

Brooklyn Journal of Corporate, Financial & Commercial Law

Volume 1

Issue 2

SYMPOSIUM:

*Securities Market Structure and Regulation: What
Does the Future Hold?*

Article 6

2007

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Recommended Citation

Daniel M. Gray, *The Essential Role of Regulation in Promoting Equity Market Competition*, 1 Brook. J. Corp. Fin. & Com. L. (2007).
Available at: <https://brooklynworks.brooklaw.edu/bjcfcl/vol1/iss2/6>

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THE ESSENTIAL ROLE OF REGULATION IN PROMOTING EQUITY MARKET COMPETITION

*Daniel M. Gray**

I. INTRODUCTION

November 2006 was a particularly good time for a symposium to evaluate equity market structure. In the United States, the equity markets were entering the final stages of implementation for Regulation NMS. Adopted in June 2005, Regulation NMS embodies changes to market structure that are designed to enhance and modernize the national market system adopted under section 11A of the Securities Exchange Act of 1934 (the '34 Act).¹ Regulation NMS includes a trade-through rule that generally prevents a market from executing trades at prices inferior to automated quotes that are displayed and immediately accessible at other markets.²

Over the last two years, the U.S. equity markets have been transformed. There are ten registered securities exchanges in the U.S., and nine of the ten have adopted new equity trading systems. Perhaps most notably, the New York Stock Exchange (NYSE), the largest equity market in the world, has fully automated its quote for the first time in its history. The exchanges brought their new trading systems into full operation on March 5, 2007.³

In Europe, as well, the state of competition among equity exchanges is in flux. As the economic boundaries between European countries have blurred, so have the boundaries between the traditional national stock exchanges. Several smaller exchanges have already merged, and there has been a continuing dance involving potential mergers among the "Big

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1. Regulation NMS, Exchange Act Release No. 51,808, 70 Fed. Reg. 37,496 (June 29, 2005) (adopting release).

2. Regulation NMS Rule 611, 17 C.F.R. § 242.611 (2006). Rule 611 replaces an older trade-through rule that had applied to securities listed on exchanges other than Nasdaq. Rule 611 updates the old rule by extending trade-through protection only to automated quotes, in contrast to the old rule that protected both automated and manual quotes. In addition, Rule 611 applies to stocks listed on all exchanges, including Nasdaq. *See* Regulation NMS, 70 Fed. Reg. at 37,501-02.

3. Regulation NMS, Exchange Act Release No. 53,829, 71 Fed. Reg. 30,038, 30,039 (May 24, 2006) (setting compliance dates for Regulation NMS). *See also* Regulation NMS, Exchange Act Release No. 55,160, 72 Fed. Reg. 4202 (Jan. 30, 2007) (extending the Trading Phase Date until March 5, 2007).

Three” European exchanges—the London Stock Exchange (LSE), Deutsche Börse AG, and Euronext N.V.⁴ More recently, of course, the U.S. exchanges have entered the mix with their own proposals for cross-Atlantic mergers.⁵ In addition to this merger activity among existing exchanges, the scheduled implementation of the Markets in Financial Instruments Directive (MiFID) in November 2007 raises the potential that a transformed regulatory environment may create a more meaningful opportunity for new competitors to challenge the Big Three for market share in Europe. As a result, the next few years will offer up a wealth of new data for evaluating the effects of regulatory initiatives on competition in the equity markets.

The topic of the panel I spoke on at the *Brooklyn Journal of Corporate, Financial & Commercial Law* symposium was entitled: The Respective Roles of Government and Competition in Shaping and Developing the Markets. The panel discussed the extent to which competition rather than government regulation should shape the markets. I want to turn those statements around and suggest that, in the absence of a regulatory scheme specifically designed to promote competition among multiple equity markets, there is unlikely to be significant competition because of the economic forces that drive markets toward consolidation. Both economic theory and historical experience suggest that a single equity market will eventually dominate trading in its listed stocks. Regulations, therefore, should be viewed as playing an essential role in preserving and promoting equity market competition.

In examining this thesis, I will focus on three broad questions. First, given the powerful network effect that operates in the equity markets—best captured in the old maxim that liquidity attracts liquidity—is significant competition among equity markets for trading volume in the same stocks likely to exist in the absence of a regulatory scheme that makes such competition a primary objective?

Second, assuming that regulation does indeed play an essential role in promoting competition among equity markets, what regulatory tools are most effective in promoting competition, without losing the economic good that underlies the network effect (the best prices for investors)?

Finally, are regulatory efforts to promote competition among equity markets actually worth it? I will examine whether the benefits of such

4. U.K. COMPETITION COMMISSION, REPORT ON THE PROPOSED ACQUISITION OF LONDON STOCK EXCHANGE PLC BY DEUTSCHE BÖRSE AG OR EURONEXT NV, 3–4, 22–24, 44 (Nov. 2005) [hereinafter U.K. COMPETITION REPORT].

5. As this article goes to press, it appears that the proposed merger of the NYSE and Euronext will be completed, while Nasdaq’s tender offer for the LSE has not been accepted by LSE shareholders. Press Release, NYSE Euronext to Commence Offer for Euronext Shares (Feb. 15, 2007), available at <http://www.nyse.com/press/1171453128510.html> (announcing commencement of offer for Euronext shares); Press Release, Nasdaq, Final Offers Lapsed (Feb. 10, 2007), available at [http://www.nasdaq.com/newsroom/news/newsroomnewsHeadlines.aspx?year=\(follow+“Final+Offers+Lapsed”\)](http://www.nasdaq.com/newsroom/news/newsroomnewsHeadlines.aspx?year=(follow+“Final+Offers+Lapsed”)) (announcing lapse of final offer for LSE shares).

competition exceed the costs of fragmenting the buying and selling interest in individual stocks, particularly by focusing on three historical events that offer empirical evidence to help assess this question.

II. IS REGULATION ESSENTIAL FOR EQUITY MARKET COMPETITION?

One of the primary statutory objectives for the Securities Exchange Commission (SEC) is to ensure fair competition among exchange markets, and between exchange markets and markets other than exchange markets.⁶ Competition in this context refers to competition among multiple markets to attract trading volume in the same stocks. Markets compete in this way by offering better trading services to investors, such as low access fees, reliable systems, and innovative trading tools.⁷ This type of competition is distinct from competition for listings, where the quality of trading services may be but one of many factors that influence an issuer's decision on where to list initially and whether to switch listings. In contrast, the quality of a market's trading services is more likely to be vitally important to actual traders and investors than it is to company management.

When evaluating the issue of equity market competition, the starting point is the principle that "liquidity attracts liquidity"—known in economic terms as a "network effect."⁸ As a single market attracts more and more trading volume in a stock, each new participant in that market enhances the value of the market to both existing and prospective participants by adding liquidity and thereby enabling that market to offer better prices. After an initial period of potentially vigorous competition among multiple markets, liquidity can be expected to tip to a single market and stick there indefinitely. Because of this network effect, any market attempting to compete with the dominant market faces a tough challenge. Even if the new competitor offers better technology and lower fees, it may not attract trading volume because it cannot assure its participants that they will receive prices that match the quality of executions available on the dominant market. Moreover, the dominant market may respond to competitive challenges by reducing fees in the short-term until a competitor is driven off, or by adopting an improved technology that was developed and introduced by the competitor.

The consequences of the network effect can be seen today by assessing the equity markets throughout the world. The network effect appears to be alive and well. In countries other than the U.S., the major equity exchanges

6. Exchange Act § 11A(a)(1)(C)(ii), 15 U.S.C. § 78k-1(a)(1)(C)(ii) (2000).

7. See Notice of Filing of Proposed Rule Change to Rescind Exchange Rule 390; Commission Request for Comment on Issues Relating to Market Fragmentation, Exchange Act Release No. 42,450, 65 Fed. Reg. 10,577, 10,582 (Feb. 28, 2000).

8. See LARRY HARRIS, TRADING AND EXCHANGES: MARKET MICROSTRUCTURE FOR PRACTITIONERS 526, 535–36 (2003).

overwhelmingly dominate public trading in their listed stocks. Examples include the LSE in the United Kingdom; the Tokyo Stock Exchange in Japan; Deutsche Börse in Germany; Euronext in France, the Netherlands, Belgium, and Portugal; and the Toronto Stock Exchange in Canada.

In contrast, the U.S. equity markets currently are characterized by extremely vigorous competition among a variety of different types of markets for trading volume in the same stocks. For example, the NYSE floor, which historically has dominated trading in NYSE stocks, has seen its market share diminish in recent months. To counter the trend, the NYSE has adopted a Hybrid Market that offers fully automated access to its displayed quotes. Of course, the NYSE also has merged with the fully automated Archipelago Exchange, but the NYSE Group has decided to maintain both entities as separate exchanges that simultaneously trade NYSE stocks on different trading platforms.⁹ Therefore, to some extent the two trading platforms operating under the NYSE Group umbrella will be competing with each other for volume in NYSE stocks.

For its part, Nasdaq has been approved as an exchange, has merged with two competitor ECNs, and has integrated the respective three trading systems into a single system with superior technology than its old system. Nasdaq has increased its share of trading in NYSE stocks by, among other things, offering low-cost routing to the NYSE floor for orders that check the Nasdaq order book first.¹⁰

The American Stock Exchange (Amex), like the NYSE, is transforming a manual floor-based market into a hybrid market with primarily automated trading.¹¹ The four traditionally “regional” exchanges—Chicago, Boston, Philadelphia, and National—have all received capital infusions from major securities firms wary of a potential NYSE/Nasdaq duopoly that would dominate trading in U.S. equities.¹² The regionals have adopted new, automated equity trading systems and believe that they have their best opportunity in many years to compete effectively for trading volume with the larger exchanges. Similarly, “[t]he two traditionally options exchanges—CBOE [the Chicago Board Options Exchange] and ISE [the

9. NYSE Group, Inc., Annual Report (Form 10-K), at 4–5 (2005).

10. Nasdaq Stock Market, Inc., Quarterly Report (Form 10-Q), at 22–26 (Nov. 8, 2006), available at http://excite.brand.edgar-online.com/EFX_dll/EDGARpro.dll?FetchFilingHTML1?SessionID=dqUgjAWGR6-FQ1D&ID=4750663; Nasdaq Membership Frequently Asked Questions (Sept. 7, 2006), http://www.nasdaqtrader.com/trader/er/er_faqs.pdf.

11. Press Release, AMEX, American Stock Exchange’s New Electronic Trading Platform Compliant With Regulation NMS (March 5, 2007), available at http://www.amex.com/?href=/atamex/news/press/sn_AEMIRegNMS_030507.htm.

12. Emily Lambert, *Could Small Mean Big? Why Regional Exchanges Are Heating Up*, FORBES.COM, July 3, 2006, <http://members.forbes.com/forbes/2006/0703/054b.html>.

International Securities Exchange]—have decided to expand into [trading] equities and . . . [have adopted] new, automated equity trading systems.”¹³

Finally, in addition to the ten registered securities exchanges, a variety of alternative trading systems (ATSs) compete for trading volume in U.S. stocks. Three electronic communications networks (ECNs) publicly display their quotes through the National Association of Securities Dealers’ (NASD’s) Alternative Display Facility, and a large number of other ATSs operate “dark” pools of liquidity. These dark ATSs include crossing systems that facilitate block trading by institutional investors, as well as liquidity pools operated by broker-dealers that seek to match orders internally prior to any interaction with the transparent, public markets.¹⁴

The United States and other countries have contrasting expectations for a competitive equity market structure. While market participants in other countries have long accepted dominant exchanges, many in the U.S. have expressed great concern over the prospect of a duopoly with trading dominated by the NYSE Group and Nasdaq. This concern to maintain a competitive market structure reflects a fundamental policy choice of the U.S. regulatory scheme.¹⁵ The Exchange Act directs the SEC to facilitate the establishment of a national market system (NMS).¹⁶ The NMS is made up of multiple markets that simultaneously trade the same stocks. One of the primary NMS objectives is to ensure fair competition among broker-dealers, among exchange markets, and between exchange markets and non-exchange markets.¹⁷

This NMS approach to market structure is an attempt to have your cake and eat it too. On the one hand, investors in the United States want to have the benefits of competition among markets (such as innovative trading tools and low trading fees). But on the other hand, they want to minimize any adverse effects of “fragmentation”—when the buying and selling interest in individual stocks becomes so split up among multiple markets that it interferes with efficient pricing of those stocks.¹⁸ In this respect, the NMS “incorporates two distinct types of competition—competition among

13. Annette L. Nazareth, Comm’r, SEC, Remarks Before the STA Annual Conference (Oct. 13, 2006). See also John Authers & Norma Cohen, *Clearing the Floor: How a Regulatory Overhaul Is Helping Rivals to Close in on the Big Board*, FIN. TIMES, Sept. 14, 2006 (noting that ISE launched its equity trading service in the Fall of 2006, while CBOE planned to launch in 2007).

14. Daniel Safarik, *Illuminating the Dark*, ADVANCED TRADING, Sept. 26, 2006, at 26, 28; Nina Mehta, *Who’s Afraid of the Dark?*, TRADERS MAGAZINE, May 2006, at 36, 40–41.

15. See Securities Exchange Act of 1934, 48 Stat. 881 (codified as amended at 15 U.S.C. §§ 78a–78nn (2000)).

16. Exchange Act § 11A(a)(2), 15 U.S.C. 78k-1(a)(2) (2000).

17. Exchange Act § 11A(a)(1)(C)(ii).

18. Commission Request for Comment on Issues Relating to Market Fragmentation, Exchange Act Release No. 42,450, 65 Fed. Reg. 10,577, 10,577–78 (Feb. 28, 2000) (requesting comment on issues relating to market fragmentation).

individual markets and competition among [individual] orders.”¹⁹ The Commission’s market structure challenge over the years has been to maintain an appropriate balance between these two forms of competition.²⁰

III. WHICH REGULATORY TOOLS PROMOTE COMPETITION AND EFFICIENCY?

The SEC has balanced the two objectives of competition among markets and competition among orders by utilizing familiar regulatory tools. They include price transparency, non-discriminatory access to markets, non-discriminatory access to clearing and settlement systems, and the duty of best execution.

Mandatory price transparency helps non-dominant markets compete by enabling them to provide some assurance that their prices are as good as those offered by the dominant market. If the dominant market displays a quote to anyone, it is required to display that quote to the public.²¹

Mandatory fair and non-discriminatory access to markets prevents a dominant market from restricting its prices to favored customers.²² Open access also prevents the dominant market from inhibiting traders from participating in other markets, such as through off-board trading restrictions.²³

In addition, market participants in the United States have fair and non-discriminatory access to a national clearing and settlement system, no matter the particular market where a trade was executed. The extraordinary importance of this regulatory tool is apparent from the state of exchange competition in Europe, where individual markets own clearing and settlement systems as part of “vertical silos” in which trading services are effectively tied to clearance and settlement services.²⁴ Notably, when Congress ordered the creation of a national system for trading stocks in 1975, it also ordered the creation of a national system for clearing and settling trades.²⁵

Finally, the duty of best execution plays a vital role in promoting competition by creating incentives for brokers to search for the best

19. See William H. Donaldson, Chairman, SEC, Testimony Concerning Recent Developments in the Equity Markets Before the U.S. Senate Committee on Banking, Housing, and Urban Affairs (May 19, 2005), available at <http://www.sec.gov/news/testimony/ts051905whd.htm>.

20. Regulation NMS, Exchange Act Release No. 51,808, 70 Fed. Reg. at 37,498–99 (June 29, 2005) (adopting release).

21. See Order Execution Obligations, Exchange Act Release No. 37,619A, 61 Fed. Reg. 48,290 (Sept. 12, 1996).

22. Regulation NMS, 70 Fed. Reg. at 37,540.

23. Off-board trading restrictions prevent an exchange’s members “from effecting transactions in [the exchange’s] listed securities away from a national securities exchange.” Commission Request for Comment on Issues Relating to Market Fragmentation, Exchange Act Release No. 42,450, 65 Fed. Reg. 10,577 (Feb. 28, 2000) (proposing rescission of NYSE Rule 390).

24. U.K. COMPETITION REPORT, *supra* note 4, at 59, 67–70.

25. Exchange Act § 17A(a), 15 U.S.C. § 78q-1(a) (Supp. II 2002).

available markets.²⁶ In some cases, brokers may be committed to a dominant market because of financial considerations or other self-interests, or just through plain inertia. The duty of best execution helps focus brokers on the interests of their customers in trading on the best market. This focus expands the opportunity for smaller markets to compete with a dominant market by offering better prices or trading services that brokers are legally required to consider.

Many of these regulatory tools that promote competition also can minimize the adverse effects of fragmentation. For example, price transparency and open access help keep prices in line among all the different markets that trade a particular stock. If quoted prices diverge, the differences can immediately be arbitrated away. Public disclosure of order execution quality statistics by all markets is another important aspect of price transparency.²⁷ This specialized disclosure supplements real-time quote and trade transparency by honing in on the quality of executions actually provided at different markets for different types of orders that otherwise could not be seen by the public. Comparable statistics on order execution quality both help equalize the prices available across markets and enable markets to compete more directly on the quality of their order executions by making this factor visible to brokers and customers.²⁸

IV. DO THE BENEFITS OF COMPETING EQUITY MARKETS OUTWEIGH THE COSTS OF REGULATION AND FRAGMENTATION?

Multiple markets trading the same stocks are necessary to have a competitive market structure. But the severity of any adverse effects of fragmentation may increase as the number of competing markets increases. The regulatory tools mentioned in Part III can help direct order flow to markets that offer the best prices. These tools thereby minimize the most obvious risk of fragmentation, which is that an investor's order will be executed at an inferior price in one market, while the best price was readily available in another market.

26. Order Execution Obligations, 61 Fed. Reg. at 48,322 ("A broker-dealer's duty of best execution derives from common law agency principles and fiduciary obligations, and is incorporated both in SRO rules and, through judicial decisions, in the antifraud provisions of the federal securities laws.")

27. Regulation NMS Rule 605, 17 C.F.R. § 242.605 (2006).

28. See generally Ekkehart Boehmer, Robert Jennings & Li Wei, *Public Disclosure and Private Decisions: Equity Market Execution Quality and Order Routing*, 20 REV. FIN. STUD. 315 (2007) (examining whether public disclosure affects behavior and finding that it produces beneficial effects); Xin Zhao & Kee H. Chung, *Information Disclosure and Market Quality: The Effect of SEC Rule 11Ac1-5 on Trading Costs*, 42 J. FIN. QUANTITATIVE ANALYSIS (forthcoming 2007), available at <http://ssrn.com/abstract=440429> (analyzing the impact of public disclosure and concluding that it encourages competition among market centers and reduces trading costs).

A deeper issue in evaluating a fragmented market structure, however, is whether its “best” prices are any good—particularly, whether the prices produced by a fragmented market structure are as good as the prices that would be produced by a more consolidated market structure. In other words, do the benefits of regulatory efforts to promote competition among multiple markets outweigh the excessive transaction costs that might be imposed on investors if fragmentation impaired price discovery for individual stocks?

As an initial matter, one should not fail to recognize, or underestimate, the costs of a fragmented market structure merely because investor transaction costs can be difficult to calculate precisely. Institutional investors experience this difficulty acutely because they trade in large size. Institutional investors, such as mutual funds and retirement plans, represent the financial interests of millions of individuals by enabling them to invest indirectly in the equity markets. For institutional investors alone, the implicit transaction costs associated with the prices at which their orders are executed has been estimated to be as high as 1% of the principal amount of their transactions.²⁹ Dollar cost estimates range from a conservative \$30 billion to more than \$100 billion annually. To provide a frame of reference, the total non-listing revenues of the NYSE Group and Nasdaq in 2005 were approximately \$2.11 billion.³⁰ Consequently, the potential benefits of competition among markets in minimizing exchange fees are smaller by an order of magnitude than the potential costs to investors of impaired price discovery.

This issue of the trade-off between competition and fragmentation can be endlessly debated in theory, depending on one’s views about optimal market structure. It is therefore interesting to look for relevant empirical data that might shed light on the issue. I will consider three historical periods that offer relevant natural experiments on the benefits and costs of competition among equity markets: first, in 1996, the entry of ECNs into the market for Nasdaq stocks following the Commission’s adoption of the Order Handling Rules; second, in 2004, the LSE’s initiation of the Dutch Trading Service (DTS) to compete with Euronext for trading in Dutch stocks; and third, also in 2004, the competition between the NYSE and Nasdaq to provide the most efficient market structure for trading their respective listed stocks.

Prior to the Order Handling Rules, trading in Nasdaq stocks was divided primarily between two markets: (1) the public dealer market operated

29. Regulation NMS, Exchange Act Release No. 51,808, 70 Fed. Reg. 37,533, 37,608 n.990 (June 29, 2005) (adopting release); Request for Comments on Measures to Improve Disclosure of Mutual Fund Transaction Costs, Investment Company Act Release No. 26,313, 68 Fed. Reg. 74,820, 74,822 (Dec. 24, 2003).

30. NYSE Group, Inc., Annual Report (Form 10-K), at 67, 69 (2006); Nasdaq Stock Market, Inc., Annual Report (Form 10-K), at 42 (2006).

by Nasdaq, and (2) the private agency market operated by a single ECN—Instinet. The public quotes for Nasdaq stocks generally reflected only market maker quotations. Instinet, in contrast, generally had better prices than the market maker quotes, but made these prices available only to Instinet subscribers and not to the public.

A natural experiment on the effect of increased equity market competition occurred when the SEC adopted rules to improve price transparency. The SEC required market makers to include in their quotes (or send to ECNs) customer limit orders that improved the market makers' published quotes. Market makers also were required to publicly display their best prices, either in their own quotes or through an ECN. The SEC believed the new rules would, among other things, address industry practices that had hindered competition among markets in Nasdaq stocks.³¹

The Order Handling Rules led to the creation of many new ECNs, which in turn transformed the market structure for Nasdaq stocks. The percentage of ECN trading in Nasdaq stocks rose from 9% in 1996 to 40% in 2003.³² The entry of these new competitors improved both the quality of trading services and the quality of prices for Nasdaq stocks. For example, market access fees fell dramatically—by approximately 80%.³³ In addition, many economic studies found that investor transaction costs had declined significantly, with quoted and effective spreads declining by approximately 30%.³⁴ Importantly, a more competitive market structure also led to increased liquidity that benefited institutional investors in executing their large trades.³⁵ Thus, the Order Handling Rules provide a good example of a regulatory change that was a “win-win” for market structure—they led to both a significant increase in competition among markets and a significant reduction in transaction costs for investors.

When assessing the impact of the Order Handling Rules on market quality, one must recognize not only that there was an increased number of competing markets, but also that these competing markets were efficiently linked together through participation in a centralized, Nasdaq-operated trading system. The ECN quotes therefore were fully accessible to all participants in the dominant Nasdaq market, which allowed the ECNs to attract order flow both directly from subscribers and indirectly through

31. Order Execution Obligations, Exchange Act Release No. 37,619A, 61 Fed. Reg. 48,290, 48,292 (Sept. 12, 1996).

32. U.S. GENERAL ACCOUNTABILITY OFFICE, SECURITIES MARKETS: DECIMAL PRICING HAS CONTRIBUTED TO LOWER TRADING COSTS AND A MORE CHALLENGING TRADING ENVIRONMENT 40 (2005), available at <http://www.gao.gov/new.items/d05535.pdf> [hereinafter GAO Report].

33. Letter from Edward J. Nicoll, CEO, Instinet Group Inc., to Jonathan G. Katz, Sec'y, SEC 5 (June 30, 2004), available at <http://www.sec.gov/rules/proposed/s71004/igi063004.pdf> (commenting on proposed Regulation NMS).

34. Commission Request for Comment on Issues Relating to Market Fragmentation, Exchange Act Release No. 42,450, 65 Fed. Reg. 10,577, 10,584 (Feb. 28, 2000).

35. *Id.* at 10,585 n.53, 10,581–82.

Nasdaq.³⁶ As a result, competition increased, but within the context of an efficient linkage that helped minimize fragmentation.

The initiation of DTS by the LSE in 2004 provides a second natural experiment on the effect of increased equity market competition. The LSE decided to compete for trading volume in Dutch stocks in response to a request from Dutch trading firms for a new entrant to compete with the dominant Euronext exchange.³⁷ The Dutch firms were dissatisfied with Euronext for a variety of reasons, including high fees and unreliable trading systems.³⁸ Despite this seemingly promising opportunity for a new competitor, DTS was able to divert only a very low percentage of trading volume from Euronext.³⁹ One important factor that enabled Euronext to maintain its market share was its decision to lower trading fees by as much as 50% in response to the new competitor. This example of what a little competition can do for exchange fees is unlikely to have passed unnoticed in the U.S. when market participants considered the prospect of an NYSE-Nasdaq duopoly.

An economic study of the DTS experience made some interesting findings.⁴⁰ First, the study found that market quality appeared to improve significantly, despite the limited competitive success of DTS. While spreads stayed about the same, the consolidated displayed depth for the multiply-traded Dutch stocks increased by nearly 100% after the commencement of quoting on both DTS and Euronext.⁴¹ Second, the study found that the ability of DTS to compete was hampered by an apparent failure of trading firms to use effective smart routers linked to DTS. For example, Euronext frequently traded through better-priced quotes on DTS. The study concluded that both the ability of DTS to compete, and the beneficial effect on market quality, would have been greater if more trading firms had used smart routers to access better-priced DTS quotes.⁴² A stronger duty of best execution might have been helpful as a means to encourage brokers to route their orders to better prices that were immediately and automatically accessible on DTS, rather than executing their customers' orders at an inferior price on the dominant exchange.

36. James McAndrews & Chris Stefanadis, *The Emergence of Electronic Communications Networks in the U.S. Equity Markets*, 6 CURRENT ISSUES IN ECON. AND FIN., Oct. 2000, at 2.

37. U.K. COMPETITION REPORT, *supra* note 4, at 49–50.

38. COMPETITION COMM'N, PROPOSED ACQUISITION OF LONDON STOCK EXCHANGE PLC BY DEUTSCHE BÖRSE AG OR EURONEXT NV, PROVISIONAL FINDINGS REPORT 76 (Aug. 3, 2005), http://www.mmc.gov.uk/inquiries/ref2005/lse/prov_find_report.pdf.

39. *Id.* at 50.

40. See Thierry Foucault & Albert J. Menkveld, *Competition for Order Flow and Smart Order Routing Systems*, (European Business Schools Librarians' Group, Working Paper No. 831, 2006), available at http://www.hec.fr/hec/fr/professeurs_recherche/upload/cahiers/CR831Foucault.pdf.

41. *Id.* at 28.

42. *Id.* at 32.

A third natural experiment on the costs and benefits of competition among markets is provided by comparing the market structures for NYSE stocks and Nasdaq stocks in early 2004. The two market structures provide an interesting natural experiment because of their contrasting levels of competition and consolidation. At that time, the NYSE floor retained approximately a 75% share of trading in its listed stocks, while still operating a manual trading mechanism that did not offer full automated access to displayed quotations.⁴³ In contrast, the market for Nasdaq stocks was automated, but seriously fragmented with trading volume split among many different markets, including Nasdaq, Inet, Arca, other ECNs, and market makers.⁴⁴ As a result, the respective market structures for NYSE and Nasdaq stocks in 2004 allow one to compare the market quality of, first, a centralized, manual market with little effective competition, and, second, a highly fragmented, automated market with vigorous competition.

As part of the Commission's review of market structure issues for Regulation NMS, the Commission staff examined comparative market quality for NYSE and Nasdaq stocks during the first part of 2004. Commentators opposed to the Regulation NMS proposals had asserted that trading in Nasdaq stocks was more efficient than trading in NYSE stocks, and that therefore there was no empirical basis for the Commission to adopt a trade-through rule for Nasdaq stocks.⁴⁵ To assess these comments, Commission staff analyzed a variety of indicators of market quality, including: short-term volatility; quoted, effective, and realized spreads; fill rates for marketable limit orders; and displayed depth.⁴⁶ The Commission found that the staff studies did not support the commentators' claim that trading in Nasdaq stocks was more efficient than trading in NYSE stocks. Rather, it concluded that both markets had weaknesses that could be addressed by updated and strengthened protection against trade-throughs.⁴⁷ Subsequently, the Government Accountability Office (GAO), as part of its report on the effect of decimal trading, studied trading in NYSE and Nasdaq stocks and made findings that are consistent with the Commission staff's studies.⁴⁸

The staff and GAO studies offer useful data for evaluating the potential costs of fragmentation. The staff studies found, for example, that short-term volatility was significantly higher for Nasdaq stocks than for comparable NYSE stocks, particularly for stocks that fall outside the top tier of trading

43. Regulation NMS, Exchange Act Release No. 49,325, 69 Fed. Reg. 11,126, 11,128 (Mar. 9, 2004) (proposing release); Regulation NMS, Exchange Act Release No. 51,808, 70 Fed. Reg. 37,517-18 (June 29, 2005) (adopting release).

44. Regulation NMS, 69 Fed. Reg. at 11,128 (proposing release).

45. Regulation NMS, 70 Fed. Reg. at 37,506 (adopting release).

46. *Id.* at 37,515, 37,600.

47. *Id.* at 37,512.

48. See GAO Report, *supra* note 32.

volume.⁴⁹ Consistent with this finding, the GAO study found that displayed depth for Nasdaq stocks was approximately one-half of the displayed depth for comparable NYSE stocks.⁵⁰ In addition, the GAO study found that, while spreads were comparable for the top tier of actively traded stocks, spreads in stocks with less trading volume generally were wider for Nasdaq stocks than NYSE stocks.⁵¹ Finally, the GAO examined the transaction cost data for institutional investors generated by three private vendors of transaction cost analyses. Consistent with GAO's findings on displayed depth and spreads, the vendor data showed that institutional transaction costs were higher for Nasdaq stocks than NYSE stocks.⁵²

These three experiments suggest varying conclusions on the benefits of market competition and the costs of market fragmentation. The Order Handling Rules and DTS examples suggest that a market structure with an overwhelmingly dominant market can be improved by the entry of new competitors. The DTS example particularly suggests that MiFID could prompt substantial improvements in the European equity markets if, as intended, it successfully enables new markets to challenge the dominant markets for trading share in their listed stocks. But the NYSE-Nasdaq example suggests caution. A highly fragmented market with superior technology may not, in fact, produce better prices for investors than a manual market with significantly consolidated order flow, particularly for investors in the thousands of smaller companies with stocks that fall outside the top tier of active trading. The severity of the adverse effects of fragmentation may well increase as trading volume decreases.

V. CONCLUSION

In adopting Regulation NMS, the Commission concluded that the market structure for both Nasdaq and NYSE stocks would be improved—though in different ways that reflect their current structural differences—by an updated and strengthened trade-through rule that protects only those displayed quotations that are immediately and automatically accessible.⁵³ The SEC noted that the new rule would promote competition by new or smaller markets with larger markets by assuring the markets that, if they display the best prices, they will attract order flow and cannot simply be ignored by participants in dominant markets.⁵⁴ The Commission also expected that the new rule would help promote greater depth and liquidity and reduce investor transaction costs.⁵⁵

49. Regulation NMS, 70 Fed. Reg. at 37,515.

50. See GAO Report, *supra* note 32, at 33 fig.8.

51. See *id.* at 11–12 tbls.1&2.

52. See *id.* at 98–99 figs.17 & 18.

53. See Regulation NMS, 70 Fed. Reg. at 37,506.

54. *Id.* at 37,607.

55. See *id.* at 37,511–12, 37,537, 37,606–07.

Events since the adoption of Regulation NMS indicate that the prospect of strengthened trade-through protection has boosted the competitive opportunities of smaller markets. The effects of the new rule on market quality and investor transaction costs, however, remain to be seen. These effects will play out over the coming months as the new trade-through rule is fully implemented. It will be quite interesting to see the new data, generated by another natural experiment, on the effects of regulatory change on equity market competition and fragmentation.