

# Recovering the Promise of the Orderly and Fair Stock Exchange

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## I. INTRODUCTION

U.S. stock exchanges do not exist in the form they historically took and our equity markets are no longer orderly or fair. In the place of the traditional stock exchange, which was oriented around human beings and featured single-venue floor trading, an array of fully-automated trading platforms across multiple venues has arisen. Some of these have been formally designated as stock exchanges for legal purposes, while others operate as trading platforms. Almost all facilitate high frequency trading.

We believe that radical change is required to address the pathologies of inefficiency and unfairness that characterize the current structure of U.S. trading markets. Our proposal is to create multiple trading venues and then to allow trading in particular securities on only one of these venues. For the approximately 6,000 companies whose shares trade publicly in the United States, we propose licensing ten stock exchanges, each of which would provide a centralized—and exclusive—forum for trading approximately 600 stocks. Organizing our markets in this way would create exchanges that are large enough to benefit from scale, yet numerous enough to compete for listings.

Formerly, stock exchanges existed to provide “fair and orderly markets” for long-term investors.<sup>1</sup> In this Article we will use the term “end-user” investor or “long-term investor” to connote investors who purchase and sell securities for investment purposes to take advantage of fundamental research into a company or to engage in portfolio management. In contrast, high frequency traders (HFTs) purchase and sell on the basis of unfair information or unfair advantages regarding what *other traders* intend to do in the future, and therefore subtract value from markets by extracting parasitic profits.

The obligation of exchanges to provide fair and orderly markets was part of a complex system of informal, non-contractual arrangements with the trading public that were sustained by the value of future relationships that served the collective interests of both exchanges and traders. This “relational contract”<sup>2</sup> between exchanges and investors served the interests not only of traders, who benefitted from fair and equitable markets, but the exchanges as well, which benefitted from a natural monopoly in the provision of liquidity services.

After describing the structure of equity markets in the era of traditional stock exchanges in Part II, we identify some of the more acute problems with the current market structure in Part III of this Article. As explained in Part II, exchanges historically were run as not-for-profit utilities. Corporations would apply to list shares for trading and exchanges would list only those firms that met their standards and paid their listing fees. Listing firms got prestige, fair and orderly markets for their investors, and an efficient set of “off-the-rack” corporate governance rules.<sup>3</sup>

In Part III, we examine four of the symptoms of the disease affecting securities market

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1. Jonathan R. Macey & Maureen O’Hara, *The Economics of Stock Exchange Listing Fees and Listing Requirements*, 11 J. FIN. INTERMEDIATION 297, 300 (2002) [hereinafter Macey & O’Hara, *Economics of Stock*].

2. Relational contracts are informal agreements and unwritten codes of conduct. See George Baker et al., *Relational Contracts and the Theory of the Firm*, 117 Q.J. ECON. 39, 39–40 (2002) (describing the benefits of informal, non-contractual arrangements called “relational contracts” that are sustained by the value of future relationships between the parties to the arrangement).

3. Macey & O’Hara, *Economics of Stock*, *supra* note 1, at 300; LARRY HARRIS, *TRADING & EXCHANGES: MARKET MICROSTRUCTURE FOR PRACTITIONERS* 47–48 (2003).

structure. These are: (1) the Trade Through Rule, which prevents large sized orders from being executed and allows markets to lock as matching orders (orders where the bid price and sell price match) cannot be executed when they exist on different markets; (2) the so-called National Best Bid Best Offer, the implementation of which creates arbitrage opportunities for HFTs; (3) the complexity of order types as illustrated by the “Hide Not Slide” order type approved by the SEC and abused by both HFTs and major exchanges; and (4) payment for order flow, which pits brokers’ duty of best execution against their private interest in obtaining additional trading revenues from directing orders to venues paying for order flow.

In Part IV, we argue that today’s markets do not exhibit the characteristics of either a natural monopoly in the provision of liquidity services or a fair and orderly market. Unfortunately, misguided policies have produced the current deplorable state of the capital markets in which the economy realizes none of the benefits from the demise of monopoly pricing, yet suffers the significant costs associated with the lack of fair and orderly markets.

## II. HISTORICAL MARKET STRUCTURE

Stock exchanges existed long before securities laws, serving as market regulators as well as trading venues. As monopolists, exchanges had a strong economic incentive to pass rules that would increase both the number of listed securities and trading volume, as this would increase the exchanges’ market power. Because market participants were quite homogeneous, there was a significant convergence of interests between exchanges and members with respect to regulation. What was perceived as being in the interests of exchange members was also perceived as being good for the development of the market. And, in turn, what was perceived as being good for the market was also perceived as being good for investors and issuers.<sup>4</sup>

The exchanges’ role of market regulator was consistent with their status as monopolies. In their original form, exchanges provided a constellation of services, which consisted of five components: (1) monitoring of exchange trading against manipulation and insider trading; (2) the provision of standard-form, off-the-rack legal rules to reduce transaction costs for investors; (3) a signaling function to inform investors that the issuing company’s stock is of high quality; (4) clearing services to ensure that secondary participants receive timely payment for securities sold and timely delivery of securities purchased; and (5) the promise of liquidity often, but not always, backed by an affirmative obligation on the part of exchange specialists to “maintain fair and orderly markets” in the stocks in which they specialized.<sup>5</sup>

Significantly, the interests of the monopoly stock exchanges were closely aligned with the interests of the corporate issuers who listed their shares for trading on the exchange. Perhaps the most important example of this phenomenon concerns the unity of interest between listing firms and exchanges with respect to the issue of committing to remaining on an exchange after the initial listing. Both the listing firms and exchanges had an incentive to make binding commitments to one another. Listing firms wanted to be able to

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4. See Jonathan Macey & Maureen O’Hara, *From Markets to Venues: Securities Regulation in an Evolving World*, 58 STAN. L. REV. 563, 570 (2006) (showing the perception that what is good for the market is good for investors and issuers).

5. Macey & O’Hara, *Economics of Stock*, *supra* note 1, at 300-01.

commit to investors that they would abide by certain corporate governance rules; thus, they found it important to be able to make a credible commitment to investors that they would remain listed and continue to be subject to the listing rules of the exchanges on which they initially listed. At the same time, the exchanges themselves wanted to attract listing firms that would commit to their trading venues.<sup>6</sup>

In the prevailing competitive environment under which exchanges currently operate, in contrast, there is little or no homogeneity of interests among the various constituencies of the exchange. The relatively recent metamorphosis of exchanges from not-for-profit to for-profit led to an unholy alliance in which exchanges and HFTs seek profits at the expense of investors. The profit motive and the dramatic fall in the transaction costs associated with operating a trading venue has transformed the relationship among issuers, trading venues, and investors from a relationship business into a commodity business.<sup>7</sup>

The interests of stock exchanges and their members are no longer aligned. Exchange members such as Goldman Sachs actively compete for trading volume and order flow with exchanges both by internalizing order flow on the buy and sell side of the same transaction and by offering high frequency trading as well as alternative trading systems that compete directly with the exchanges for order flow.<sup>8</sup>

Significantly, the interests of issuers are no longer aligned with the interests of the exchanges. As monopolists, exchanges had strong incentives to pass trading rules that increased the overall size of the markets for the securities they traded. Now, exchanges compete with an array of other venues for market share, with little or no regard for the overall size of the market. The defining features of the current market structure are unaligned incentives and extreme fragmentation of formerly orderly and centralized markets.

### III. FRAGMENTATION IN THE CURRENT MARKET STRUCTURE

America's equity markets are far from unified. As BlackRock recently observed, U.S. stocks trade in "a complex and highly fragmented market where trade order flow must navigate 13 exchanges, 40+ dark pools, and a handful of Electronic Communication Networks (ECNs)."<sup>9</sup> In less than a decade, the NYSE's market share dropped from 77% of volume in its listed shares, to 32% in 2014. NASDAQ's share of trading in its listed stocks dropped to 29% in 2014, down from 53% in 2005. Now, there are over 40 venues on which U.S. stocks are traded, including over 30 dark pools and 11 exchanges that have been designated National Securities Exchanges by the SEC.

The defenders of such fragmentation operate under the assumption that the benefits of many competing trading venues outweigh the costs.<sup>10</sup> We disagree. Market

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6. *Id.*

7. *Id.*

8. *Id.*; Sam Mamudi & Michael Moore, *Goldman Gets Serious About High-Speed Trading*, BLOOMBERG (June 12, 2015, 5:00 AM), <https://www.bloomberg.com/news/articles/2015-06-12/goldman-sachs-revs-up-in-high-speed-market-it-sought-to-reform>.

9. Barbara Novick et al., *US Equity Market Structure: An Investor Perspective*, BLACKROCK 2 (2014), <https://www.blackrock.com/corporate/en-za/literature/whitepaper/viewpoint-us-equity-market-structure-april-2014.pdf>.

10. See, e.g., Maureen O'Hara & Mao Ye, *Is Market Fragmentation Harming Market Quality?*, 100 J. FIN. ECON. 459, 459 (2011) (noting that fragmentation results in "lower transactions costs and faster execution speeds")

fragmentation degrades market quality as investors lose opportunities to interact directly with one another, as trades are scattered across multiple venues. In addition, fragmented markets create arbitrage opportunities, like those exploited by HFTs that did not exist when trading markets were unified. And, transparency disappears behind a shroud of complex order types executed on both exchanges and vaguely sinister dark pools, which are trading venues that sometimes disadvantage long-term investors.

In our view, this market fragmentation harms long-term investors by allowing HFTs to free-ride on the costly investments in research made by real investors. Our fragmented markets discourage economic growth and employment by raising the costs of equity finance. In addition to the parasitic profits garnered by the HFTs and exchanges, fragmentation encourages brokerage firms to put their own interests ahead of their customers by engaging in practices like accepting kickbacks (known more politely as rebates) from trading venues to route trades to them, even if these venues are not the best for customers.

Because the price discovery process is important to capital allocation decisions, fragmentation harms capital markets by clouding the process of price discovery. In addition, fragmentation harms small traders, such as those trading through brokers like Charles Schwab, E\*TRADE, and T.D. Ameritrade. Small traders suffer when these brokers generate hundreds of millions of dollars for themselves by taking payment for order flow, which is the sale of retail investor orders to HFTs. Small investors are then harmed a second time when HFTs take advantage of them when their trades are executed.

The trading of individual securities in different locations has allows HFTs to insert themselves between natural buyers and natural sellers, imposing costs on investors and generating riskless profits for traders that represent wealth transfers from legitimate investors to front-running traders who do no research and represent no constituencies other than themselves. Thus, institutional investors (pensions, mutual funds, endowments and the like) face increasingly dysfunctional Balkanized markets that lack the depth and resilience of our formerly more unified exchanges.

The flash crash of May 6, 2010 illustrates in high relief the dangers of fragmentation. A toxic stew of HFTs and complex computer algorithms caused a dramatic market drop in which

[m]any of the almost 8,000 individual equity securities and exchange traded funds . . . suffered . . . price declines and reversals within a short period of time, falling 5%, 10% or even 15% before recovering most, if not all, of their losses. According to the SEC, over 20,000 trades were executed at prices more than 60% away from their values just moments before, some at prices of a penny or less, and others as high as \$100,000.<sup>11</sup>

Four years after the crash, traders buying and selling shares continue to experience declining depth and liquidity.

We identify four material effects created by fragmentation that negatively affect traditional investors: (1) the Trade Through Rule; (2) the so-called National Best Bid Best Offer; (3) the complexity of order types as illustrated by the “Hide Not Slide” order type

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and “does not appear to harm market quality”).

11. CFTC & SEC, FINDINGS REGARDING THE MARKET EVENTS OF May 6, 2010, at 4 (Sept. 30, 2010), <https://www.sec.gov/news/studies/2010/marketevents-report.pdf>.

approved by the SEC; and (4) payment for order flow. All of these effects disadvantage traditional investors at the expense of HFTs and other special interests.

#### A. The National Market System and the Trade Through Rule

The fragmentation of U.S. equity markets began in earnest in 2005 with the promulgation of Regulation NMS, which ostensibly was intended to “modernize and strengthen the national market system . . . for equity securities”<sup>12</sup> and “foster efficiency, enhance competition, and contribute to the best execution of orders”<sup>13</sup> by ending the traditional monopoly status of the organized stock exchanges. By encouraging the creation of multiple competing exchanges, our formerly unified system became fractionated. The ability to trade in large size without unduly moving the price—market depth—suffered and continues to erode as orders to buy and sell are increasingly distributed over multiple venues and as HFTs pursue bait-and-switch tactics. Startling evidence for the lack of robustness in today’s market comes from a 2013 Securities and Exchange Commission report that found order cancellation rates as high as 95% to 97%, a result of HFTs playing cat-and-mouse games and a strong indication that market depth is merely an illusion that fades in the face of real buying and selling.<sup>14</sup> The lack of market depth is an acute problem for large investors like mutual funds, endowments, and pension funds that trade large blocks of securities as fiduciaries for their beneficiaries. Similarly, the trading of individual securities in different locations opened the door for HFTs to insert themselves between natural buyers and natural sellers, imposing costs on investors and generating riskless profits for traders.

A key part of Regulation NMS is the so-called “Order Protection” or “Trade Through” Rule. This Rule, adopted in 2005,<sup>15</sup> is intended to operationalize a basic principle of fair and equitable trading: the first investor to place an order at the best current price should be the one whose order is filled first. Unfortunately, the rule does not meet the needs of long-term investors. Indeed, it sacrifices the interests of long-term investors for the interests of speculators.

The core of the Trade Through Rule is paragraph (a)(1), which prohibits trades from being executed at prices that are inferior to displayed quotations at another venue.<sup>16</sup> Oddly, Rule 611 does not affirmatively require that orders be routed to the trading center that displays the best prices. Instead, the rule forbids trades at worse prices than the so-called “protected quotation.”<sup>17</sup> Thus, there is no “trade at” requirement. In other words, bids and

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12. Regulation NMS, 70 Fed. Reg. 37,496 (June 29, 2005) (to be codified at 17 C.F.R. pts. 200, 201, 230, 240, 242, 249, 270).

13. *Id.* at 37,585.

14. *Trade to Order Volume Ratios*, SEC (Oct. 9, 2013), <https://www.sec.gov/marketstructure/research/highlight-2013-01.html#.WNRi5RjMyiO>.

15. *See generally* Memorandum from SEC Div. of Trading and Mkts. to SEC Mkt. Structure Advisory Comm., (Apr. 30, 2015), <https://www.sec.gov/spotlight/emsac/memo-rule-611-regulation-nms.pdf> (describing the features of the Trade Through Rule).

16. *Id.* at 3. Other venues include center all of the types of venues that execute trades in today’s equity market structure, including registered exchanges, alternative trading systems (both dark pools and ECNs), off-exchange market makers, and any other broker-dealers that execute trades internally, whether as principal or agent. *Id.*

17. To be protected, a quotation must be “automated quotations” displayed by an “automated trading center” where they are immediately and automatically executable. In addition, to be protected, a quotation must be

offers that are at the same price do not have to be automatically executed against one another. In fact, they lock markets under the current market structure regulations. A locked market is simply one in which the bid price equals the offer price, where the bid and offer are displayed on different markets. When the SEC implemented Regulation NMS, it created a “National Best Bid and Best Offer”<sup>18</sup> (NBBO) designation requiring that one of two Securities Information Processors (SIPs) calculate and disseminate bids and offers.<sup>19</sup> Once the NBBO was constructed, locked markets on the NBBO were prohibited.

The NBBO was designed to *create* fragmented markets, which were thought necessary to promote competition among trading venues. In order to accomplish its goal of getting different trading venues to compete against one another, the SEC had to deal with the problem that these venues are located in different locations and operate at different processing speeds.<sup>20</sup> Forbidding locked markets was a mechanism for dealing with the potential problem that an order might be executed simultaneously in several markets when a bid comes in that matches the offer price in more than one market. Time is needed to determine where the order will execute. Thus, trading is slowed when markets are locked. Since markets are supposed to encourage trading and to match buy orders with sell orders, it is difficult to view the ban on locked markets as anything but irrational from a public policy perspective.

If one starts with the hypothesis that the SEC is captured by special interest groups that include HFTs, the ban on locked markets is not so surprising. Locked markets cannot happen when all trades occur on a single market. Matched bids and offers on the same market would automatically execute against one another. But, barring the automatic execution of matched orders on two markets (locked markets) facilitates front-running by HFTs. When a market is locked, HFTs can leapfrog over existing orders and resell the securities at better prices (better for the HFT, worse for the investor) almost instantaneously to the original investor facing the locked market. As such, locked markets result in the deterioration of order execution quality.

The rule against locked markets is inconsistent with the rule requiring that orders be sent to multiple markets, because they prevent trading from occurring in a second market when a bid on one market matches an offer on another market. It is difficult to imagine why this rule exists other than to allow HFTs to insert themselves between the bid and the offer sides of locked markets. Disallowing trading when bids match offers thus greatly aids HFTs and market manipulators. Allowing trading when bids and offers meet is common sense and would go a long way to ameliorate the problem of proliferating order types.

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disseminated in the consolidated market data feeds. Finally, to be protected, a quotation must be the “best bid” (highest-priced bid) or “best offer” (lowest-priced offer) of a national securities exchange or a national securities association (currently FINRA through its Alternative Display Facility (“ADF”). *Id.*

18. National best bid and national best offer means, with respect to quotations for an NMS Security, the best bid and best offer for such security that are calculated and disseminated on a current and continuing basis by a “plan processor” or Security Information Processor (SIP) pursuant to an effective national market system plan. 17 C.F.R. § 600(b)(42) (2016).

19. The only plan processors are the Consolidated Quote System (CQS), which disseminates the NBBO for New York Stock Exchange Stocks (on Tapes B and C), and the UTP Quotation Data Feed (UQDF) which disseminates quotations for Nasdaq Stock Market listed stocks (on Tape C).

20. *Let’s Talk Locked and Crossed—Lock Stock and Two Smoking Barrels*, THEMIS TRADING LLC (Dec. 2013), <http://blog.themistrading.com/2013/12/lets-talk-locked-and-crossed-lock-stock-and-two-smoking-barrels/>.

Another important component of the Trade Through Rule is the requirement that broker-dealers route all trades to the exchange displaying the best price (highest bid or lowest offer) for a stock at any given moment,<sup>21</sup> harming long-term traders at the expense of speculators. With respect to market orders, of course it often makes sense for a market bid for a security priced at around \$100 to be cleared against the lowest offer price of \$100.01, rather than against a higher offer price of \$100.05, just as it makes sense for an offer to be cleared against a bid of \$100.05 rather than a lower bid in many cases.

However, strict adherence to price priority is not always rational, because trades move prices. It is particularly likely that trading will move prices when sophisticated long-term institutional investors are buying and selling large amounts of securities. For these sorts of end-user investors, the quantity of securities that they can trade at a particular moment may be of far greater importance than the price. The Trade Through Rule is flawed because it does not allow those who bring liquidity to the market by making bids and offers to specify the quantity of securities they wish to trade at a particular price. A simple example illustrates the point. Suppose that there is a bid of \$100.01 displayed for 1,000 shares of a security at a particular venue and a bid of \$100.03 displayed for 10,000 shares of the same security at another venue. The Trade Through Rule requires a bidder to buy the 1,000 shares of stock at \$100.01 before executing against the \$100.03 offer for 10,000 shares. But, when HFTs see the first trade at \$100.01, they can postulate algorithmically that the bidder (because of the Trade Through Rule) was unable to fill its entire demand for the stock with the first trade. HFTs will start buying securities (including the 10,000 shares at \$100.03) virtually instantaneously when they see the trade at \$100.01. This means that by the time the long-term investor fills its whole order (which might be for considerably more than 10,000 shares), it has paid a higher average price than it would have paid if it could have executed immediately against the 10,000 share offer at \$100.03. The HFT wins and the long-term investor loses. The Trade Through Rule wrongly makes illegal the purchase of a large block of shares at a higher price than the best offer (or sale at a lower price than the best bid).

### *B. Problems with the NBBO: It's not the Best Bid or the Best Offer*

While the Trade Through Rule provides priority for the best prices on exchanges, the best prices on non-exchange “regulated alternative trading platforms”<sup>22</sup> can be ignored by brokers and their larger exchange competitors even when alternative platforms display the best prices for a particular security. An important paper by Ding, Hanna, and Hendershot examines the differences between publicly provided market data and data sold directly from the exchanges as a means for assessing the transparency and fairness of U.S. equity markets.<sup>23</sup> As Ding, Hanna, and Hendershot observe: “Broadly speaking, there are two trading systems in the United States: registered exchanges and alternative trading

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21. Order Protection Rule, 17 C.F.R. § 242.611 (2016).

22. A regulated trading platform is an electronic virtual trading venue on which buyers and sellers are matched outside of a formal exchange and transact in securities without rules requiring transparency, automatic routing, or that orders be exposed to all participating dealers.

23. Shengwei Ding et al., *How Slow is the NBBO? A Comparison with Direct Exchange Feeds*, 49 FIN. REV. 313, 313–32 (2014).

systems.”<sup>24</sup> Registered exchanges are required to provide the NBBO, which are the best bids and offers on the Consolidated Quotation System (CQS). The non-exchange alternative trading systems, which include dark pools, may have better prices, but they do not have to provide quotes to the CQS, only match trades within the NBBO. All exchanges are required to provide quotes to the SIPS for the NYSE and Nasdaq who gather the data and publish the NBBO.

Trades cannot be executed at prices inferior to the NBBO. A key feature of modern U.S. market structure is that not all market participants have “equal access to trade and quote information.”<sup>25</sup>

Both physical proximity to the exchange and the technology of the trading system contribute to the latency. In addition, gathering and processing data takes time and also causes delay. The NBBO from the NASDAQ SIP may not be the fastest NBBO investors can obtain from the market. The delay is significant to the extent that investors cannot get the optimal price if they have a large amount to be traded. Also, there are delays in trade execution that cause the shown best price to be no longer available at the moment an order reaches the market. Thus, there is uncertainty whether NBBO prices can translate into trade prices. To mitigate problems such as the NBBO requirement, the SEC allows trading via intermarket sweep orders (ISO) and dark pools. ISO is a trade execution method in which an investor sends orders to multiple exchanges for immediate execution, disregarding whether such a price is the best nationwide.<sup>26</sup>

Ding, Hanna, and Hendershot find that a best bid/best offer synthetically created by looking at proprietary feeds produces significant arbitrage possibilities for HFTs. On one trading day, price dislocations in Apple shares appeared approximately fifty-five thousand times, or 2.34 times per second on the bid and asked sides.<sup>27</sup> These dislocations impose costs on real traders, particularly those that trade often. Ding, Hanna, and Hendershot provide the following example:

Assume BATS updates AAPL’s bid price from \$530 to \$531, and the ask price remains at \$532. This changes the mid-price from \$531 to \$531.5. In the first 1.5 milliseconds, slower traders are not aware of the price change. If some such traders have placed an order to trade at mid-price in a dark pool, then faster traders can buy the stock at \$531 in the dark pool when the synthetic NBBO gets updated. After 1.5 milliseconds, traders can sell it for \$531.5 in the dark pool. In this case the trade gains 50% of the price dislocation. Dark pools represent roughly 11% of trading volume, corresponding to 1,888,478 shares of AAPL on May 9. If half of the average dislocation of 3.4 cents is captured on this volume then fast traders would make a profit of \$32,510 in a single stock on a single day. The profit figure represents an upper bound on the profits of this type of strategy because it assumes all dark pool trades occur during price dislocations on dark pools using the SIP NBBO for prices. While AAPL is one of the highest-volume stocks, the dollar figure illustrates the possible magnitude of profits and costs

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24. *Id.* at 314.

25. *Id.* at 315.

26. *Id.*

27. *Id.* at 321–22.

stemming from latency for traders continuously in the market.<sup>28</sup>

Ding, Hanna, and Hendershot conclude that there are large price discrepancies between the public and private information feeds that provide data to investors. Further, they found that price dislocations commonly exist in U.S. equity markets. These price dislocations last long enough to permit HFTs to “pick off” or undermine the trading strategies of investors, particularly frequent transactors. The toxic combination of trading the same security on multiple venues combined with a two-tier system with slow data being reported on the NBBO and better quotes existing outside of the exchanges’ reporting system creates the opportunity for exploitation by certain HFTs, which have in essence a “faster NBBO” than the official NBBO.<sup>29</sup>

Firms such as ICE (which owns three exchanges, including the New York Stock Exchange) and BATS (which owns four exchanges and was founded by a HFT) operate under a business model that welcomes and caters to the interests of HFTs,<sup>30</sup> which currently provide more than half of all trading volume.<sup>31</sup> In addition to trading fees, the exchanges make profits from HFTs in myriad other ways. HFTs pay fees for co-location in the data centers, fees for privileged access to market data, and fees for high speed proprietary data feeds.

The existing system favors HFTs by allowing them to place their computer servers physically inside of the exchanges’ order execution centers so that their orders will arrive at the exchanges before the orders of other investors.<sup>32</sup> These collocated servers facilitate a form of micro front-running, by allowing the traders’ collocated computers to detect orders to buy and sell on one exchange and then rapidly send cancellations and orders to other venues where their servers are also collocated.<sup>33</sup> Put simply, HFTs purchase the ability to see a trade occur and react to it before the majority of investors are even aware that the first trade occurred.

Fortunately, Brad Katsuyama of *Flash Boys* fame recently established IEX, an exchange that foregoes the high profits earned by the major exchanges from selling speed advantages on the theory that they can make money more ethically by attracting investors who do not want to have their orders front-run by the HFTs and whose interests are ignored under the current system.<sup>34</sup> The IEX business model is “to allow the best investment and/or trading strategy to determine who can succeed, as opposed to who can purchase the fastest data and technology.”<sup>35</sup> This approach will benefit society by serving investors that

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28. Ding et al., *supra* note 23, at 323.

29. *Id.* at 315.

30. See Jonathan Macey & David Swensen, *Parasitic Trading and Frenzied Lobbying: Why the Heroes of ‘Flash Boys’ Must Win their Battle with the Establishment*, BUS. INSIDER (Apr. 22, 2016, 9:10 AM), <http://www.businessinsider.com/iex-battle-with-market-establishment-2016-4>.

31. *Equity Market Structure Literature Review Part II: High Frequency Trading*, SEC DIV. OF TRADING AND MKTS., 5 (Mar. 18, 2014), [https://www.sec.gov/marketstructure/research/hft\\_lit\\_review\\_march\\_2014.pdf](https://www.sec.gov/marketstructure/research/hft_lit_review_march_2014.pdf).

32. Geoffrey Rogow, *Colocation: The Root of All High-Frequency Trading Evil*, WALL. ST. J. (Sept. 20, 2012, 1:57 PM), <http://blogs.wsj.com/marketbeat/2012/09/20/collocation-the-root-of-all-high-frequency-trading-evil>.

33. *Id.*

34. See Annie Massa, *IEX Outduels Citadel, NYSE as ‘Flash Boys’ Exchanged Approved*, BLOOMBERG (June 17, 2016, 7:40 PM), <https://www.bloomberg.com/news/articles/2016-06-17/iex-outduels-citadel-nyse-as-flash-boys-exchange-is-approved> (explaining how IEX is different from other exchanges).

35. Sophia Lee, *Comment Letter on Investor’s Exchange LLC Form 1 Application*, IEX GROUP, INC. (Sept.

conduct fundamental research into stocks, which is irrelevant to HFTs.

### *C. Hide Not Slide and Complex Order Types*

For years, the SEC inexplicably has allowed HFTs and exchanges to create complicated orders types that facilitate their front-running business model. As then-SEC chair Mary Jo White observed in a June 5, 2014 speech on equity market structure, complex order types had proliferated and most of these complex order types were designed to deal with the SEC's rule against locked markets.<sup>36</sup> We respectfully disagree. Complex order types are designed by exchanges and HFTs to profit at the expense of true investors. The SEC is a guilty party, actively aiding and abetting HFTs and the exchanges.

Not content with the traditional order types of market orders and limit orders, HFTs and the exchanges connived with the SEC to gain approval of gimmicks like the "Hide Not Slide," an order type invented by DirectEdge, which is now owned by BATS.<sup>37</sup> When the best bid price and the best offer price for a security are identical across all exchanges, the market is locked, which must be avoided for trading to occur. Markets are unlocked when the bid "slides" back to the previous lower bid price. Hide Not Slide Orders allow HFTs to enter orders that lock markets and hide them from display, rather than sliding down to the previous bid. If the higher offer is executed later, the hidden bid will be displayed, because it no longer locks the market and will be first in line to be executed—even ahead of the previous higher bid that slid down to a slightly lower price. The Hide Not Slide scheme allows HFTs to jump ahead of ordinary investors placing ordinary buy orders.<sup>38</sup>

Consider an example: suppose that a limit order to buy Microsoft Corporation at \$30.01 a share is sent to the electronic stock exchange Direct Edge Holdings LLC, with instructions to be filled only there and not routed elsewhere. When the \$30.01 buy order is submitted, there is no sell order for Microsoft on Direct Edge at a price of \$30.01 or less, but another market, such as the Nasdaq Stock Market, has an order to sell Microsoft at \$30.01. It is an order to be filled only on that exchange. As noted above, the SEC considers this a locked market and does not allow the trade. As a result of the ban on locked markets, the limit order to buy Microsoft for \$30.01 cannot be displayed on Direct Edge. The order will "slide" to the lower price of \$30.00. However, a Hide Not Slide order at \$30.01 will not slide to the lower price; it will remain hidden from view—not displayed on the exchange's order book. If the order on Nasdaq is filled or cancelled, the subsequent \$30.01 order will be filled ahead of the prior \$30.01 order, which was not a Hide Not Slide order because it "slid" to \$30.00 when it locked with the order on Nasdaq.

As for the first investor's order—the one that slid to \$30—it converts back to the original \$30.01 price, but is placed in line behind the Hide Not Slide order. If a \$30.01 sell order for Microsoft enters Direct Edge, the Hide Not Slide order will get it first. This

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13, 2015), [https://www.iextrading.com/docs/IEX\\_Response\\_Letter\\_Nov\\_13\\_2015.pdf](https://www.iextrading.com/docs/IEX_Response_Letter_Nov_13_2015.pdf).

36. Mary Jo White, Chairman, SEC, *Enhancing Our Equity Market Structure*, Speech Before the Sandler O'Neill & Partners, L.P. Global Exchange and Brokerage Conference (June 5, 2014), <https://www.sec.gov/News/Speech/Detail/Speech/1370542004312>.

37. See SCOTT PATTERSON, *DARK POOLS: THE RISE OF THE MACHINE TRADERS AND THE RIGGING OF THE U.S. STOCK MARKET* 204–05 (2013) ("High-speed firms worked hand in hand with the trading networks to create exotic order types that would behave in very specific ways.")

38. Scott Patterson & Jenny Strasburg, *How 'Hide Not Slide' Orders Work*, WALL ST. J. (Sept. 18, 2012, 10:40 PM), <https://www.wsj.com/articles/SB10000872396390444812704577605840263150860>.

produces a situation in which the first investor to enter the market with a \$30.01 bid may not be able to purchase any shares if all of the available shares for sale have been purchased by the subsequent Hide Not Slide order at \$30.01.

The SEC investigated exchanges over their Hide Not Slide policies, and, shockingly, the investigation essentially resulted in an endorsement of the policy. The SEC fined DirectEdge \$14 million for its marketing of “Hide Not Slide” order types.<sup>39</sup> But, the SEC did not object to the order type itself. Specifically, the SEC merely observed that:

The exchanges’ rules did not completely and accurately describe the prices at which those orders would be ranked and executable in certain circumstances, and they also failed to describe the execution priority of the three order types relative to each other and other order types. The SEC’s investigation further found that the exchanges separately disclosed information about how those order types operated to some but not all of their members.<sup>40</sup>

Tellingly, the SEC found:

[T]he exchanges provided complete and accurate information about the order types to only some members, including certain high-frequency trading firms that Direct Edge also solicited for input about how the Hide Not Slide order type should operate. Direct Edge originally developed this order type following a request from one of the firms. Although the exchanges provided information about the Hide Not Slide order type in technical specifications made available to all members, those technical specifications did not contain fully accurate information. This created a significant risk that not all market participants would understand how these order types operated.<sup>41</sup>

These findings by the SEC are relevant to the discussion of market structure for two reasons. First, they illustrate the close relationship between the exchanges and the HFT community. As the SEC observed, the Hide Not Slide order type was developed by an HFT firm in the first place. Second, and perhaps more importantly, we see that the SEC appears to be entirely indifferent to the consequences of the increasing complexity of order types that it has been approving. Order types such as Hide Not Slide are used by HFTs to determine the price, sequencing and other variables in an order. The SEC is not promoting the interests of long-term investors.

Before the advent of exchanges and HFTs pursuing profit-generating activities adverse to the interests of long-term investors, the marketplace for securities transactions operated with a simple set of order types: buy at market, sell at market, buy at a limit, sell at a limit. Now, it is estimated that there are as many as 2,000 different order types.<sup>42</sup> Among them are Partial Post Only at Limit with Maximum Remove Percentage, Post No Preference Blind, Price-to-Comply and Mid-Point Passive Liquidity Add Liquidity Only. Indeed, none of these thousands of order types added in recent years serve the public

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39. Press Release, SEC, SEC Charges Direct Edge Exchanges with Failing to Properly Describe Order Types (Jan. 12, 2015), <https://www.sec.gov/news/pressrelease/2015-2.html>.

40. *Id.*

41. *Id.*

42. Herbert Lash, *Analysis: Complaints Rise Over Complex U.S. Stock Orders*, REUTERS (Oct. 19, 2012, 3:53 PM), <http://www.reuters.com/article/us-exchanges-order-types-idUSBRE8910YU20121019>.

interest.

It is not remotely possible for disclosure of the type envisioned by the SEC to place long-term investors, who trade relatively infrequently, on a level playing field with HFTs. This is why the SEC's settlement in the Direct Edge/Hide Not Slide enforcement proceeding is simply silly from a public policy point of view. Thousands of order types and permutations on order types are used by exchanges to advantage HFTs at the expense of long-term investors. Mere disclosure is not going to remedy the problem. The answer is to move to monopolistic trading of individual securities to eliminate the arbitrage opportunities upon which the exchanges and HFTs feast.

#### *D. Payment for Order Flow*

Besides the obscurity and lack of salience of order types, payment for order flow represents another significant obstacle to fairness in securities markets. Payment for order flow is the practice of trading venues paying rebates to broker-dealer firms in exchange for having the broker-dealer firm direct customers' orders to the trading venue. Defenders of the practice contend that customers benefit because it allows their brokers to charge them lower prices. There is no evidence to support this contention.

The problem with payment for order flow is that it creates a conflict of interest between brokers' legal obligation to provide customers with best execution of their orders<sup>43</sup> and the broker's incentives to profit from kickbacks. The stakes are significant. Over the past decade, the organized exchanges, led by the NYSE, Nasdaq, and BATS have paid almost \$30 billion in rebates to their broker members.<sup>44</sup>

The rebates are "so complex that at any moment in time more than 800 different pricing possibilities are being offered to trading firms across twelve official exchanges."<sup>45</sup> Once again, the HFTs win, with one market professional observing that "[i]nstead of finding natural buyers and sellers, we're finding intermediaries who come in and are benefiting from the complexity."<sup>46</sup> Large investment firms that handle investments, including retirement savings, for long-term investors "have regularly complained that it has become much trickier to confidently trade large blocks of stocks."<sup>47</sup>

While it appears that certain hedge funds may actually receive the rebates that were paid to their broker-dealer firms, the mutual funds and pension funds that trade on behalf of long-term investors do not benefit from the rebates paid by exchanges.<sup>48</sup> In a recent article Battalio, Corwin, and Jennings show that there is a negative relationship between several measures of order execution quality and the amount of money paid for order flow, strongly suggesting that the current practice of routing orders to maximize payment for

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43. Jonathan Macey & Maureen O'Hara, *The Law and Economics of Best Execution*, 6 J. FIN. INTERMEDIATION 188, 212 (1996).

44. *Why Stock Exchange Rebates Are Harming Investors and Should Be Eliminated*, IEX (unpublished manuscript) (on file with authors) [hereinafter IEX].

45. Nathaniel Popper, *Stock Exchange Prices Grow So Convoluted Even Traders Are Confused*, *Study Finds*, N.Y. TIMES (Mar. 1, 2016), [https://www.nytimes.com/2016/03/02/business/dealbook/stock-exchange-prices-grow-so-convoluted-even-traders-are-confused-study-finds.html?\\_r=2](https://www.nytimes.com/2016/03/02/business/dealbook/stock-exchange-prices-grow-so-convoluted-even-traders-are-confused-study-finds.html?_r=2).

46. *Id.* (internal quotations removed).

47. *Id.*

48. IEX, *supra* note 44.

order flow “does not maximize limit order execution quality.”<sup>49</sup>

The SEC’s order protection rule provides no guidance about where orders should be directed when more than one trading venue has the same posted price for a particular security. Currently orders are often directed to the venue with the highest rebates. In some markets, so-called “maker-taker” markets, traders posting bids or offers are considered liquidity makers, while in other markets, called “taker-maker” or “inverted” markets, those who buy at the offer or sell at the bid are paid the rebate.

Angel, Harris, and Spatt argue that delegating order routing decisions to brokers, which is what most investors do, leads to a conflict of interest in the broker’s order routing decision.<sup>50</sup> Investors choose brokers based primarily on the commissions they charge because they cannot to observe or evaluate the quality of the order execution, making it impossible for them to evaluate brokers in any other way. Brokers take advantage of this information asymmetry by making order routing decisions that maximize payments from order flow, rather than making decisions that maximize order execution quality. Battalio, Corwin, and Jennings find that execution quality diminishes when trades are routed to the highest rebate-paying venues, because such routing increases uncertainty of execution (as measured by decreased fill rates) and increases the adverse-selection risk that the customer whose order is being routed for rebates will be trading with more informed counterparties.<sup>51</sup> In sum, fill rates go down, execution speed declines, and realized spreads go up when orders are routed based on rebates.

Unfortunately, the ways in which payment for order flow harms investors are subtle and complex, making it extremely improbable that the issue will gain sufficient political saliency to gain policymakers’ attention. Some measure of the importance of payment for order flow for market structure lies in the fact that the NYSE operates four exchanges, NASDAQ operates three exchanges, and BATS operates four exchanges. One difference between these exchanges is that each has different rebate pricing policies. If stocks traded—as they used to—on a single trading venue, there would be no need for payment for order flow.

#### IV. A NEW MARKET STRUCTURE PROPOSAL

We begin with the premise that markets for stocks are natural monopolies, where buyers and sellers of an individual security are best served by meeting in one location. Centralizing the trading for an individual security maximizes the depth of the market, providing both buyers and sellers with the potential for the best possible outcome for their trades.

As anyone who took introductory economics knows, natural monopolies require regulation to prevent the monopolist from earning excess profits. Based on our bleak assessment of the regulatory environment in the United States, including the likelihood of regulatory capture, we have little confidence in the alternative of enlightened regulation of monopolistic trading venues for stocks. (Although even a poorly regulated monopoly might be far superior to the current disastrous disarray in which our securities markets currently

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49. Robert Battalio et al., *Can Brokers Have It All? On the Relation between Make-Take Fees and Limit Order Execution Quality*, 71 J. FIN. 2193, 2193 (2016).

50. James Angel et al., *Equity Trading in the 21<sup>st</sup> Century*, 1 Q.J. FIN. 1 (2011).

51. Battalio et al., *supra* note 49, at 2311.

operate.)

Instead, we propose that competitive forces serve as a check on monopolistic excess. Specifically, we propose the creation of ten stock exchanges, each of which would receive an endowment of one-tenth of the approximately 6,000 U.S. publicly traded securities. Each of the exchanges would receive approximately equal aggregate market capitalizations.

The key to creating a healthy competitive dynamic between the exchanges would be complete transparency in pricing and ease in moving securities from one exchange to another. For example, if pricing and execution of trades in Company *X*'s stock on Exchange *C* is consistently inferior to the pricing and execution of securities traded on Exchange *F*, the management of Company *X* should be able to move trading of its shares to Exchange *F* with alacrity. Such competition will keep trading costs and executions in line.

In addition, firms making initial public offerings of their shares would be free to list their shares for trading on any of the exchanges. Competition for new listings provides another vehicle for competition. Importantly, our proposal would eliminate the fragmentation and complexity that interfere with the effective operation of today's markets. High-Frequency Trading disappears, as does payment for order flow, payment for high speed data feeds, payment for colocation, complexity in order types and the Trade Through Rule. Each and every one the market aberrations listed above requires multiple markets in the same security. With a single location for trading an individual stock, the long list of market dysfunctions evaporates. Long-term investors benefit from deeper, fairer, more transparent markets.

## V. CONCLUSION

As a consequence of the SEC's disastrous implementation of Regulation NMS, securities markets have evolved from being characterized by centralized markets to being collections of highly diffuse fragmented trading venues. Fragmentation produces markets that lack depth and reliability. The radical change that we propose—the creation of ten independent stock exchanges with the monopolistic authority to list and trade individual securities of public companies—brings the benefits of competition and restoration of quality and integrity to the securities markets.

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