larger context of the platform to test for anti-competitive behavior.

The application of well-established economic theory shows that exchanges are platforms. Exchanges facilitate interactions between multiple sides of the market—buyers and sellers, companies and investors, and traders and market watchers—and their value relies upon their ability to draw customers to multiple sides of the platform, with the presence of participants on one side attracting participation on the other. The competition among exchanges as trading platforms, as well as the competition between exchanges and alternative trading venues, constrain exchanges from charging excessive fees for any exchange products, including trading, listings, ports and market data. Indeed, the fees that arise from the competition among trading platforms may be too low because they fail to reflect the benefits to the market as a whole of exchange products and services, allowing other venues to free-ride on these investments by the exchange platforms, increasing fragmentation and search costs.

Given that the exchange market is competitive and that exchanges compete as platforms, platform competition is the most accurate model of the exchange landscape and should therefore be central to the Commission's economic analysis of exchange fee filings.

2 Economic Definition of a Platform

In economics, the widely-accepted definition of platforms is that they are "[t]wo-sided (or more generally multi-sided) markets [which] enable interactions between end-users, and try to get the two (or multiple) sides 'on board' by appropriately charging each side."[16]

A key aspect of platforms is the existence of "[i]nter-side 'externalities[,]' [meaning] demand for platform services by customers on one side of the platform depends positively on the demand for platform services by customers on the other side of the platform."[17]

In other words, the value of the platform relies on network effects, in which the firm must attract users to each "side" of the platform. Platforms face pricing incentives that would be unusual for other types of businesses. For platforms, the owner "may choose to charge a 'negative price' …

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14 Staff Guidance on SRO Fees. As noted above, we cannot demonstrate that returns are equalized across platforms, as we do not know the costs of other exchanges. Supra, n.2. Having said that, the equalization of costs to the user demonstrates that platform competition constrains the fees charged by exchange platforms without requiring a separate analysis of whether returns are equalized across platforms.

15 *Ohio v. American Express Co.* 138 S. Ct. 2274, 585 U.S. ___ (2018).

16 Rochet, Jean-Charles and Tirole, Jean. (2004). Two-Sided Markets: An Overview.

17 Ordover, Janusz and Bamberger, Gustavo. "Statement of Janusz A. Ordover and Gustavo Bamberger." 2019.

to one side of the transaction and a 'positive price' to the other side"[18] to incentivize participation and enhance the value of the platform overall.

These unique features of platforms mean that measures of competition that focus only on one side of the platform—or, even more narrowly, measures that focus on only one dimension of competition (such as price) on one side of the platform—are ill-suited for multi-sided platforms, and competition must be measured at the platform level.

Another aspect of platforms is that they often produce "'joint products' with 'joint costs.'"[19] Joint products are "multiple products or services that are generated by the same production technology," and their production results in joint costs, or "costs that are incurred on behalf of more than one product or service and thus, potentially, are linked to more than one revenue source."[20] For example, in the dairy industry, cow's milk generates cream, cheese, yogurt, khoa, ice cream, butter and saturated oil (ghee).

The challenge of joint products, particularly in a regulated market, is that joint costs make standard economic cost-based pricing impossible to employ accurately since "there is no economically sound methodology for allocating or attributing any portion of the joint costs to any given product, service, or customer… [and] no economically appropriate way to evaluate whether the price of an individual jointly produced product or service is above or below the cost of providing that product."[21]

Consider the fact that growing wheat results in wheat and straw, refining flour creates flour and bran, and raising cattle results in beef and leather. It is not possible to assign a unique cost to each of the joint products. For example, 50 percent of the cost of raising cattle could be assigned to the production of leather, but the implicit cost of producing leather could also be estimated at 10 percent, or 90 percent. There is no objective way to distinguish one cost allocation from another.

Legal precedent is consistent with economic theory. In *Ohio v. American Express Co.*, the Supreme Court held that credit card networks operate two-sided platforms that "cannot make a sale to one side of the platform without simultaneously making a sale to the other," and that platforms exhibit "'indirect network effects,' … where the value … to one group depends on how many members of another group participate."[22] Therefore, "[t]wo-sided platforms must take

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18 *Id.*

19 Staff Guidance on SRO Fees.

20 Ordover, Janusz and Bamberger, Gustavo. "Statement of Janusz A. Ordover and Gustavo Bamberger." 2019.

21 *Id.* We note that the 2019 Staff Guidance assumes that a unique cost can be assigned to each exchange product. For joint products, assigning a single, unique cost to joint products is arbitrary. The difficulties of allocating costs for joint products are magnified where a substantial portion of the platform's costs are fixed, as is the case for stock exchanges. Markets characterized by high fixed costs and low marginal costs present the additional problem of accounting for disproportionately high fixed costs in assessing an appropriate measure of prices vs. costs than, for example, markets for wheat or beef.

22 *Ohio v. American Express Co.* 138 S. Ct. 2274, 585 U.S. ___ (2018)

these effects into account before making a change in price on either side."[23] The Court concluded that American Express's "antisteering" provision, which prevented merchants from encouraging patrons at the point of sale to use other credit cards with lower transaction fees, was not anti-competitive. This is because the higher fees were part of American Express's larger platform, and were used to cross-subsidize its rewards program, enhancing the value of the platform to cardholders, which encouraged spending valued by merchants.

SEC Staff's 2019 Guidance broadly aligns with this definition, and its viability to prove competition among exchanges, noting that "platform theory generally asserts that when a business … bring[s] together two or more distinct types of customers, it is the overall return of the platform, rather than the return of any particular fees charged to a type of customer, that should be used to assess the competitiveness of the platform's market."[24] The SEC has also acknowledged the role of cross-subsidization in platforms, which is often the result of them producing "'joint products' with 'joint costs.'"[25]

3 Exchanges as Platforms

In this section, we demonstrate that, by the economic definition, exchanges are platforms. They are multi-sided markets whose value is reliant on network effects that feature joint products.

3.1 Exchanges Are Multi-Sided Markets

Exchanges are a "quintessential example of multi-sided 'platforms'" because, in the purest sense, platforms "facilitate interactions among two or more 'sides,'" or distinct groups of customers,[26] and this is precisely what occurs on exchanges.

In attracting customers, exchanges demonstrate characteristics consistent with multi-sided platforms, relying on inter-side externalities, or network effects, to increase the value of the platform, and using the exchange's price structure to promote those network effects.

Market data acts as a form of advertising for an exchange, where better performance in market quality attracts additional liquidity. Exchanges without the best quotes attract fewer trades. Market data begets trading and vice versa (see Figure 6 in Section 4.4.1.1), as exchanges with better quotes tend to trade more, creating positive externalities of public prices and greater liquidity. The trades and quotes in turn create more liquidity through many professional and non-professional displays. There is even evidence that greater adoption of market data results in

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23 *Id.*

24 Staff Guidance on SRO Fees. As noted above, an analysis of returns is not necessary to demonstrate the effects of platform competition Supra, n.2.

25 *Id.*

26 Ordover, Janusz and Bamberger, Gustavo. "Statement of Janusz A. Ordover and Gustavo Bamberger." 2019.

more trading among *non-subscribers* to market data due to the benefit of increased liquidity on the exchange.[27]

Listings also facilitate trading and market data, attracting more users to the platform. If an exchange demonstrates superior liquidity and market quality, as confirmed by the data, it will attract more companies to list on the exchange. As more companies list on an exchange, it attracts more order flow, again resulting in a virtuous cycle that boosts network effects.

The same is true for colocation. Market participants use the colocation services of exchanges with better trading, boosting the participants' confidence in trading, improving liquidity and spreads, attracting more traders, and making data more valuable to other customers.

Exchanges use a different pricing structure to attract investors and bolster these network effects, depending on their business model (see Section 4.4).

3.2 Exchanges Have Joint Products

Exchanges also feature another prototypical characteristic of platforms: joint products.

Joint products are "multiple products or services that are generated by the same production technology."[28] Just as the processing of milk results in a variety of joint products, a common exchange process—the trading engine—creates joint products. The trading engine advertises quotes, which attract orders and result in trades, which, at the same time create market data. The process also provides liquidity for issuers, which promotes listing services and encourages users to purchase colocation services to ensure better connections. [29]

The fact that these are joint products is demonstrated by a simple thought experiment. One cannot imagine a quote without trading, or a trade without a quote,[30] or traders connecting to a venue that is not trading.

Consider markets "without an exchange," like bond markets today. There are fewer infrastructure costs associated with creating those markets, but also "no demand for connections to the exchange… [and] no market data is created."[31]

Substantial evidence that exchanges are platforms is provided by an examination of what exchanges actually sell.

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27 Hendershott, Terrence & Rysman, Marc & Schwabe, Rainer. (2024). Stock Exchanges as Platforms for Data and Trading. https://sites.bu.edu/mrysman/files/2024/02/2024.02.16-DRAFT-NYSE-IF-paper.pdf

28 *Id.*

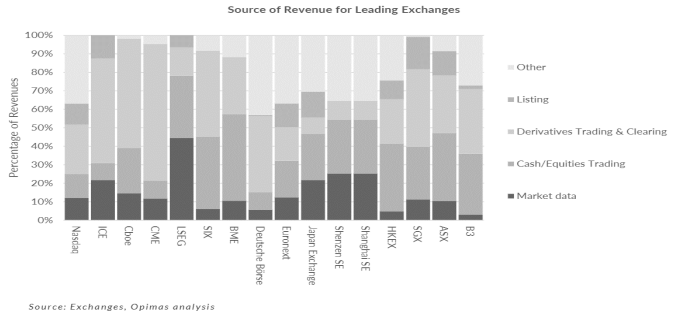
29 Schwabe, Rainer. "Platform Competition and the Regulation of Stock Exchange Fees." *National Law Review,* 9 Jun. 2022, https://www.natlawreview.com/article/platform-competition-and-regulation-stock-exchange-fees

30 To be sure, dark pools do not publish public quotes, but they base their trades on the quotes provided by lit markets.

31 Ordover, Janusz and Bamberger, Gustavo. "Statement of Janusz A. Ordover and Gustavo Bamberger." 2019.

Data shows that exchanges around the world earn revenues from a combination of their joint products, regardless of the regulatory environment that prevails in a particular country or region (Figure 1).

Figure 1: Exchanges Worldwide Earn Revenues from Joint Products



As platforms, all exchanges produce joint products, which different customers value differently. These products are another source of competition among exchanges, with innovation and pricing structures creating different avenues for platforms to differentiate.

In the U.S., an exchange that prices its joint products optimally to one customer group provides opportunities for other exchanges to price their joint products in different ways to appeal to other customer groups, which enhances competition and improves customer welfare as the various exchanges respond to customers and competition in determining the various components of their competitive offerings.

Clearly listing, trading, data, and colocation services are joint products.

3.2.1 The Challenges of Joint Products

It is a misconception that consumers use joint products jointly; joint products are jointly produced, but are not necessarily jointly purchased. "These trading, data, and co-location services are used by overlapping sets of firms (some use all three, some only a subset) and the value of these services is interconnected. Data from a stock exchange, for example, are more valuable when the exchange carries more trading activity."[32]

In other words, not all customers use all exchange services. To be sure, traders use market data, but not to the same extent, and not all users of market data actually trade. Index providers use market data to create indexes, but do not necessarily trade the underlying securities on an exchange. Similarly, ATSs may use market data to benchmark prices without trading on an exchange.

The specific offerings of each exchange, as well as its pricing structure, determine the utility to each customer. And, critically, different customers utilize the exchanges' various products in different quantities, which leads to variations in the extent to which customers are attracted to the different exchanges' pricing structures. In assessing the utility of a platform, each customer must consider the total costs incurred for the product mix they will use at each exchange.

Importantly, the utility of the market is also maximized when each joint product is optimally priced—as that reduces the amount of forgone consumer and producer surpluses (economic

32 Schwabe, Rainer. "Platform Competition and the Regulation of Stock Exchange Fees." *National Law Review,* 9 Jun. 2022, https://www.natlawreview.com/article/platform-competition-and-regulation-stock-exchange-fees

deadweight losses) due to inefficient pricing and production, where some underpay while others do not consume. Economic theory shows more optimal pricing could more readily reflect the value of products to users, allowing exchanges to create new products for additional customers, increasing access to the market and promoting innovation.

In the case of exchange fees, platform competition and the fee's impact on all sides of the platform must be considered. The determination of whether a proposed fee is subject to such competition requires a determination of whether the product is part of the exchange platform, i.e., whether the product is subject to inter-side externalities, where the presence of participants on one side attracts participation on the other. If the proposal does not restrict overall competition, and it is part of the platform and subject to inter-side externalities, then it is subject to competitive constraint.

Critically, in assessing whether fees are subject to competition, the pricing choices of one exchange should not be deemed unreasonable simply because they differ from the choices made by other exchanges (e.g., pricing higher in one joint product and lower in others). Differentiation and variation in product offerings are hallmarks of competition and beneficial to customers and consumer welfare. A fee proposal should not be rejected, for example, simply because a proposed price for one platform product is higher than a competitors' prices for a similar product because one can expect the first platform's other joint products to be priced lower to maintain platform competitiveness.

Determining a cost basis for exchanges' joint products is not objectively possible, as economic theory has developed no objective criteria to assign a specific cost to one product out of a set of joint products, and therefore any assignment of cost would be highly subjective. Is the cost of a server related to listings, data, or trading? Is that allocation the same for liquid and illiquid securities? How should subsidies to market quality be included? There is no objective way to distinguish one allocation from another.

3.3 Nasdaq Is a Platform

By these well-established economic standards, Nasdaq and other exchanges are platforms. Stock exchanges operate trading engines that bring together buyers and sellers of securities. Nasdaq pays liquidity providers (a "side") a rebate to attract them to the exchange, and our success in doing so has resulted in superior market quality (see Table 1 in Section 4.4.1), incentivizing liquidity providers and removers to trade on Nasdaq (network effects).

The bids, asks, spreads, and transaction clearing prices—which form the building blocks of market data—are all inherent in the operation of the trading engine. Market data and trade executions are generated by operation of the trading engine (joint products). The presence of joint products is further evidence that exchanges are platforms.

The volume of trades on Nasdaq results in valuable market data, which in turn makes traders more confident in Nasdaq, and makes it worthwhile for many to invest in colocation services.

The excellent market quality on Nasdaq attracts listings to the exchange, and has even resulted in companies switching to Nasdaq after listing on an exchange with poorer market quality (see Box 3 in Section 4.4.1.5). Increased listings add to trading and quoting breadth, which adds to data and secondary market revenues. But that is not the only way to price and offer products that exist in today's U.S. Equities markets, as we show in the following section.

4 Exchanges Compete Across Their Platforms

By now, it is clear that exchanges operate as multi-sided platforms that feature joint products.

In this section, we demonstrate that platform competition constrains pricing among exchanges as measured by all-in costs for users to trade.

Customers consider the all-in cost for them to trade at each venue, including the explicit costs of trading, connectivity, membership, and data. Regardless of different pricing structures for each service, exchanges compete at the level of aggregate cost to the customer, as a mix of multiple services is the relevant metric for many customers.

We also see that implicit costs to trade cannot be overlooked in assessing competition. Implicit costs, including markouts, opportunity costs and fulfillment rates, are part of the cost of interacting on an exchange, and are a basis for competition among exchanges.

When explicit and implicit costs are considered in tandem, costs to the user are largely equalized across exchanges. This suggests, as explained in greater detail below, that a competitive equilibrium exists and exchange fees are therefore constrained by competition.

Although all-in costs to users are constrained, we cannot gauge the aggregate returns of each exchange platform. Still, as we will discuss, the competitive nature of the exchange business sees some exchanges operating at a loss, a result that is inconsistent with the assertion that exchanges enjoy market power (Section 4.4.1.2).

In the context of the competition among platforms, different exchanges operate a variety of different business models. Each exchange's platform uses different pricing structures, each appropriate for its target customers in order to enhance its multi-sided platform via network effects.

As noted above, a subset of competition among trading platforms is the competition between listing and non-listing exchanges. This is because UTP rules allow venues to unbundle listing and trading operations, and profit from lower costs of just executing orders (see Section 4.4.1.5).

4.1 Proof That Platform-Wide (All-In) Costs to Users Matter to the Market

Demonstrating that exchanges compete at the platform level, and that all-in costs to the user are already constrained by that competition, requires a two-step analysis.

First, we analyze the all-in explicit costs for the user to trade across exchanges, which vary significantly.

Second, we consider the implicit costs for the investor to trade on each venue, which broadly equalizes costs to the user across venues. These implicit costs come primarily in the form of realized spreads.

Considered together, it is clear not only that all-in costs to users are roughly equal across exchanges, but also that implicit costs explain how venues with far higher explicit costs manage to compete with seemingly much cheaper venues (and conversely, how exchanges with higher implicit costs use lower fees to compete). This is strong evidence that all exchange fees are constrained by competitive forces. To the degree that any exchange sets a particular fee at a level that causes all-in costs to the user to be too high relative to the market, that exchange must lower other fees to remain competitive. The fact that all-in costs to users have equalized means that competition has constrained exchanges to a competitive equilibrium of prices at a platform level. Fees for particular products may vary as different exchanges attempt to appeal to different segments of the market, but fees overall are constrained by operation of market forces.

As an additional constraint on the ability of an exchange to set fees at a level that is too high relative to the market, we also demonstrate that exchanges face competition from non-exchange venues.

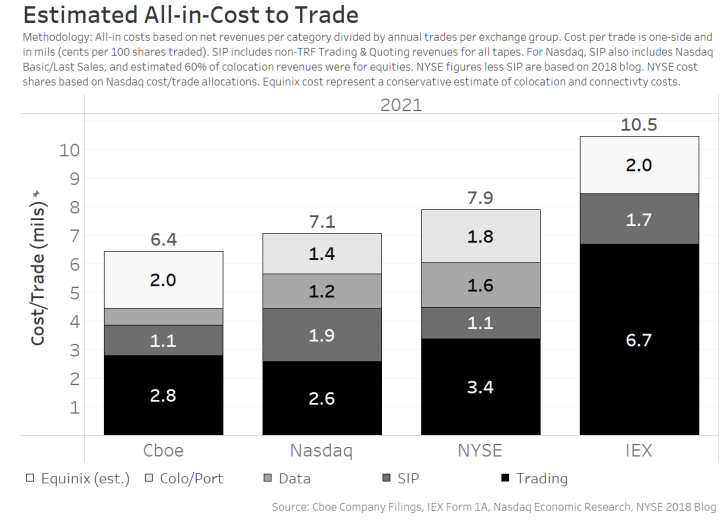
4.1.1 All-In Explicit Costs Vary Across Platforms–But Are Kept in Line at a Platform Level

The first step in demonstrating that exchanges compete at the platform level, and therefore face constraints on exchange fees, is to analyze the explicit cost to trade on each exchange.

As platforms, exchanges can utilize a variety of pricing structures, since joint products preclude pricing based on the cost to the exchange.

Exchanges may choose to charge more for trading and little or nothing for data—though that may partly reflect the economic value of a particular exchange's data (exchanges with more liquidity also have more valuable data, and those with less liquidity have less valuable data). These choices are consistent with the SEC staff's understanding that "an exchange pricing its trade execution fees higher and its market data fees lower (or vice versa), would—because of 'platform' competition—nonetheless receive the same overall aggregate return from the two joint products."[33]

Figure 2: 2021 All-In Cost to Trade by Exchange



33 Staff Guidance on SRO Fees.

This aligns with the customer experience as well. Although traders pay a fee per trade, joint products like data and colocation are also part of the cost to trade. This includes all explicit costs incurred, whether charged directly by the exchange or indirectly through a vendor of exchange data. For example, Cboe and IEX do not charge for colocation, but those wishing to trade on those venues still incur an explicit cost paid to a third party for the ability to route orders to those venues, which we have estimated (Figure 2, Equinix portion of bars). Nasdaq and NYSE charge participants directly for colocation and fees are reflected in the chart accordingly.

Taking all explicit costs to trade into account, however, reveals significant differences across exchanges. In fact, it is over 60% more expensive to trade on the costliest exchange than on the cheapest (Figure 2).

Such a sizeable disparity suggests that there is another factor that keeps these exchanges in competition. Specifically, when implicit costs are considered, the difference in cost to trade is minimized.

4.1.2 Implicit Costs and Explicit Costs Matter at the Platform Level

Examining implicit costs to trade is the second step in demonstrating that exchanges compete at the platform level, which constrains pricing power.[34]

The realized spread, or markouts,[35] capture losses or profits liquidity providers earn atop of explicit fees (see Box 1 for additional context on how to understand markouts, and their impact).

The fact that implicit costs are not revenues that accrue to exchanges is immaterial because they are costs borne by customers and therefore impact customer decisions.

Data shows the venues with the highest explicit costs (Figure 3, black dots) – typically inverted and fee-fee venues – have the lowest implicit costs from markouts (positive values imply profits for market participant) and vice versa (bars). Higher markouts mean more spread capture, but since these venues also tend to have the least volume (bar width represents non-TRF market share), those markouts are less consistently available.

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[34] Trading costs are not always borne by a single party. Broker-dealers, when not trading on their own behalf, are agents of third-party investors. This does not change our analysis, however, as broker-dealers are expected to act in good faith on behalf of their customers.

[35] Per-trade markout is a measure of theoretical profitability from the perspective of a **liquidity provider**. We only consider regular and odd-lot trades executed at the NBBO during continuous trading session. Instances when the market is crossed, or the bid-ask spread is higher than $1 plus 5% of the NBBO midpoint price (Rule 605 criteria), have been excluded from the sample. For each security-day combination, the markout is calculated as:

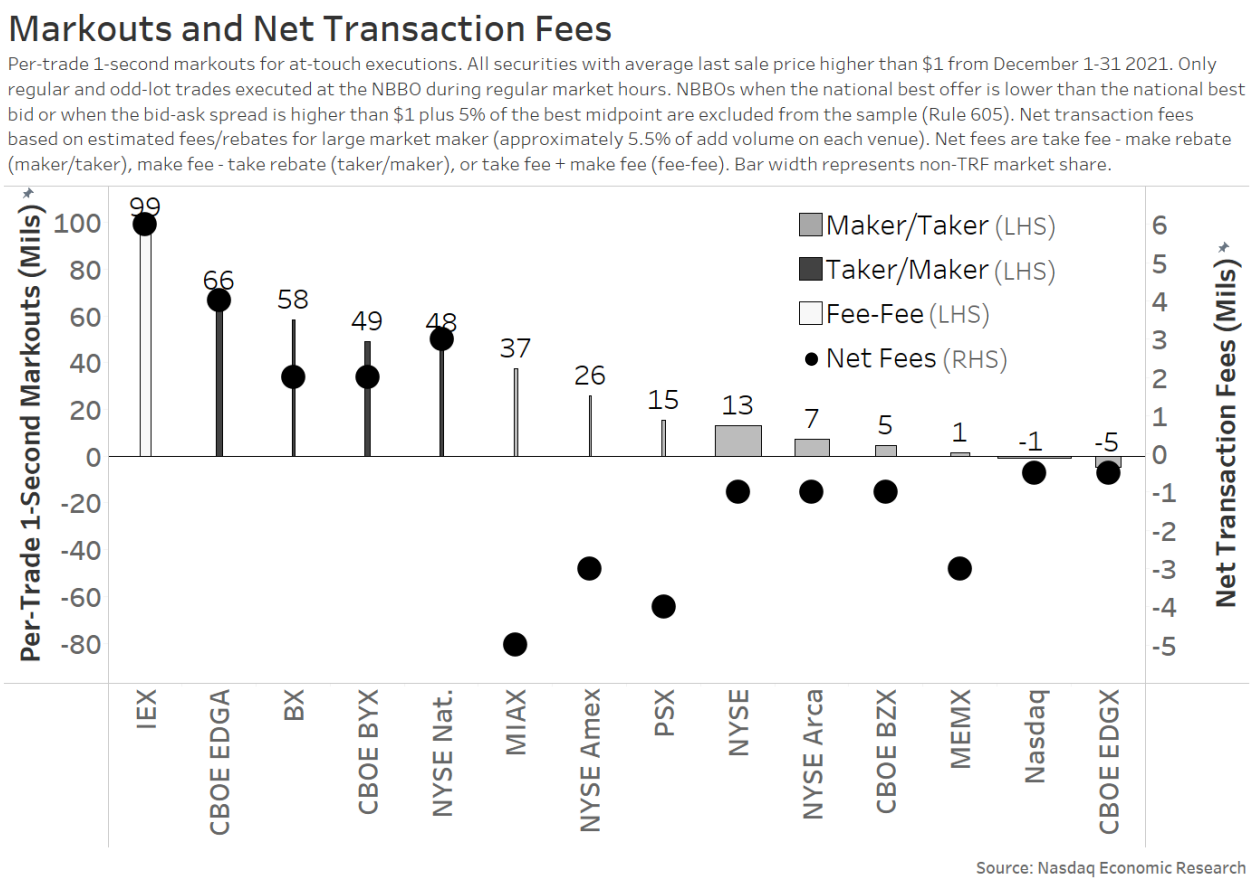
$$Markout = 10{,}000 * \frac{1}{E}\sum_{e=1}^{E} Side_{e,t} \times \left(Midpoint_{e,t+1s} - Execution\ Price_{e,t}\right)$$

where $Side_{e,t}$ is a variable that takes the value -1 (1) for trades executed at the prevailing best offer (bid); and $Midpoint_{e,t+1s}$ is the prevailing NBBO midpoint one second after execution time *t*.

The overall per-trade markout is calculated as the trade-weighted markout.

Maker-taker venues instead subsidize NBBO quotes via net negative fees, which helps offset worse spread capture. These differences highlight why all-in economics matter for customers. Absent a subsidy to offset adverse selection, a market maker would be unlikely to quote on maker-taker venues, for example.

Figure 3: Per-Trade Markouts and Net Transaction Fees by Exchange



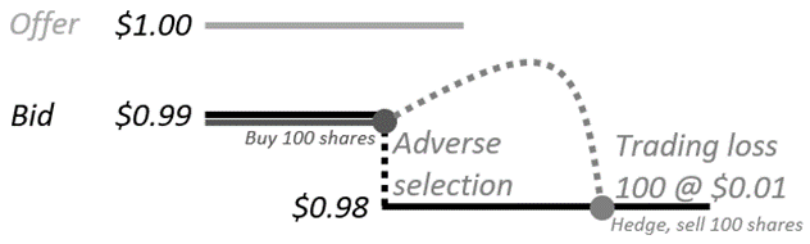
Note on Data:

In general, the data in this report is from 2021 or 2022. This is the deliberate result of trying to make sure cross-comparisons between figures in this paper are fair. Importantly, we believe that more recent data are consistent with the findings of this paper. For example, see a 2022 version of Figure 2's All-In Cost to Trade – the latest data available at the time of publishing – in the "All-in Economics to Trade Are What Matter Most" post on Nasdaq.com.[36]

36 Mackintosh, Phil. "All-in Economics to Trade Are What Matters Most." *Nasdaq,* 28 Sep. 2023, https://www.nasdaq.com/articles/all-in-economics-to-trade-are-what-matters-most

Box 1: Understanding Markouts: Why market participants select adverse selection

The concept of markouts was created by market makers, who are trying to capture the spread, while providing a two-sided (bid and offer) market. For those traders, being filled on the bid or the offer will cause a loss if the fill results in the market prices changing.

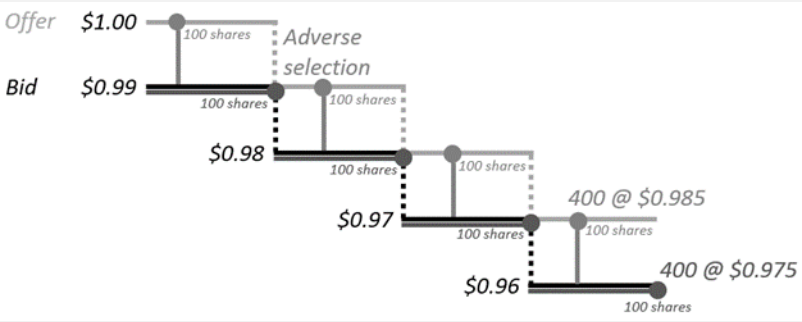


For example, a fill on a market maker's bid, just as the stock gets cheaper to buy, results in a "virtual loss", as they have a long position and the new bid is lower than their fill. Hedging their exposures out would require selling at the new, lower, bid, locking in a realized loss on the trade.

However, markouts aren't always bad. In fact, for an institutional investor, working a large order, a fill with a negative markout can be close to optimal for a few of reasons[37]:

1. It is a fill, at the "near touch" (bid for a buyer) which is cheaper than the original order paying the spread
2. It eliminates additional wait time to finish the order, allowing another order to be entered sooner, reducing opportunity costs.
3. It often allows the next order to be placed at an even better limit price, reducing the overall cost of the position.

We show that in the example below:

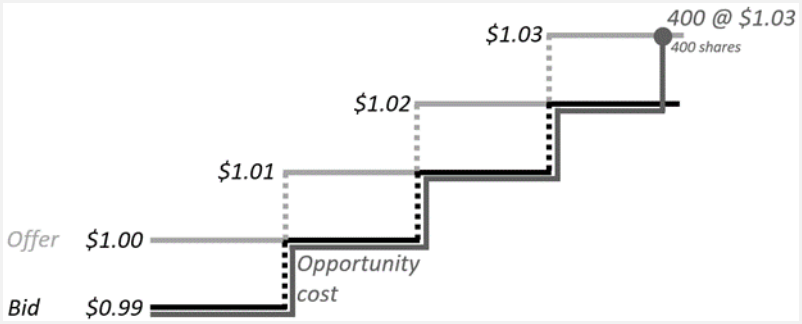


- A relatively urgent buyer (but not so urgent as to push prices higher) might pay the offer each time they enter the market. Over the time window in the chart below, their trading leads to 400 shares executed at $0.985, which is superior to the mid price at the time of the first order's arrival.
- A relatively passive buyer, in contrast, will join the bid. However, as the stock price is falling, each time the buyer gets a fill, they experience "adverse selection." Over the time window in the chart below, their trading leads to a lower cost for 400 shares executed at

$0.975, even though adverse selection adds to $4 (400 shares at $0.01). Again, the realized price beats the arrival mid price.

In this sense, adverse selection can be "good," especially if an investor is working a large order that requires many more executions to complete.

Avoiding adverse selection (for a buyer) requires avoiding fills at the bid side of the spread. That creates opportunity costs, as the diagram below shows. This can also happen if the posted order, instead of being adversely selected, signals the buyer to the market.



Over time, if the price instead drifted up, the buyer could have no executions at the end of the period. Completing their 400 shares trade, by crossing the spread at the end of the period, may instead cost $1.03. That results in the worst execution price, a shortfall vs arrival mid of $0.035, which is $0.015 worse than the order with adverse selection.

Analysis shows waiting for executions significantly adds to the variance in shortfall, or execution risk,[38] on average. It can also result in much faster trading toward the end of the trading window, in order to complete the total order, which can also add to execution costs, according to research.[39]

Our research also shows a trade-off between liquidity and execution quality that exists on a continuum: The more liquidity you need, the more price impact you should expect.[40] Consequently, broker algorithms and market makers are constantly weighing the cost of

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37 Institutional investors typically work large orders over time, sometimes days, adding to, on average, an impact cost from trading: https://www.nasdaq.com/articles/how-much-does-trading-cost-the-buy-side

38 Mackintosh, Phil. "How Fast Should You Trade?" *Nasdaq,* 7 Nov. 2019, https://www.nasdaq.com/articles/how-fast-should-you-trade-2019-11-07

39 Mackintosh, Phil & Ewen, Graham. "Portfolio Strategy: Estimating Execution Costs." Exhibit 8, *Credit Suisse,* 12 Nov. 2008.

40 Mackintosh, Phil. "What Markouts Are and Why They Don't Always Matter." *Nasdaq,* 23 Jul. 2020, https://www.nasdaq.com/articles/what-markouts-are-and-why-they-dont-always-matter-2020-07-23

immediate liquidity, and lower opportunity costs, against better spread capture (lower markouts[41,42]) with more opportunity or explicit trading costs.

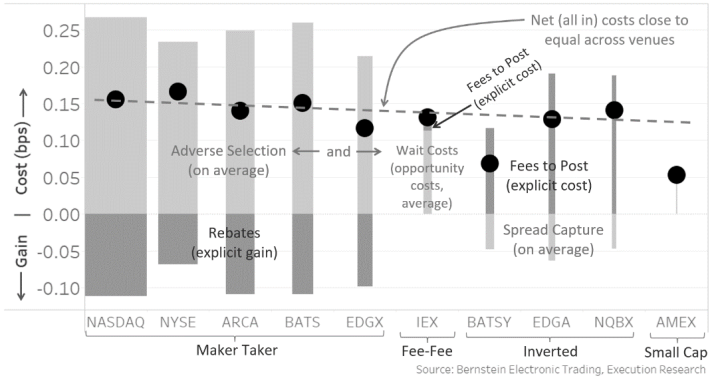
However, brokers and investment managers also deploy sophisticated analytic tools[43] to assess how to better manage that tradeoff.

Other research from multiple sources finds that competition has largely equalized all-in costs to users across venues, when accounting for explicit and implicit costs.

Research by Bernstein confirms that participants route trades in a way that not only accounts for explicit and implicit costs – but also very efficiently values opportunity costs, like lower odds of getting a fill on inverted venues.[44]

Figure 4 is sorted by liquidity (bar size and rank is by market share). The fact that all-in trading costs[45] (black dots) marginally decline for the less liquid venues is interesting (dashed line). This may reflect the fact that there are other costs of waiting in less liquid venues that are not included here, such as the cost of trading in a venue that has a lower fill probability. Having said that, what is striking here is that all-in trading costs are equalized, with minor variation. These lower costs for less liquid venues reflect the lower quality of such exchanges, and the greater difficulty of such exchanges in providing fills.

Figure 4: All-In Trading Costs by Venue



Notwithstanding these minor variations, research by DiMaggio has found that, after accounting for more than just the cost of take fees, the "all-in" (or net) trading costs of routing to inverted

41 Mackintosh, Phil. "Routing 201: Some of the Choices and Algo Makes in the Life of an Order." *Nasdaq,* 14 Nov. 2019, https://www.nasdaq.com/articles/routing-201%3A-some-of-the-choices-an-algo-makes-in-the-life-of-an-order-2019-11-14

42 Mackintosh, Phil. "Routing 101: Identifying the Cost of Routing Decisions." *Nasdaq,* 14 Dec. 2018, https://www.nasdaq.com/articles/routing-101-identifying-cost-routing-decisions-2018-12-14

43 Tools include Virtu's TCA product, Babelfish TCA, Pragma and internal proprietary TCA and routing reports.

44 Bershova, Nataliya & Jaquet, Paul. (2019). Execution Quality and Fee Structure: Passive Lit Executions. Bernstein Electronic Trading, Execution Research. The data in Figure 4 is from this research, and therefore excludes the newer trading venues added after this paper was published.

45 The Bernstein research measures costs via price reversion (mid-quote 1 second after the fill – fill price) adjusted for fees/rebates, with reversion and fees/rebates normalized by spread at time of execution.

venues and maker-taker venues was the same. [46] This shows that not only are the explicit costs of trading an important part of the competitiveness of platforms, so are the implicit costs.[47] That competitiveness has resulted in the sum of explicit and implicit costs to trade largely equalizing across exchanges, which is a durable result across different methodologies.

4.2 All-In Costs Need Not Equalize Across Participant Categories

We have shown that all-in costs to trade are largely equalized across exchanges, demonstrating the competitive equilibrium of the exchange market. To extend this, are all-in costs equalized across types of market participants, like market makers?

In short, no. And they need not be.

That's because not all exchanges are trying to attract market makers. Therefore, costs will differ for venues whose business model rely on attracting market makers – like maker taker venues – and for those that do not – like inverted venues.

In fact, in the exchange business, with so many different business models and so many different participants – including those who do no trading – it's infeasible for prices to equalize at the participant level.

4.3 Platform Competition Constrains Total Costs and Product Costs

A key point to understand is the manner in which platform competition constrains the pricing of individual products.

If an exchange charges a supra-competitive price for a particular product, meaning a price that would boost the total cost to the investor to interact with the exchange above competitive levels, market forces will discipline that pricing approach.[48] If an exchange boosts the price of one joint product, but drops the prices of other joint products (or offers negative pricing for other joint products), that is not a point of concern, but rather reflects competitive differentiation that should be expected to enhance consumer welfare. Conversely, if the overall package of products and prices is not attractive to a sufficient volume of customers, enough consumers will have another option so as to constrain the price that an exchange may charge.

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[46] Di Maggio, Marco & Liu, Jerry & Rizova, Savina & Wiley, Ryan. (2020). Exchange Fees and Overall Trading Costs. SSRN Electronic Journal. 10.2139/ssrn.3625801.

[47] The Di Maggio research measures costs via gross effective spread + rebate or fee + market impact (change in quoted NBBO midpoint over a five-minute window).

[48] Market forces also work at a product level, separately from platform competition. For example, many market data products, such as top of book data (bids and offers as well as last sale information) are substitutable across exchanges. As a result, as discussed in Section 4.8 below, direct competition has constrained market data fees.

As long as all-in costs to the user are restrained by competitive forces, as we have shown they are, there is no regulatory basis to be concerned with pricing in isolation for one among the joint products of a platform.

4.4 Comparing Different Exchange Platforms

U.S. exchanges operate a number of different platform business models today, and each is able to attract customers and compete. In this subsection we detail:

- How exchanges work and where economic cross subsidies exist to attract customers.
- How exchanges contribute to (or detract from) fair and efficient markets and capital formation.
- How different types of exchange platforms address different customer needs, many (but not all) of whom multi-home, meaning they are customers on multiple exchanges. That way, they can trade on whichever exchange best meets their needs for the current trade.

4.4.1 Different U.S. Exchange Business Models

Table 1 shows all exchanges ranked by market share, with explicit trading costs (columns 10-12), and contribution to market quality in the columns between. We have color coded this heatmap to show apparent strengths (dark grey) and weaknesses (white) of each model.

Explicit costs to trade are very different.

How do all these different business models compete unless all-in costs to users are constrained?

Table 1: Heatmap of Different Exchange Models and Their Characteristics

1	2	3	4	5	6	7	8	9	10	11	12
Venue	Business Model	Pricing Model	Lit Market Share[1]	Listing Exchange	Time at NBBO[2]	Quote Breadth[2]	S&P 500 Spreads (bps)[3]	Provider Markouts (mils)[4]	Provider Exchange Fees (mils)[5]	Taker Exchange Fees (mils)[5]	Net Fees (mils)
Nasdaq	Market Quality	Maker Taker	28.5%	Yes	47%	83%	12	-1	-30.5	30.0	-0.5
NYSE	Market Quality	Maker Taker	17.8%	Yes	29%	65%	16	13	-29.0	28.0	-1.0
Arca	Market Quality	Maker Taker	13.3%	Yes	26%	76%	27	7	-31.0	30.0	-1.0
Cboe - EDGX	Market Quality	Maker Taker	9.9%	No	17%	66%	34	-5	-28.0	27.5	-0.5
Cboe - BATS	Market Quality	Maker Taker	8.0%	Yes	18%	90%	22	5	-31.0	30.0	-1.0
MEMX	Market Maker	Maker Taker	7.2%	No	26%	55%	435	1	-32.0	29.0	-3.0
IEX	Speed Bump	Fee-Fee	4.1%	No	24%	40%	553	99	0.0	6.0	6.0
Cboe - EDGA	Queue Priority	Inverted	2.5%	No	5%	48%	34	66	26.0	-22.0	4.0
Cboe - BATY	Queue Priority	Inverted	2.2%	No	3%	48%	47	49	17.0	-15.0	2.0
National	Queue Priority	Inverted	1.5%	No	3%	33%	285	48	26.0	-23.0	3.0
MIAX	Market Maker	Maker Taker	1.4%	No	9%	22%	673	37	-32.0	27.0	-5.0
PHLX	Market Quality	Maker Taker	1.3%	No	7%	51%	168	15	-34.0	30.0	-4.0
BX	Queue Priority	Inverted	0.9%	No	5%	46%	205	58	17.0	-15.0	2.0
American	Small Cap	Small Cap	0.9%	Yes	16%	46%	550	26	-29.0	26.0	-3.0
Chicago	Other	Fee-Fee	0.5%	No	8%	31%	783	572	10.0	10.0	20.0
LTSE	ESG	Other	0.0%	Yes	0%	0%	1000	2202	0.0	0.0	0.0

1 December 2021 share excluding TRF.

2 December 2021 data in all RegNMS Securities. Quotes measured over 1-minute snapshots on day-by-day basis for each symbol and exchange. Numbers reflect simple average across symbols and days.

3 December 2021 data. Quoted spread equals Limit-Up Limit-Down bands spread when no quote is available on an exchange at a specific moment.

4 December 2021 data for securities with average last sale price > $1. Only regular and odd lot trades executed at the NBBO during regular market hours.

5 Estimated fees/rebates for large market maker (approximately 5.5% of add volume on each venue) as of September 2022.

4.4.1.1 Market Quality Models

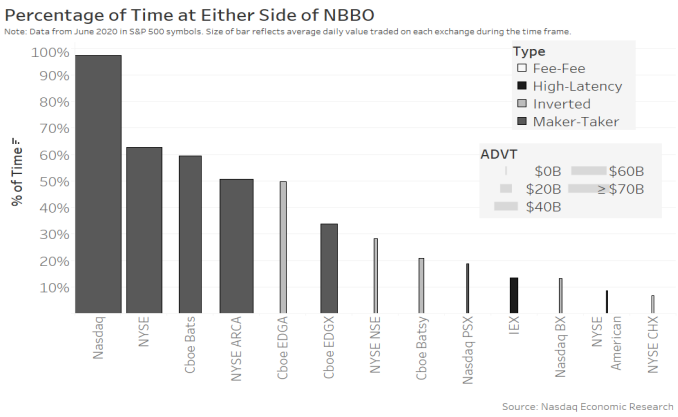
The six largest exchanges by market share all operate maker-taker platforms.

Rebates—a negative price—are paid to liquidity providers, while other trading customers are charged more to trade. This attracts liquidity providers, or market makers, since they face adverse selection in the role of providing liquidity and require an incentive to offset that risk.

This business model is similar in many ways to the platform business model analyzed by the Supreme Court in *Ohio v. American Express Co.* That case recognized that, since platforms facilitate transactions between two or more sides and their value is dependent on network effects, fees cannot be analyzed from only one side, and must be considered within the larger context of the platform to test for anti-competitive behavior.

As we see from Table 1, these markets overwhelmingly contribute more to market quality (darker shades for NBBO, breadth and spreads).[49] This fact is highlighted by the data in Figure 5, which shows the leading maker-taker exchanges have the most liquidity (bar width), set NBBO the most (bar height), [50] and they also have the tightest spreads.

Figure 5: Maker-Taker Venues Have Most Time at NBBO and Highest Liquidity



A benefit of rebates is that they can be used to encourage public quoting to create two-sided markets[51] for *all* stocks,[52] not just the largest by market capitalization. That is particularly important to small-cap issuers, allowing investors to trade efficiently in their less liquid stocks.

The "market quality" of a platform creates additional network effects:

- Many are also listing exchanges, with their liquidity and tighter spreads benefiting the issuer via lower trading costs and higher market capitalization.
- Because they consistently have the best prices,[53] even after explicit costs, they attract more urgent traders (takers) to the platform for liquidity.
- They also maintain actionable quotes that all can trade with. That in turn increases trading and market share. It also means many more sophisticated traders, with high-turnover strategies, prefer to be connected to these venues directly, often with co-located hardware for themselves or their customers.

Because of reliably good prices and high liquidity, price discovery tends to occur on these venues more, making their quote and trade information (data) an important input to more

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49 Mackintosh, Phil. "The Third Annual Intern's Guide to the Market Structure Galaxy." *Nasdaq,* 16 Jun. 2022, https://www.nasdaq.com/articles/the-third-annual-interns-guide-to-the-market-structure-galaxy

50 Mackintosh, Phil. "Three Charts That Show the Importance of a Competitive Bid/Offer NBBO." *Nasdaq,* 4 Dec. 2018, https://www.nasdaq.com/articles/three-charts-that-show-the-importance-of-a-competitive-bid-offer-nbbo-2018-12-04

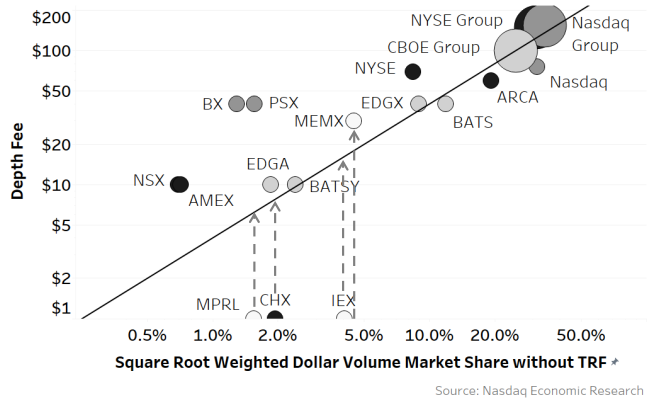
51 Mackintosh, Phil. "Who Pays for Price Discovery?" *Nasdaq,* 21 Nov. 2019, https://www.nasdaq.com/articles/who-pays-for-price-discovery-2019-11-21

52 Mackintosh, Phil. "Incentivizing a Competitive NBBO for All." *Nasdaq,* 23 Sep. 2021, https://www.nasdaq.com/articles/incentivizing-a-competitive-nbbo-for-all-2021-09-23

53 Mackintosh, Phil. "The 2022 Intern's Guide to Trading." *Nasdaq,* 23 Jun. 2022, https://www.nasdaq.com/articles/the-2022-interns-guide-to-trading

customers (including ATSs and wholesalers).[54] That in turn makes their data more valuable and easier to sell (Figure 6); "[d]ata from a stock exchange… are more valuable when the exchange carries more trading activity."[55] Our research has also shown a relationship between proprietary data fees and market share, particularly at the exchange group level (large circles).[56] The relationship is weaker at individual venues (small circles) with lower market share. In some cases, like IEX, this is by design because their platform model does not charge for use of depth data by professionals – possibly because its lower volumes make its data less valuable – but may charge more for other aspects of the platform, like trading.[57]

Figure 6: Maker-Taker Venues Have Most Time at NBBO and Highest value data



The highly liquid venues also contribute more positively to fair and efficient markets, as well as price discovery, in line with the SEC's mandated objectives. However, those positive externalities are not currently considered in the SEC's processes for reviewing fees.

The negative price charged to liquidity providers is part of the larger maker-taker platform because it is in service of creating features attractive to the other side of the platform—oftentimes tight spreads, and actionable and lit quotes along with more valuable market data.

The linear relationship between market volume and depth of books fees shown in Figure 6 is direct evidence of the network effects inherent in all platforms: liquidity makes data more valuable. As discussed below, exchanges employ various techniques to attract liquidity, including rebates.

Negative trading costs may also be necessary to try to compete with wholesaler platforms, which bundle price improvement, PFOF, and fill guarantees, combined with the enhanced spread capture made possible by customer segmentation.[58] As such, negative trading costs are essential

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54 Mackintosh, Phil. "An Intern's Guide to the Market Structure Galaxy." *Nasdaq,* 16 Jul. 2020, https://www.nasdaq.com/articles/an-interns-guide-to-the-market-structure-galaxy-2020-07-16

55 Schwabe, Rainer. "Platform Competition and the Regulation of Stock Exchange Fees." *National Law Review,* 9 Jun. 2022, https://www.natlawreview.com/article/platform-competition-and-regulation-stock-exchange-fees

56 Mackintosh, Phil. "Accounting for Prices of NMS-II Depth." *Nasdaq,* 9 Dec. 2021, https://www.nasdaq.com/articles/accounting-for-prices-of-nms-ii-depth

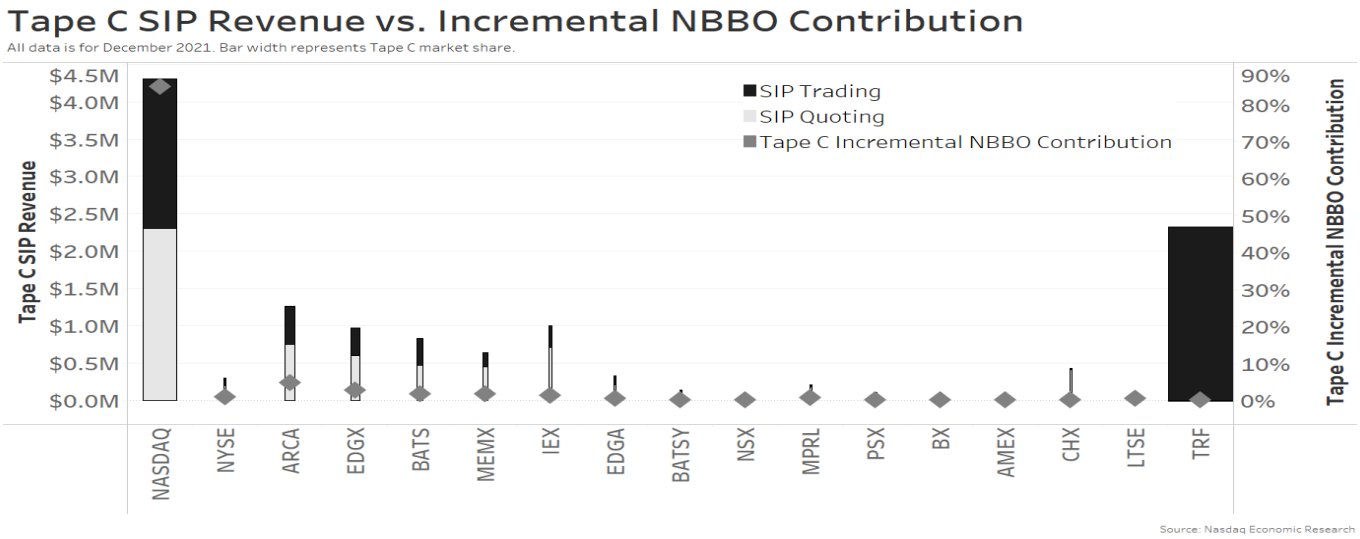
57 The chart reflects professional depth of book fees; we note that IEX and MIAX have both added certain market data fees, but have not added professional depth of book fees.

58 Mackintosh, Phil. "What Is Segmentation?" *Nasdaq,* 4 Nov. 2021, https://www.nasdaq.com/articles/what-is-segmentation-2021-11-04

to bring liquidity to lit markets, which provide external benefits of transparency not available on dark platforms. Of course, negative trading costs would be impossible to offer without the support from other "sides" of the platform—market data, connectivity and other services—which allow exchanges to offer negative prices while also providing essential information not just for broker-dealers trading on the platform, but also for ATSs, index providers and other market participants. The only way to take these other factors into account when assessing proposals related to market data, connectivity, and other fixed costs is to examine the "all in" cost of trading on an exchange.

Maker-taker platforms also have another benefit for the platform owner. By making the largest contribution to the NBBO, their data is, by definition, more useful to participants. This result is consistent with the incentive structure established by the SEC in the SIP plans to pay a greater share of SIP[59] data revenues to markets based on time at the inside (Figure 7).

Figure 7: The SIP incentive structure rewards venues that contribute most to the NBBO



4.4.1.2 Participant-Owned Models

A variation of the maker-taker model is a participant-owned exchange like MEMX and MIAX.

Industry ownership creates an even broader platform where participants can capture profits from an exchange's activities, or offset exchange losses with trading profits. That allows select participants to cross-subsidize market-priced trading and data revenues with dividends in order to compete against existing exchanges. Furthermore, by paying larger rebates and charging lower take fees than other maker-taker venues, they increase price competition among exchanges.

59 Mackintosh, Phil. "SIP Accounting 101." *Nasdaq,* 25 Mar. 2021, https://www.nasdaq.com/articles/sip-accounting-101-2021-03-25

Proof of how competitive the industry is, on a platform level, can be seen from the Form 1's from MEMX and MIAX for 2021 (released in 2022). Both show those platforms are running at a significant loss, thanks to net rebates for trading, in order to compete with network benefits offered by other exchange models.[60]

In particular, MEMX's cost of revenues exceeded its trading and data revenues by $35 million in 2021.[61] This is because its net fees are more negative than other maker-taker venues, which helps MEMX gain market share and puts pressure on incumbents to constrain fees. In 2021, MEMX earned $200 million in transaction fees, but paid $251 million in rebates, a loss of $51 million on net fees alone. On top of that, its operating costs were $82 million for 4% market share.

In its 2022 filing, MEMX recognized that these losses were by design, noting that "[p]rior to January 3, 2022, MEMX did not charge fees for connectivity to the Exchange... to eliminate any fee-based barriers… when MEMX launched as a national securities exchange in 2020, and [it was successful attracting] a significant number of Members [who are now] directly or indirectly connected to the Exchange."[62] But, after attracting that "significant number of Members," MEMX introduced fees for membership, connectivity, and market data in 2022 to offset its trading losses.

Since the founders and owners of MEMX are retail and institutional investors, who are active traders on other exchanges, promoting competition among exchanges and constraining costs on other exchanges benefits them when trading on those other exchanges.

This is explicit from MEMX's inception, with its initial press release stating "MEMX's mission is to increase competition, improve operational transparency, further reduce fixed costs, and simplify the execution of equity trading in the U.S."[63]

Meanwhile, MIAX Pearl ended 2021 at a deficit of $79 million.[64] Importantly, MIAX Pearl is not directly owned by retail and institutional investors, but allows member firms that achieve "certain liquidity volume thresholds" the "right to invest in… the parent holding company of…

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60 MIAX currently charges for historical data, but not real-time data.

61 "Form 1." *MEMX,* 28 Jun. 2022, https://www.sec.gov/Archives/edgar/data/1792834/999999999722003516/9999999997-22-003516-index.htm

62 Securities and Exchange Commission Release No. 34-94419; File No. SR-MEMX-2022-02. 15 Mar. 2022, https://www.sec.gov/rules/sro/memx/2022/34-94419.pdf

63 "Group of Leading Retail Brokers, Financial Services Firms, Banks, and Global Market Makers Plan to Launch the Only Member-Owned Equities Exchange, MEMX™, Members Exchange." *PRNewswire,* 7 Jan. 2019, https://www.prnewswire.com/news-releases/group-of-leading-retail-brokers-financial-services-firms-banks-and-global-market-makers-plan-to-launch-the-only-member-owned-equities-exchange-memx-members-exchange-300773713.html

64 "Form 1." *MIAX,* 28 Jun. 2022, https://www.sec.gov/Archives/edgar/data/1683823/999999999722003537/9999999997-22-003537-index.htm

MIAX Pearl."[65] Through this program, seven firms have equity rights in MIAX Pearl's equities exchange.

Notably, MIAX Pearl's net fees are even more negative than MEMX's, but its market share is considerably lower. This likely reflects two factors—MIAX Pearl is a newer entrant than MEMX, and its market quality measures are generally worse (Table 1, columns 6-9), indicating that market quality remains an important factor in routing decisions.

4.4.1.3 Queue Priority Models

Inverted venues have the opposite price structure of maker-taker venues, where liquidity providers pay to add liquidity, while liquidity takers earn a rebate.

Naturally, this leads to less supply of liquidity than a venue where providers are paid for their service, and these platforms do not typically perform best on market quality metrics,[66] like time at the NBBO, quote breadth, and average spread.

The benefit of these platforms is that they cross-subsidize liquidity takers by providing lower effective spreads for urgent orders. In return, these platforms offer their liquidity providers the ability to pay for better queue priority versus other participants at the NBBO, which captures more spreads and leads to faster fills, reducing opportunity costs (see Box 2).

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65 "MIAX Equity Rights Program." *MIAX,* https://www.miaxglobal.com/company/about/membership.

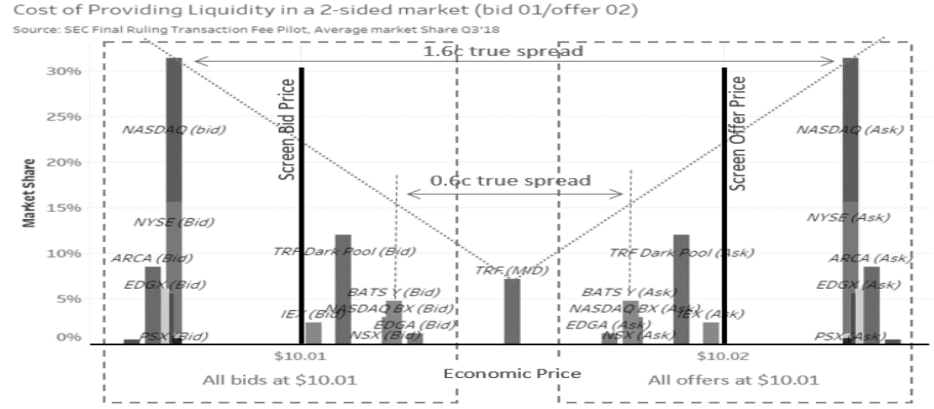
66 Mackintosh, Phil. "What Is the Value of Market Fragmentation?" *Nasdaq,* 30 Jul. 2020, https://www.nasdaq.com/articles/what-is-the-value-of-market-fragmentation-2020-07-30

Box 2: Net costs to trade affect queue position and fill rates

The rebate and fee models used on maker-taker and inverted (queue priority) venues create explicit costs that impact the net cost to trade on each venue. That in turn affects the order in which a liquidity taker trades, which affects queue priority and fill probability (an implicit cost).

The diagram below shows the "after exchange fee" prices that a liquidity provider receives. In general, takers pay similar fees. That means a:

- maker-taker venues (far right and left) allow a provider to capture spread plus rebates (making the true explicit spread closer to 1.6 cents, net of fees), while takers pay a similarly wider spread.



- Inverted venues (center right and left) subsidize liquidity takers by charging a provider to quote. The true explicit spread is closer to 0.6 cents, net of fees.

It is cheaper for takers to trade first on inverted venues, where their net costs are lower. That means providers on those venues are more likely to get the first fill – creating time priority and increased fill probability (implicit or opportunity costs) – even though their spread capture is lower.

Data confirms that market makers opportunistically post on inverted venues when spreads are artificially wide, and usually on only one side of the quote.[67] This also helps exchanges generate effective spreads that are inside the NBBO,[68] helping exchanges to compete with Price Improvement economics offered by wholesalers.[69]

4.4.1.4 Speed Bump Platforms Add to Provider Spread Capture by Avoiding Trades

67 Mackintosh, Phil. "What Else Can We Learn From Inverted Venue Usage?" *Nasdaq,* 16 May 2019, https://www.nasdaq.com/articles/what-else-can-we-learn-from-inverted-venue-usage-2019-05-16

68 Mackintosh, Phil. "Quantifying the Cost of Maker-Taker Markets." *Nasdaq,* 8 Oct. 2020, https://www.nasdaq.com/articles/quantifying-the-cost-of-maker-taker-markets-2020-10-08

69 Mackintosh, Phil. "A Deeper Dive Into Dark Trades." *Nasdaq*, 11 Nov. 2021, https://www.nasdaq.com/articles/a-deeper-dive-into-dark-trades

More recently, the SEC has approved exchange platforms operating "speed bumps" for U.S. markets.

This market model provides an excellent example of competition at the platform level since it has the highest all-in cost for the user to trade (Figure 2), and the highest net transaction cost of any venue with market share above 0.5% despite offering almost free data and colocation (Table 1, column 12).[70]

The average realized spread is best on IEX, which offsets the fact that the explicit cost to trade on IEX is by far the highest (Figure 3). For Nasdaq, NYSE, and Cboe, their venues with the highest market share are all maker-taker venues, and they have some of the worst realized spreads. This too counterbalances the lower cost to trade on those venues.

Therefore, although Cboe, Nasdaq, and NYSE have explicit all-in costs for users to trade between 25% and 39% lower than IEX (Figure 2, which includes the cost of market data and other fixed costs), the difference in realized spreads offsets those explicit savings.

Analysis of the economics shows that IEX's competitiveness comes from a combination of cross-subsidizations and implicit customer savings. For example:

- Although they claim that they have no (or very low) colocation and port fees, they are located in Secaucus, next door to a data warehouse where many brokers buy colocation from Equinix. Instead of eliminating colocation costs, this business model transfers the explicit costs of colocation to a third-party, non-exchange, provider. It also introduces unequal access times, which may benefit low latency customers located closer to their point of presence (POP), and harm slower investors' orders.

- The speed bump order types use data from other price-setting exchanges as an input to their own platform and products. Not surprisingly, their model has been optimized to predominantly use prices from maker-taker exchanges who have the highest quality data (see Figure 8 for formula below).[71,72]

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70 Mackintosh, Phil. "Who Pays for Price Discovery?" *Nasdaq,* 21 Nov. 2019, https://www.nasdaq.com/articles/who-pays-for-price-discovery-2019-11-21

71 Mackintosh, Phil. "Who Pays for Price Discovery?" *Nasdaq,* 21 Nov. 2019, https://www.nasdaq.com/articles/who-pays-for-price-discovery-2019-11-21

72 "Investors Exchange Rule Book." *IEX*, 19, May 2023, https://assets-global.website-files.com/635ad1b3d188c10deb1ebcba/64668bd342ce64b3ff7a40f4_Investors%20Exchange%20Rule%20Book%2005-19-23.pdf

Figure 8: IEX's Crumbling Quote Formula Relies on Data From Large Market-Maker Exchanges

$$D := II[BATS] + II[EDGX] + II[NASDAQ]$$

where *II[BATS]* is an indicator variable that equals 1 if BATS was present on the near side 1 ms ago but is not now, and equals 0 otherwise. *II[EDGX]* and *II[NASDAQ]* are defined analogously, so the value of D is always between 0 and 3.

Source: *The Evolution of the Crumbling Quote Signal*, Page 14

- Then, "by design [the D-Limit order type] prevents trading… for a resting D-Limit order compared to a standard limit order."[73] This means that their platform uses limit prices based on prices from other exchanges' NBBO orders. When trades start to happen, those copied quotes reprice to lower, better prices before takers can access advertised prices through the speed bump.

- By fading incoming trades, their liquidity providers avoid adverse selection trades. Consequently, spread capture and market maker profits, when trades do occur, are higher (Figure 3). That attracts liquidity providers, who can more than offset high explicit trading fees by implicit trade savings.[74]

- Since their platform ingests high-quality data and delays it, the value of their market data to others is low. Data from professionals in Form ATS-N show that even though IEX's proprietary data had been free for years, some professionals opt out of specific direct feeds on a venue-by-venue basis, and some do not even take free proprietary data. The choice to avoid connecting to some proprietary data also highlights a diseconomy of competition across too many venues. Customers choose to avoid the fixed costs of connecting to more data sources, separate from the direct and regulated costs of the data itself, when its benefits do not offset the costs.[75] Minimizing the implicit costs of fragmentation and connection is part of other platforms' competitiveness.

- Even though IEX quotes frequently avoid trading, representing 25% of the liquidity they advertise,[76] they still receive SIP revenue for quotes that fade under the current SIP allocation formula. Current data-pricing rules allow IEX to free-ride off the creation of

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73 Ryan, Ronan. "D-Limit Performance & the Fill Rates Race." *IEX,* 3 Mar. 2021, https://medium.com/boxes-and-lines/d-limit-performance-the-fill-rates-race-4dcd26661a98

74 "IEX Exchange Fee Schedule." *IEX,* 1 Jul. 2022, *https*://exchange.iex.io/resources/trading/fee-schedule/

75 Mackintosh, Phil. "Dispelling the Complementary Product Theory for Market Data." *Nasdaq,* 20 Aug. 2020, https://www.nasdaq.com/articles/dispelling-the-complementary-product-theory-for-market-data-2020-08-20

76 Stockland, Eric. "Leveling the Playing Field for Lit Trading." *IEX,* 17 Dec. 2019, https://medium.com/boxes-and-lines/leveling-the-playing-field-for-lit-trading-682dc723cef1

competitive NBBO on other markets, which data shows to be maker-taker markets. The costs to IEX of proprietary data feeds required to peg orders to other exchanges' best prices adds to less than $1.2 million per year.[77] This platform earns IEX SIP revenues of approximately $20 million.[78]

- An additional external cost to investors is also created, but unmeasured, by the lack of a fill. Investors, thinking they can execute at the best price on IEX, find that liquidity instead moves to a worse price, adding time to fill and ultimately resulting in worse prices when those trades do occur.

In summary, this platform is profitable for IEX liquidity providers, who can avoid losing trades, making those traders happy to pay much higher explicit costs. The platform attracts liquidity providers attracted to the IEX D-Limit order type, which in turn adds to exchange SIP data revenues, helping IEX to subsidize data and port costs.

The lesson from this examination of IEX is that different exchanges can offer radically different products and pricing structures to attract order flow. These different approaches manifest as radically different fees for different products and services. Examination of any specific fee in isolation can be quite misleading—and indeed meaningless—as zero or negative fees for products on one side of the platform can be offset by higher fees on the other part of the platform. The only meaningful way to examine and understand exchange fees is by examining the all-in cost to users of interacting with the exchange.

4.4.1.5 Listing v. Non-Listing Platforms

Another differentiation of exchange business models is whether or not they are listing exchanges.

Listing exchanges are critical to the SEC's mission of capital formation.

Listings are also a joint product that supports the listing exchange's platform. Data show primary listing exchanges around the world typically have the most liquidity and the best market makers and spreads.

Moreover, research shows that listing exchanges compete for listings based on market quality.[79] Potential customers considering listing switches and IPOs frequently want evidence that their

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77 Mackintosh, Phil. "Dispelling the Complementary Product Theory for Market Data." *Nasdaq,* 20 Aug. 2020, https://www.nasdaq.com/articles/dispelling-the-complementary-product-theory-for-market-data-2020-08-20

78 Mackintosh, Phil. "IEX Is All-In on Data Revenues, Quote Fade and (Virtual) Rebates." *Nasdaq,* 1 Apr. 2021, https://www.nasdaq.com/articles/iex-is-all-in-on-data-revenues-quote-fade-and-virtual-rebates-2021-04-01

79 Poser, Steven. "Market Making and the NYSE DMM Difference." *NYSE*, 8 Sep. 2021, https://www.nyse.com/data-insights/market-making-and-the-nyse-dmm-difference

chosen exchange has "less volatility, tighter spreads and more depth," along with "more liquidity … during closing auctions,"[80] even during periods of high volatility.[81]

That ultimately forces listing exchanges to focus their platform on market quality goals in order to retain listings, as the Interactive Brokers switch away from and then back to Nasdaq proved (Box 3[82,83]).

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80 Nasdaq Economic Research. "Switching to Nasdaq Is Good for Your Stock." *Nasdaq,* 15 Sep. 2020, https://www.nasdaq.com/articles/switching-to-nasdaq-is-good-for-your-stock-2020-09-15

81 Poser, Steven. "When Volatility Calls, NYSE DMMs Answer." *NYSE*, 18 Feb. 2002, https://www.nyse.com/data-insights/when-volatility-calls-nyse-dmms-answer

82 "Interactive Brokers Group to Move Stock Listing to Nasdaq." *Nasdaq,* 23 Sep. 2019, https://www.nasdaq.com/press-release/interactive-brokers-group-to-move-stock-listing-to-nasdaq-2019-09-23

83 Mackintosh, Phil. "What's Fair? It Depends on Your Point of View." *Nasdaq,* 3 Oct. 2019, https://www.nasdaq.com/articles/whats-fair-it-depends-on-your-point-of-view-2019-10-03

Box 3: Case Study Proving That Market Quality Matters to Issuers

The listing switches of Interactive Brokers provide a natural experiment to highlight the value market efficiency plays in attracting listings.

Interactive Brokers opted to move its listing from Nasdaq to IEX in 2018, but moved it back to Nasdaq in 2019. In making the decision to move back to Nasdaq, the Chairman and Founder of Interactive Brokers, Thomas Peterffy, said:

> Last year, we switched to IEX because we believed that their advanced exchange model, including their mid-price orders and crumbling order algorithms, provided the opportunity for substantially better execution prices for orders routed there… Unfortunately, IEX exchange could not gain more listings and there were fewer market-makers trading our stock on IEX than on Nasdaq. We gave it a year and we tried our best, but we now have to accept that, in spite of our good intentions, returning to Nasdaq will be best for our shareholders.[84]

The data support this statement. Our research shows that the spread on Interactive Brokers stock (IBKR) was 83% wider on IEX than on Nasdaq (Figure 3A). Importantly, over the same period, spreads on S&P 500 stocks had increased only 4%.[85] We estimate this resulted in added costs of more than $1 million for investors trading IBKR.

Moreover, quotes improved from being at the NBBO 12% of the time on IEX to 96% of the time on Nasdaq, while liquidity was 27% lower on IEX. Lower liquidity contributed to higher volatility for market-on-close orders, leading to an increase in closing price dislocation from 2 cents to 9 cents (Figure 3B), which is estimated to cost investors another $500,000 in additional costs.

This natural experiment provides a unique example of how listings and trading are joint products, and part of each exchange's platform. The superior market quality at Nasdaq induced Interactive Brokers to return to Nasdaq, which enhances market efficiency via lower costs to trade for investors and reducing cost of capital for Interactive Brokers.

Figure 3A

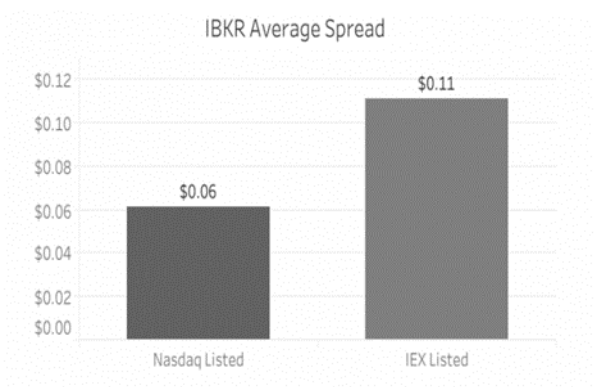
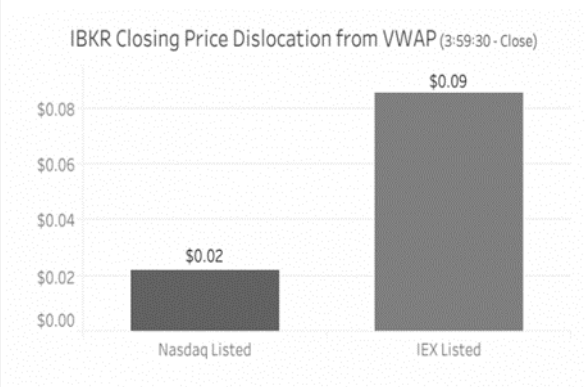


Figure 3B



Source*: https://www.nasdaq.com/articles/whats-fair-it-depends-on-your-point-of-view-2019-10-03*

Despite the benefits of a listing exchange, many exchanges choose *not* to list stocks. Non-listing exchanges avoid the costs of marketing and providing services and surveillance to issuers, but still benefit from revenues from trading each stock, while listing exchanges have the advantage of better execution quality. This is another aspect of platform competition that is missed by focusing on individual exchange products.

4.5 Exchanges Compete Against Non-Exchange Platforms

Exchanges are also competing for trades with other venues who operate their own platforms—often with different regulations and costs, including the artificially regulated cost of inputs from exchanges themselves.

Broker-dealers operate their own platforms that include off-exchange trading facilities, where prime-services and research operations benefit cross-platform sales. Often, costs and cross-subsidization within broker-dealer platforms are opaque and data have shown behaviors exist that are not competitive on the basis of cost.[86]

Wholesale market makers profit from spread crossing orders matched off exchange—and data shows they can capture more spread, at lower costs, from accepting only segmented flow and matching on-exchange NBBO, which even with direct feeds, cost a fraction of their customer profitability.[87]

Competition with Non-Exchange Platforms also works to constrain the fees that exchanges can charge for their services, in addition to the competition among exchange platforms.

4.6 Unbundled Prices and Economic Costs

The fact that these different models exist highlights the innovation and competition within the exchange industry. A one-size-fits-all approach is insufficient for the needs of investors, which may change from moment to moment.

Exchanges compete against each other, and non-exchange venues, for each individual trade.

Large investors, in particular, will multi-home, allowing them to use whichever exchange is likeliest to maximize their utility function for each trade.

The fact that different venues employ disparate models with different fee structures means that direct comparisons between individual products are not a meaningful method to assess

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84 "Interactive Brokers Group to Move Stock Listing to Nasdaq." *Nasdaq,* 23 Sep. 2019, https://www.nasdaq.com/press-release/interactive-brokers-group-to-move-stock-listing-to-nasdaq-2019-09-23

85 Mackintosh, Phil. "What's Fair? It Depends on Your Point of View." *Nasdaq,* 3 Oct. 2019, https://www.nasdaq.com/articles/whats-fair-it-depends-on-your-point-of-view-2019-10-03

86 Anand, Amber & Samadi, Mehrdad & Sokobin, Jonathan & Venkataraman, Kumar. (2021). Institutional Order Handling and Broker-Affiliated Trading Venues. The Review of Financial Studies. 34. 10.1093/rfs/hhab004.

87 Mackintosh, Phil. "What Is Segmentation?" *Nasdaq,* 4 Nov. 2021, https://www.nasdaq.com/articles/what-is-segmentation-2021-11-04

competition, and the only meaningful method of assessment is at the platform level. As we have shown in Sections 4.1.1 and 4.1.2, platform competition has already resulted in rough equalization of all-in costs for users across exchange venues.

4.7 Competition and the Consolidated Tape Plans

The consolidated tape plans publish a National Best Bid and Offer ("NBBO"), which, under the Vendor Display Rule (Rule 603), must be provided to the customer at the point of sale. This creates a type of "momentary monopoly," in the sense that only one exchange can provide the best bid or offer at any given moment in time.

To be sure, the consolidated tape plans are in a unique position as the sole source of the NBBO. This does not, however, undermine the competition among exchanges to be at the NBBO. Under the revenue sharing formula offered by the consolidated tape plans, exchanges are rewarded for the amount of time they are at the NBBO. To be at the NBBO, exchanges are required to compete for liquidity. Moreover, multiple exchanges can be at the best price and, as such, still compete for trade executions. In addition, customers, particularly those with large orders, may seek price improvement on non-exchange venues, and all of the exchanges must continue to compete against non-exchange venues for liquidity. As such, the existence of the consolidated tape plans do not undermine the competition among exchanges, but rather enhance competition as they continue to compete to be at the NBBO.

4.8 Platform Competition Has In Fact Constrained Market Data Fees

Platform competition has constrained market data fees over the last two decades. For example, fees for the display of depth of book information are at the same nominal level (and lower after accounting for inflation) than they were in 2002. In November of 2002, Nasdaq proposed a fee of $150 per user per month for its depth of book product, TotalView.[88] A year later, in October of 2003, Nasdaq lowered fees to $70 per month for professional users and $14 per month for non-professional users "in response to the lack of demand by vendors and users."[89] Today, those fees have barely changed in nominal terms: professional subscribers pay a monthly fee of $76 each for display usage of TotalView, and non-professional subscribers of TotalView pay a monthly fee of $15,[90] representing a considerable reduction in real terms.[91]

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88 Securities Exchange Act Release No. 46843 (November 18, 2002), 67 FR 70471 (Nov. 22, 2002) (SR-NASD-2002-33); see also Securities Exchange Act Release No. 55007 (December 22, 2006), 72 FR 600 (January 5, 2007) (SR-Nasdaq-2006-053 (recounting history of depth of book fee changes).

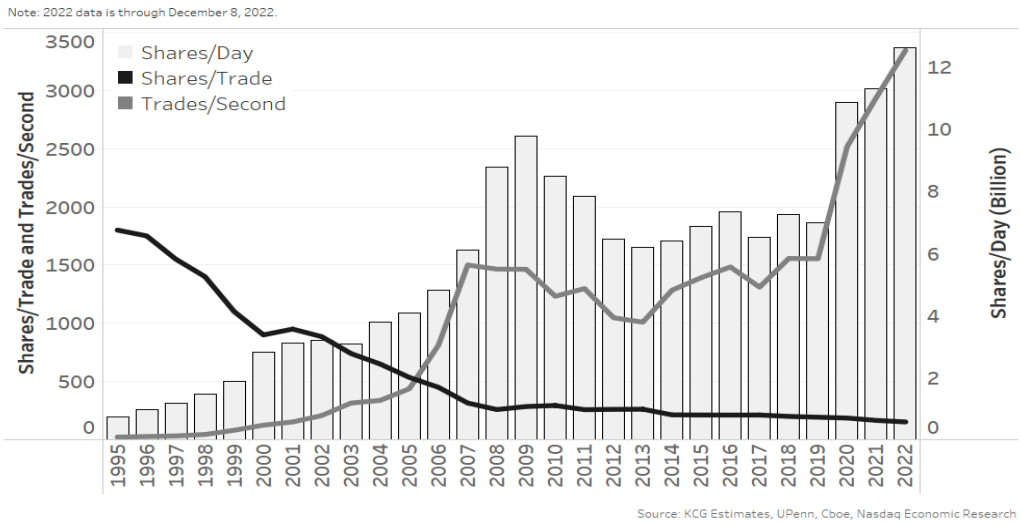
89 Securities Exchange Act Release No. 48581 (October 1, 2003), 68 FR 57945 (October 7, 2003) (SR-NASD-2003-111); see also Securities Exchange Act Release No. 55007 (December 22, 2006), 72 FR 600 (January 5, 2007) (SR-Nasdaq-2006-053) (explaining the rationale for the fee reduction).

90 The Nasdaq Stock Market LLC Rules, Equity 7 (Pricing Schedule), Section 123(b)(2).

91 The Bureau of Labor Statistics' CPI Inflation Calculator shows that, for Nasdaq's fees to have merely kept up with inflation, the TotalView fees today would have to be $114.79 for professional subscribers for display usage and $22.96 for non-professional subscribers – about 50% higher than today's prices. Instead, $76 in April 2023 is equivalent to $46.35 in October 2003, when adjusted for inflation. Similarly, $14 in April 2023 is equivalent to $8.54 in October 2003.

Specific non-display fees for TotalView were separated from display usage following the market automation in the 2000s, as algorithms performed an increasingly large proportion of all trading. Volumes increased from fewer than 1 billion shares per day in the mid-1990s to more than 6 billion shares per day by 2007 (Figure 9) and the number of trades per second increased significantly through the early 2000s (ascending line). It became increasingly clear that it was unfair to charge the same fees to human traders – who traded smaller volumes – and algorithmic traders – who traded much faster and in disproportionately larger volumes.

Figure 9: Daily share volumes increased significantly as the market automated



As a result, in April 2012, specific fees for non-display were created to more fairly allocate costs to those doing the trading. In 2012, those fees were $300 per server, and they were increased to $375 per server in January 2016[92] – after which, they have remained unchanged. As with display fees, this represents a considerable reduction in real terms.[93]

TotalView is not an isolated example. The constraint on market data fees can be seen through an examination of changes in market data revenue over time. Figure 10 tracks cumulative annual revenue growth, adjusted for inflation, over the decade between 2010 and 2020 to one of three factors: (i) new sales, (ii) new products, and (iii) other factors (one-time revenue adjustments, including mergers and acquisitions).

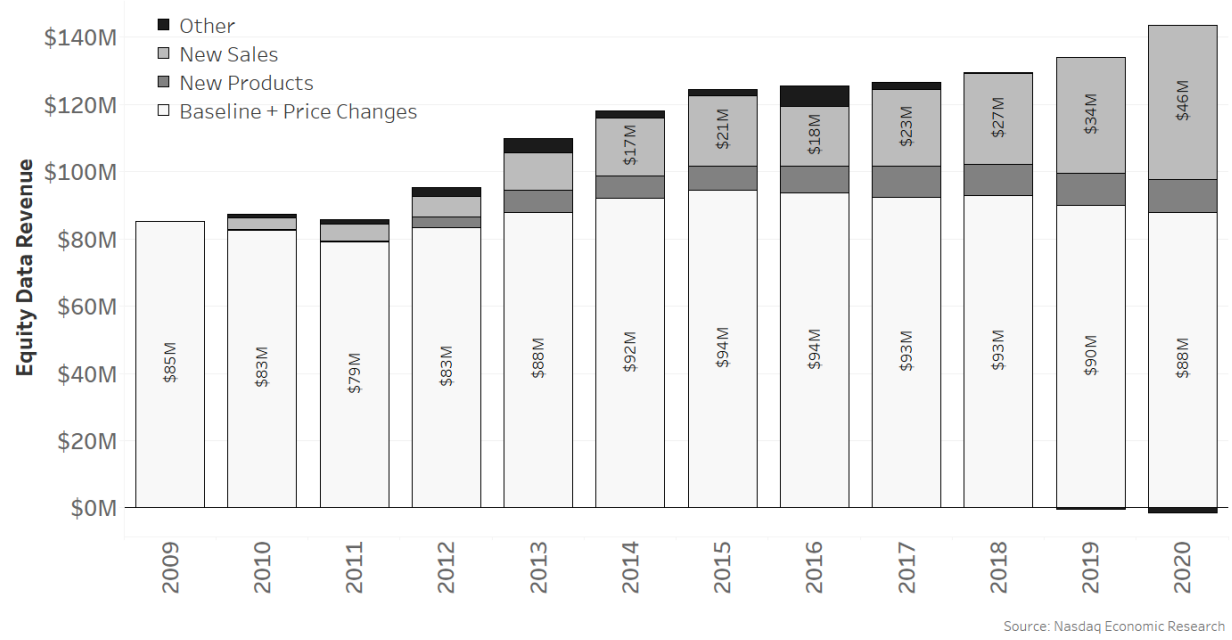
Figure 10 shows that annual growth is largely driven by new sales—both new customers and existing customers buying additional products—and *not* by price changes. By 2020, for example, new sales and new products together accounted for 98% of the increase in revenue,

92 Prices are tiered above 10 servers.

93 The Bureau of Labor Statistics' CPI Inflation Calculator shows that, for Nasdaq's fees to have merely kept up with inflation since January 2016, the TotalView fees today would have to be $480.17 for non-display usage – 28% higher than today's prices. Instead, $375 in April 2023 is equivalent to $292.86 in January 2016, when adjusted for inflation.

while the baseline and fee changes only added 5% (white bars), and other factors caused a 2% drop. This highlights that, over time, nominal fee increases have been almost entirely outstripped by the rate of inflation. These fees were constrained by the need to compete as a platform.[94]

Figure 10: New customers and products are only Drivers of Growth in Nasdaq data revenues



Platform theory is not just an economic theory—it reflects the business reality faced by investors and exchanges. Our customers have revenues and costs; the difference between the two determines what is available for trading. If fixed costs rise, resources available for trading fall. This is a practical manifestation of the network effect inherent in platforms.

Exchange customers routinely cancel or curtail exchange services. In 2022, for example, Nasdaq reported that the introduction of fees for the five MRX data feeds caused an approximately 15 percent reduction in the number of customers with access to those feeds, from 34 to 29.[95] We have also had cancellations of BX and PSX data feeds because the liquidity available on those exchanges has been insufficient to support the cost of market data. On larger exchanges, we

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94 The Nasdaq exchange has sometimes been asked to demonstrate that increases in market data directly lead to a loss of order flow. In fact, market data fees have remained stable over an extended period of time. Nasdaq has not proposed market data fee changes that would impact order flow because it intends to remain competitive as a platform. If Nasdaq had proposed market data fee changes that would have caused its "all in" costs to rise above those of its competitors, it would have become uncompetitive as an exchange and lost order flow.

95 Securities Exchange Act Release No. 96144 (October 24, 2022), 87 FR 65273 (October 28, 2022) (SR-MRX-2022-22).

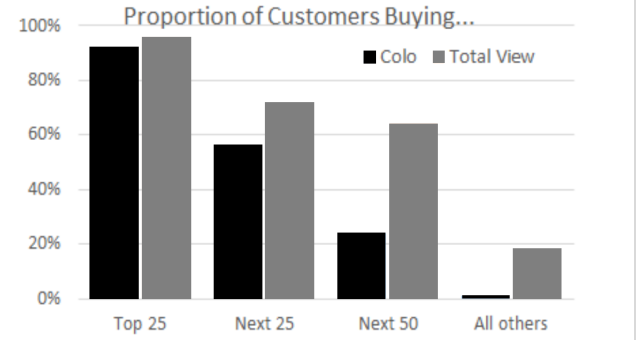
have seen high-frequency traders scale back their spending on connectivity by, for example, reducing the bandwidth on their connections, or by replacing sophisticated FPGA technology with standard connections. Customers have also reduced spending on display feeds. All of these actions enforce discipline on the amount exchanges can charge for data and connectivity.

5 Customers' Business Models and Customer Choice

In this section, we demonstrate that the variety of customers operating on exchanges underscores the need for flexibility in pricing to better meet the needs of the users, while also enabling more equitable pricing practices. These are separate competitive forces that constrain the ability of exchanges to charge excessive fees.

Exchange customers have a variety of options when it comes to exchange products, and they exercise that choice. Some access the exchange without purchasing anything from an exchange, instead using third-party routers and data.

Figure 11: Colocation and Proprietary Data Purchases



For those whose business models necessitate the purchase of some mix of trading, connectivity, and data services, there are a variety of options at different price points, allowing customers to exercise choice, and forcing exchanges to compete on their offerings and prices.

In the case of data, proprietary feeds are not necessary for most customers. In fact, 99% of SIP customers do not purchase direct feeds, [96] meaning proprietary data is subject to substitution-based competition with the SIP. Even the largest customers, typically international brokers and large market makers, do not all purchase depth data, and fewer purchase colocation services.

In fact, outside of our top 100 data customers, less than 20% purchase depth data (Figure 11, rightmost grey bar).[97] Many of these smaller customers may opt to purchase data from a third-party aggregator, presenting another instance of substitution-based competition. For customers who do purchase proprietary feeds, many profitably use them as an input to their business, whether that be as a hedge fund, a dark pool, or a number of other businesses.

In terms of colocation services, virtually none of our customers outside the top 100 colocation customers buy colocation (Figure 11, rightmost black bar). For those that do purchase colocation, however, they have options that suit different customers' latency requirements.

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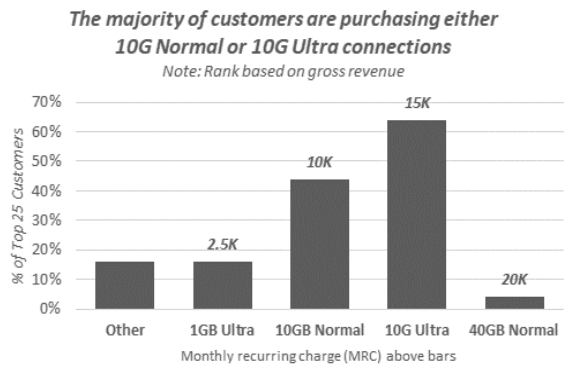
96 Mackintosh, Phil. "NMS II: A Strange Way to Fix a Two-Tiered Market." *Nasdaq,* 18 May 2020, https://www.nasdaq.com/articles/nms-ii%3A-a-strange-way-to-fix-a-two-tiered-market-2020-05-18

97 Mackintosh, Phil. "Is Free Fair for All?" *Nasdaq,* 29 Jan. 2019, https://www.nasdaq.com/articles/is-free-fair-to-all-2019-01-29

In the case of ports, customers again have numerous choices (Figure 12). Depending on how much trading a customer does, they can purchase ports with different bandwidths and latencies. Ports exhibit the common economic practice of nonlinear pricing. For example, a 10GB Ultra port offers 10 times the bandwidth of a 1GB Ultra port for six times the price.

Figure 12: Ports Purchases for Top 25 Customers



Therefore, within the umbrella of joint products, there are layers of choice available to customers to tailor these inputs to their businesses, enabling customers to maximize the efficiency of their resource allocation. For many would-be customers, that means not purchasing any products from exchanges, and instead routing orders via a broker without incurring the costs or commitments of services from exchanges.

The diversity of joint products is akin to that of exchange business models, resulting from competition and innovation to best meet the needs of customers. Customer choice helps maintain reasonable fees as it provides dimensions on which exchanges must compete. Furthermore, different options promote fair and equitable markets, as one-size-fits-all offerings would lead to inefficient resource allocation by customers. Lastly, the fact that customers can route orders to exchanges without purchasing anything directly from an exchange provides customers with other options to limit costs.

6 Not All Participants on the Platform Have Equal Consumption

Exchanges allow all investors and traders to compete to advertise liquidity at the best prices – which creates quotes. More urgent investors then initiate trades, creating prices used to describe the market and value portfolios.

Different participants use, and benefit from, the marketplace in vastly different ways. Any analysis of exchange fees requires an understanding of the different levels of usage and economics of market participants.

Setting fees at the same level across different types of participants is not fair, or efficient. It makes prices too high for some participants to justify consumption, while subsidizing activities of others. Rarely does it reward the positive externalities some providers create.

6.1 US Equities Markets Are Formed By An Ecosystem Of Market Participants

Specialized participants have emerged, each with different but important roles, in the primary (initial public offerings) and secondary (trading) markets (Figure 13). Exchanges are open to all

and create a single market for issuers, investors and liquidity providers, playing a central role in facilitating both capital formation and fair, orderly, and efficient markets.[98]

Figure 13: Markets as an Ecosystem

In order to promote capital formation, listing exchanges provide uniform listing standards that, along with SEC rules requiring corporate accountability via quarterly accounting statements and other disclosures, enhance the transparency of public markets for investors. These rules and regulations promote trust between issuers and investors, creating a safer environment for both sides of the transaction.

Listing exchanges encourage capital formation by bringing together companies and investors.

A number of exchanges engage in initial public offerings (IPOs) and list stocks, and there is intense competition among these exchanges for listings. UTP regulation permits, regardless of the exchange on which a stock is listed, these stocks to be traded on any of the 16 designated exchanges, over 30 dark pools (ATS's) and directly with broker dealers. Given that all exchanges can trade stocks listed on another exchange, all exchanges are engaged in the intense competition for secondary market liquidity (trading), and enable price formation and secondary market liquidity by bringing together companies and investors and producing publicly available quotes.

6.2 Issuers Benefit From Capital Formation and Provide Returns to Investors

Issuers enjoy the benefits of capital formation, which allows them to make critical investments in their business, grow the economy, increase employment, and provide investment opportunities.

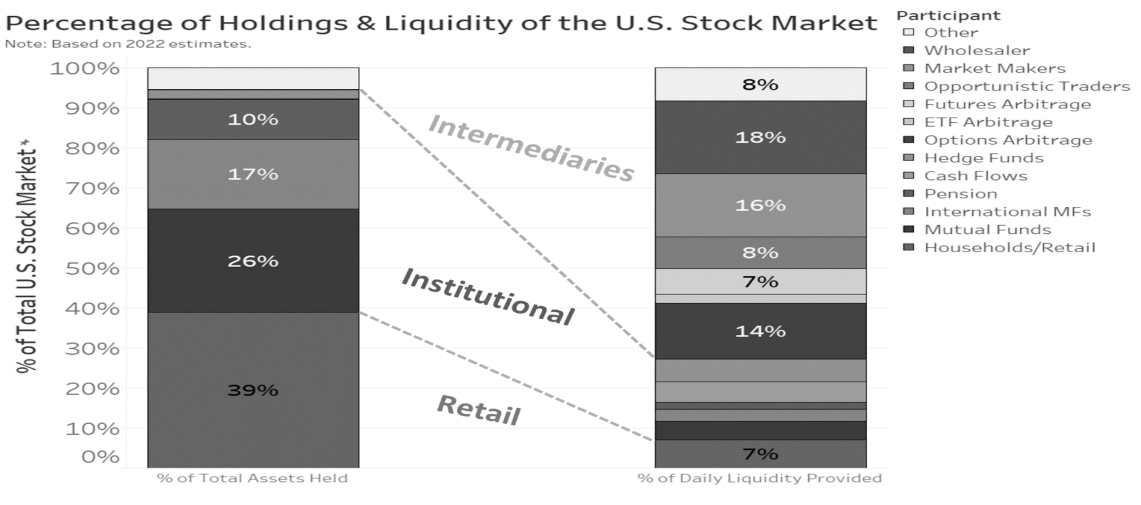
They provide benefits to investors too. When companies choose to list on public markets, investors have more investment choices and likely higher returns.

6.3 Those Who Trade the Least Provide Price Discovery

Long-term investors—typically mutuals funds, index funds, and retail investors—provide most of the market capital to issuers (Figure 14). Their confidence to invest assets in public companies is core to capital formation. The research they do on each company, and the buying and selling that results, provides price discovery that makes asset allocation more efficient across the economy. However, they do relatively little trading and quoting.

98 Mackintosh, Phil. "The Third Annual Intern's Guide to the Market Structure Galaxy." *Nasdaq,* 16 Jun. 2022, https://www.nasdaq.com/articles/the-third-annual-interns-guide-to-the-market-structure-galaxy

Figure 14: Investors Have Majority of Assets; Intermediaries Do Majority of Trading



These participants typically outsource spending on technology and infrastructure, and often trade relatively little on exchanges, despite benefiting most from secondary market liquidity and spreads.

6.4 Those Who Trade the Most Make Markets More Efficient

Data suggests that short-term traders—typically market makers, hedge funds, arbitrageurs, and banks—contribute the majority of daily liquidity to markets (Figure 14). Their focus on short-term opportunities and arbitrage adds liquidity and creates a more orderly and efficient market by ensuring there is always an investor on the other side of the trade.[99]

This creates a positive externality because it helps all traders keep prices as efficient as possible, creating tighter spreads,[100] which reduce transaction costs[101] for all investors, even those who trade off exchange.

These participants are also typically heavily invested in technology and infrastructure, despite experiencing lower margins as markets become more and more efficient.

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99 Mackintosh, Phil. "Who Is Trading on U.S. Markets?" *Nasdaq,* 28 Jan. 2021, https://www.nasdaq.com/articles/who-is-trading-on-u.s.-markets-2021-01-28

100 Mackintosh, Phil. "Three Charts That Show the Importance of a Competitive Bid/Offer NBBO." *Nasdaq,* 4 Dec. 2018, https://www.nasdaq.com/articles/three-charts-that-show-the-importance-of-a-competitive-bid-offer-nbbo-2018-12-04

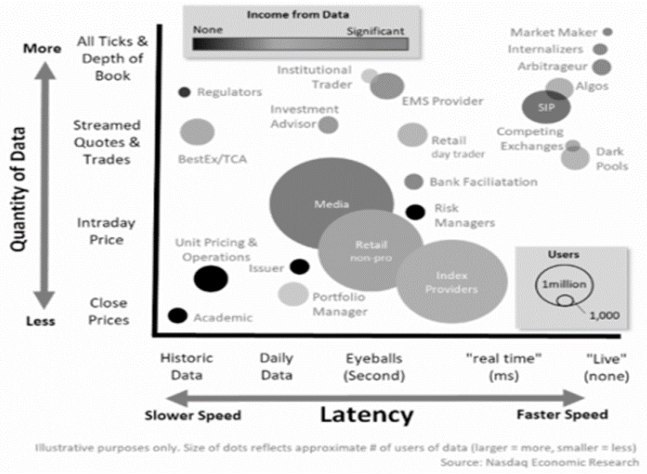
101 Nasdaq Economic Research. "V Is for Volume, and Its Implications for the Access Fee Pilot." *Nasdaq,* 4 Apr. 2019, https://www.nasdaq.com/articles/v-volume-and-its-implications-access-fee-pilot-2019-04-04

6.5 Not All Market Participants Trade, and Many Who Do Trade Slowly

Technological advances have also played a major role in the efficiency of markets. Computerized trading has led to fewer manual errors, quicker processing, and cheaper and faster trading. This means arbitrage happens very quickly, making markets very efficient. For participants trying to profit from arbitrage opportunities, computing power and trading speed are critical.

However, data needs and speeds and, in turn, costs are dependent on the use case of the customer (Figure 15). The majority of market participants react to news that occurs on a daily or even slower cadence. Humans, by definition, gain no benefit from the costs of high-speed technology.

Figure 15: There Are Many Data Options for Many Use Cases



Many other businesses benefit from the stock market on a daily basis, but do no trading on exchanges at all. That includes media companies, index providers, custodians and prime services businesses, and order management and risk system providers.

These participants have a range of benefits from a stream of public prices from quotes and trades, despite doing no trading at all.

In contrast, our research estimates that ATSs earn about $300 million, if unbundled, in trading revenues, for a combined cost of around $30 million[102] for the NBBO created by exchanges, while simultaneously reducing competition for public prices and concentrating exchange trading costs for those remaining on exchange.

6.6 Fixed Fees Inefficiently Allocate Utility Across the Market's Varied Participants

In the complex market ecosystem, exchanges are a key cog in supporting the SEC's mission. They stimulate capital formation, create price discovery, and facilitate liquidity.

However, the benefits of exchange products to various businesses are far from equal.[103]

Fees should be set in a way that takes into consideration these differing benefits, and SEC review of fees should reflect the fact that setting fees at different levels to reflect these benefits is not inconsistent with the requirement for fees to be "equitably allocated." Flat fees that do not take

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102 Mackintosh, Phil. "SIP Accounting 101." *Nasdaq,* 25 Mar. 2021, https://www.nasdaq.com/articles/sip-accounting-101-2021-03-25

103 Mackintosh, Phil. "What Is Core Data?" *Nasdaq,* 25 Feb. 2021, https://www.nasdaq.com/articles/what-is-core-data-2021-02-25

into consideration differing use cases may cause fees to be too high for some classes of consumers, causing them to consume less than would be optimal, while at the same time subsidizing usage for consumers that obtain a high value from the product. Examples of different use cases that should be considered when assessing fees include:

- **Market makers** require their own extensive technology investment, colocation, and proprietary data. They also create a lot of message traffic, but in doing so, create many of the positive externalities from which other investors and issuers benefit.

- **Hedge funds** who trade a lot and make significant profits are able to benefit from sponsored access provided by brokers.[104]

- **Human traders** do not benefit from contributing to costs for low-latency technology; 99% of SIP users do not use direct feeds.[105]

- **Index providers** earned $5 billion in revenue in 2021, with only three companies–MSCI, S&P Dow Jones Indices, and FTSE Russell–accounting for more than two-thirds of that revenue. [106] In the case of MSCI, market maker quote data helped its index business earn $951 million in profit in 2021.[107]

6.7 Fees That Vary By User and Usage Are Both Efficient and Fair

As demonstrated above, market participants vary widely with respect to the degree and types of interaction with exchanges, how they use exchange information and services, and the degree to which they capture private benefits from exchange services. Low-latency traders place intense demands on exchanges for low-latency, highly accurate information, while most investors only occasionally demand information at much lower speeds. A few customers place high demand on the exchange; the vast majority do not.

Fees will be most efficient and fair if they vary by use case. Flat fees set according to the most capital-intensive use cases will lead to underutilization by the vast majority of investors, which have no need for low-latency, high-output feeds. Setting fees according to the lightest use cases will lead to underinvestment in low latency products. The way to both finance sufficient investment to meet the needs of power users, as well as the more casual needs of the general investing public is to set fees according to use case.

This is already done for many products. To cite one example, professional subscribers to Nasdaq's depth of book fees are charged $76 for display usage, while non-professionals pay a

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104 *Id.*

105 Mackintosh, Phil. "NMS II: A Strange Way to Fix a Two-Tiered Market." *Nasdaq,* 18 May 2020, https://www.nasdaq.com/articles/nms-ii%3A-a-strange-way-to-fix-a-two-tiered-market-2020-05-18

106 Swink, Sonya. "Index Providers Take Record $5bn in Revenue in 2021." *Financial Times,* 24 May 2022, https://www.ft.com/content/595c3c18-7c13-4e33-9a68-f82f558b7ad6

107 "Form 10-K." *MSCI,* 26 Apr. 2022, https://ir.msci.com/static-files/c681582e-2a0b-486d-b942-aa38ce59c572

monthly fee of $15.[108] This type of pricing helps finance the infrastructure investment required for Professionals, and allows for the widespread distribution of financial information to the general investing public, who do not earn wages and commissions from their use of the data.

In fact, the SIP also demonstrates that fees shouldn't be equal, based on use case.[109] Retail traders get the same data cheaper than professionals, who in turn get the same data cheaper than algorithmic trading firms. This tiered pricing makes economic sense.

Looking at the extreme ends of the spectrum, retail traders, via their broker, are paying a maximum of $36 per year for the SIP. Algorithmic trading firms, however, pay $114,000 per year for uncapped use of the SIP. That's over 3,000 times what retail traders pay per year.

Still, tiered prices are more economically efficient than the same rate for all users because of the value extracted from the SIP by the different groups. A retail trader, trading at human speed, can only extract so much benefit from the SIP. It may not be fair to charge retail traders a flat rate of $114,000 per year.

In contrast, algorithmic trading firms and off-exchange market makers may trade millions of times per day, make profits of hundreds of millions of dollars, partly based on prices in the SIP. Arguably for those users, the $114,000 fee per year may be economically insufficient. Our research suggests that, for many, the revenue their platform earns from the SIP is higher than their total costs for market data, even though their trading is predominately off-exchange.[110]

It's also worth highlighting that, although high-volume traders pay more in total, they pay less than retail traders on a per-use basis.

Under the current pricing structure, even though both groups of users are accessing the same data, they pay very different prices for it. However, those prices better reflect the economic value each group can extract from the same data.

Finally, regulators should consider the economics of the positive externalities created by active market participants. They provide quote data to the rest of the market, keep prices accurate and spreads tight, all of which benefit the market as a whole, including retail traders.

7 Public Markets Create Public Benefits Not Reflected in Exchange Fees

Public markets create public benefits that are not necessarily limited to entities purchasing services directly from an exchange. Knowing whether markets are up or down and what the best

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108 The Nasdaq Stock Market LLC Rules, Equity Rules, Equity 7 (Pricing Schedule), Section 123(b)(2).

109 Mackintosh, Phil. "Equal Is Not Fair." *Nasdaq,* 30 Nov. 2023, https://www.nasdaq.com/articles/equal-is-not-fair

110 Mackintosh, Phil. "SIP Accounting 101." *Nasdaq,* 25 Mar. 2021, https://www.nasdaq.com/articles/sip-accounting-101-2021-03-25

prices are at any time helps analysts and advisors allocate assets more profitably for their clients. Constant quoting and trading also lowers the liquidity premium demanded by investors.

A competitive market of actionable quotes available to all also helps protect investors from unreasonable fees and poor executions, thereby improving market efficiency. For example, one study found that, in the US Corporate Bond market, which is far less transparent than the equity market, markups by broker-dealers cost customers $700 million in one year.[111]

Centralized trading and clearing ensures all can trade at the "best" prices and with minimal settlement frictions.

These benefits accrue without trading, connecting, or in some instances purchasing market data beyond last sale information or quotes for select stocks. By our estimates, improving public spreads by as little as a basis point could save $2.2 billion in mutual fund shortfall.[112] Furthermore, reduced spreads also lower the cost of capital for issuers by $3.6 billion per basis point, which adds to market valuations and returns.

Consequently, we estimate that promoting on-exchange trading—making bids and offers more competitive and thereby improving public spreads—would increase consumer economic surplus by billions of dollars.

Competitive spreads are also important for issuers, according to research. If you make a stock cheaper to trade, it becomes more attractive to investors.[113]

That broadening of the investor base, in turn, improves a stock's valuation and reduces the costs of capital for the issuer.[114,115] In fact, a study in 2009 found that liquidity improvements following stock splits reduced the average companies' cost of equity capital by 17.3%, or 2.4 percentage points per annum.[116] Moreover, a 2020 study found that reducing the bid-ask spread by 15.22 bps increased the median U.S. stock value by 69 bps and total U.S. market

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111 Harris, Lawrence. (2015). Transaction Costs, Trade Throughs, and Riskless Principal Trading in Corporate Bond Markets. SSRN Electronic Journal. 10.2139/ssrn.2661801.

112 Mackintosh, Phil. "How Much Does Trading Cost the Buy Side?" *Nasdaq,* 17 Feb. 2022, https://www.nasdaq.com/articles/how-much-does-trading-cost-the-buy-side

113 Chen, Honghui & Nguyen, Hoang & Singal, Vijay. (2011). The Information Content of Stock Splits. Journal of Banking & Finance. 35. 2454-2467. 10.1016/j.jbankfin.2011.02.005.

114 Maloney, Michael & Mulherin, J. (1992). The Effects of Splitting on the Ex: A Microstructure Reconciliation. Financial Management. 21. 10.2307/3665840.

115 Mackintosh, Phil. "Stock Splits Save Investors and Issuers." *Nasdaq,* 5 May 2022, https://www.nasdaq.com/articles/stock-splits-save-investors-and-issuers

116 Lin, Ji-Chai & Singh, Ajai & Yu, Wen. (2009). Stock splits, trading continuity, and the cost of equity capital. Journal of Financial Economics. 93. 474-489. 10.1016/j.jfineco.2008.09.008.

capitalization by $54.9 billion."[117] Based on this, issuers gain $3.6 billion per basis point of spread improvement.

We point to the external benefits of public markets to demonstrate that the observed demand for exchange services most likely understates the actual benefits of those services because not all beneficiaries directly purchase from the exchanges. This means that, in assessing whether a specific fee proposal "promote[s] just and equitable principles of trade," prevents "unfair discrimination," provides "reasonable" fees, and prevents "any burden on competition" not necessary to achieve the aforementioned goals,[118] proposals that promote public markets will always be consistent with those principles, as long as nothing in the proposal is directly counter to any of these goals.

8 Conclusion

As we have demonstrated and as the Commission has recognized in the past, the exchange market is competitive. Additionally, exchanges compete as platforms.

If the all-in cost to the user of interacting with an exchange—including the amount of liquidity of the exchange—exceeds market price, customers cease to buy the services of that exchange, and therefore the exchange must adjust one or more of its fees to attract customers. Exchanges are thereby constrained from charging excessive fees for any exchange products, including trading, listings, ports and market data.

This is underscored by the fact that competition has driven explicit and implicit exchange costs to an equilibrium, as evidenced in this paper.

Exchanges, by promoting market transparency, also create public benefits that are not necessarily reflected in the fees generated by competitive markets. New fee proposals that lead to expanded trading in lit markets will generally benefit the market as a whole, provided that nothing in the proposal impairs the competition among the many trading venues available in the market.

Given that the exchange market is competitive and that exchanges compete as platforms, platform competition is the most accurate model of the exchange landscape and should therefore be central to the Commission's economic analysis of exchange fee filings.

The way in which the Commission should integrate platform theory into its economic analysis process is beyond the scope of this paper. However, Nasdaq looks forward to working with the Commission and industry stakeholders in developing a framework to do so.

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[117] Li, Sida & Ye, Mao. (2020). The Tradeoff between Discrete Pricing and Discrete Quantities: Evidence from U.S.-listed Firms. SSRN Electronic Journal. 10.2139/ssrn.3763516.

EXHIBIT 5

Deleted text is [bracketed]. New text is underlined.

The Nasdaq Stock Market LLC Rules

General Equity and Options Rules

General 8: Connectivity

Section 1. Co-Location Services

* * * * *

Connectivity to the Exchange

Description	**Installation Fee**	**Ongoing Monthly Fee**
Fiber Connection to the Exchange (10Gb)	$1,055	$10,550
Fiber Connection to the Exchange (10Gb Ultra)	$1,583	$17,800[$15,825]*
Fiber Connection to the Exchange (40Gb)	$1,583	$23,700[$21,100]**
Fiber Connection to the Exchange (1Gb Ultra)	$1,583	$2,638
Fiber Connection to the Exchange (1Gb)	$1,055	$2,638
1Gb Copper Connection to the Exchange	$1,055	$2,638

* Members with a Minimum ADV as defined in Equity 7, Section 123(b)(3) shall be charged an ongoing monthly fee of $15,825, in lieu of $17,800.

** Members with a Minimum ADV as defined in Equity 7, Section 123(b)(3) shall be charged an ongoing monthly fee of $21,100, in lieu of $23,700.

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Equity Rules

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Equity 7: Pricing Schedule

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Section 123. Nasdaq Depth-of-Book Data

(a) No change.

(b) Subscriber Fees.

(1) No change.

(2) No change.

(3) Professional Subscribers pay a monthly fee for Non-Display Usage based upon Direct Access to Nasdaq Level 2 or Nasdaq TotalView:

Subscribers	**Monthly Fee (Minimum ADV)**	**Monthly Fee (No Minimum ADV)**
1-39	$375 per Subscriber	$500 per Subscriber
40-99	$15,000.00 per firm	$20,000 per firm
100-249	$30,000.00 per firm	$40,000 per firm
250+	$75,000.00 per firm	$100,000 per firm

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"Minimum ADV" means an average of at least one million shares of added executed displayed liquidity per trading day in all securities through one or more of the member's Nasdaq Market Center MPIDs. The average daily volume is calculated as the total volume of shares executed for all added displayed orders in all securities during the trading month divided by the number of trading days in that month, averaged over the six-month period preceding the billing month, or the date the firm became a member, whichever is shorter. New members will be deemed to meet the Minimum ADV for the first month of operation. Minimum ADV excludes sponsored access by a member on behalf of a third party.

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