

**Public Interest Comment on
The Securities and Exchange Commission's Request for Comment on
ISSUES RELATED TO MARKET FRAGMENTATION¹**

The Regulatory Studies Program (RSP) of the Mercatus Center at George Mason University is dedicated to advancing knowledge of the impact of regulation on society. As part of its mission, RSP employs contemporary economic scholarship to assess rulemaking proposals from the perspective of the public interest. Thus, our response to the Securities and Exchange Commission's request for comment on issues related to market fragmentation do not represent the views of any particular affected party or special interest group, but are designed to evaluate the effect of the Commission's proposals on overall consumer welfare.

The Securities and Exchange Commission (SEC) is concerned that when the same security trades in multiple locations, "market fragmentation" might prevent investors from getting the best possible terms of trade. However, to the extent that fragmentation poses problems, they are government-created, and would not be solved with additional regulations, centrally mandated linkages, or uniform and cumbersome disclosure systems. There is little evidence that the problems the Commission fears from fragmentation are significant. Some alleged sources of fragmentation, such as internalization and payment for order flow, also possess offsetting benefits, because they allow brokerages to lower trading costs for themselves and their customers. Far from creating "fragmentation," competition among market centers and market participants encourages low trading costs, price discovery, transparency, market efficiency and innovation.

Market centers have incentives to promote their competitive advantages in execution and order processing in order to increase trading volume. In a competitive environment, investors will be able to choose the market centers or other execution venues that provide them with the combination of features that best meets their demands. Over time, as investors converge upon the most liquid market centers that satisfy their demands at the lowest cost, markets will become less fragmented and more efficient. By promoting an environment where competition rules the day, the SEC can best ensure that fragmentation and its alleged problems are minimized.

I. Background

The New York Stock Exchange recently proposed to repeal its Rule 390, which prohibits exchange members from engaging in off-exchange trading of many exchange-listed

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securities in certain situations. The Commission notes that, because Rule 390 tended to promote concentration of trading interest for NYSE-listed securities at the NYSE, it has been criticized as a restraint on competition among market centers, which prevents investors from getting the best possible terms of trade. Now that the NYSE has recommended repealing the rule, the Commission has expressed concern that trading of the same security in multiple locations might prevent investors from getting the best possible terms of trade. The NYSE's proposal has become a catalyst for the Commission to initiate a broader inquiry into the effects of "market fragmentation" – the trading of the same security in multiple locations.

Conceptually, the type of "fragmentation" that concerns the Commission occurs whenever a security trades in multiple locations, and those locations are not linked in a way that would let a trader in one location fill an order displayed in another location. In practice, the Commission expresses special concern about two sources of fragmentation:

- *Internalization*, which occurs when a broker-dealer matches buy and sell orders internally without exposing them to competing orders in other trading locations; and
- *Payment for order flow*, which occurs when a broker or dealer receives compensation to route the orders it originates to a particular market center, stock exchange, broker or dealer.

In both cases, the Commission fears that some investors might not receive the best possible terms when they buy or sell, due to the limited ability of other traders to compete with the broker-dealer who internalizes orders or pays for order flow.²

The Commission asks commenters to consider a wide variety of potential remedies. The least intrusive proposal would require market centers and brokers to disclose how they route their orders and execute trades, so investors can better evaluate the quality of execution they are likely to receive. The most radical proposal would establish a "National Linkage System" (also called a "central limit order book" or CLOB by many in the industry) that would display orders and quotations of all market centers. This system would also give trading priority to the first trader who improves on the best displayed bid or offer; the first party to improve the price would be first in line to trade with anyone else.³

II. The Commission's Analysis and Economic Theory

The *Request for Comment* presents two quite distinct theories purporting to explain how market fragmentation can reduce traders' incentive to offer vigorous quote competition. First, fragmentation is alleged to increase the odds that a price-improving trader's order

² *Request for Comment*, pp. 10-11. All references to page numbers refer to pagination that results when the html version of the document is printed out on paper.

³ *Request for Comment*, pp. 16-19.

will go unexecuted, because other traders can match that trader's offer. Second, fragmentation is alleged to make it easier for traders who fail to match the best offer to get order flow, even though they do not offer the best price.⁴ In other words, fragmentation is alleged to harm investors both because it encourages price matching, and because it does not!

A. Price matching

The *Request for Comment* suggests that market fragmentation reduces incentives for vigorous quote competition, because dealers in one market center have no obligation to route their orders to a trader in another market center whose bid or offer represents the best price available. Instead, dealers can simply match this offer, and the price-improving trader's order may go unfilled. Faced with this prospect, some traders might decline to quote as vigorously as they otherwise would.

At first glance, this incentive argument sounds plausible, but it involves a *non sequitur*. Price matching is not unique to fragmented markets. Price matching can occur in non-fragmented markets as well. In fact, it can occur in any market other than the very special and unusual one in which the price-improving trader is explicitly guaranteed first priority to trade with anyone else. Market fragmentation is the root cause neither of price matching nor of the incentive problems alleged to be associated with price matching.

Is price matching a problem at all? Ordinary intuition suggests that price matching is a desirable aspect of competitive markets. After all, when grocery chains, furniture stores, or car dealerships match competitors' prices, most people regard this as a sign of vigorous competition, rather than as a threat to competition. Price matching is a normal means by which the benefits of competition spread through a market.

There is, however, one hypothetical scenario in which price matching could diminish the efficiency of financial markets, and hence harm investors. If information is costly and the price offers of informed investors convey all relevant information about each stock's future prospects, uninformed investors can "free ride" on the informed investors' expenditures on information simply by observing (and matching) stock prices. Since the prices reveal all relevant information, an informed investor would be better off if he simply matched the price offer of some other informed investor and saved himself the cost of buying or producing information. But if all informed investors decided to free ride, then no one would bother to become informed. All investors would be worse off as a result, because stock prices would fail to reflect much useful information.

This kind of market failure, however, occurs only in a rarified theoretical world in which stock prices reflect all relevant information, both public and private. In such a world, stock prices are "sufficient statistics" that summarize all information worth knowing.⁵ Empirical analysis generally rejects this strong version of the "efficient markets" hypothesis.⁶

⁴ These two problems are presented in adjoining paragraphs on page 3 of the *Request for Comment*.

⁵ See Sanford J. Grossman, "On the Efficiency of Competitive Stock Markets When Traders Have Diverse Information," *Journal of Finance* 31 (May 1976), pp. 573-85; Sanford J. Grossman and Joseph E. Stiglitz,

There are two reasons free riding is unlikely to become a problem that hampers the efficiency of financial markets:

1. Traders in real-world markets cannot simply be described as “informed” or “uninformed;” rather, different traders possess information of varying scope and accuracy. As a result, a trader who seeks to free ride on a second trader’s investment in information can never be sure if the second trader’s information is complete, or even true.
2. Even very well-informed traders can often prevent others from learning their identity when they make offers, so it is difficult for others to free ride on the offers of traders known to be well-informed.

Commonsense observation reveals that many investors devote a great deal of time and resources to acquiring information. This suggests that there are ample opportunities in the stock market to profit from information acquisition. Although price matching occurs, it apparently leaves plenty of incentive for investments in information.⁷

B. “Captive” order flow

Internalization and payment for order flow could theoretically prevent investors from getting the best possible prices (and/or other terms) when they buy or sell, because orders handled in this way do not necessarily have the opportunity to trade against the best offers made in the marketplace. The broker’s fiduciary duty to provide customers with best execution counters this tendency somewhat. However, “best execution” does not necessarily mean that customers must receive the best possible price or other terms available anywhere in the market. The provision of best execution concerns a number of characteristics, including not just price but also speed of execution, anonymity, transparency, liquidity, and transactions costs. From the customer’s perspective, “best execution” does not necessarily mean best price, but entails a variety of factors that vary with the customer and the trades involved.⁸

“Information and Competitive Price Systems,” *American Economic Review* 66 (May 1976), pp. 246-53; Sanford J. Grossman and Joseph E. Stiglitz, “On the Impossibility of Informationally Efficient Markets,” *American Economic Review* 70:3 (June 1980), pp. 393-408..

⁶ See Burton Malkiel, “Efficient Market Hypothesis,” in John Eatwell, Murray Milgate, Peter Newman, eds. *The New Palgrave Finance* (New York: The Macmillan Press Limited, 1989). Also, Pu Liu, Stanley D. Smith, and Azmat A. Syed, “Stock Price Reactions to the *Wall Street Journal’s* Securities Recommendations,” *Journal of Financial and Quantitative Analysis* 25 (Sept 1990) is first of many papers to find that prices react to publication of tips and recommendations thought to emanate from Wall Street insiders.

Rejection of the strong efficient markets hypothesis need not mean that markets are subject to remediable market failures. Disequilibrium prices may provide wide scope for entrepreneurial activity that improves the allocation of resources. See Esteban Thompson, *Prices and Knowledge: A Market-Process Perspective* (London: Routledge, 1992), Ch. 3.

⁷ Some theories (e.g., Grossman and Stiglitz 1976) suggest that traders might even over-invest in information, because some trading profits represent a mere transfer of wealth from one trader to another, rather than new wealth created by improved resource allocation.

⁸ *Request for Comment*, pp. 12-13.

Even if orders are not executed at the best possible price, it would be a mistake to assume that internalization and payment for order flow systematically cheat investors. If financial firms that engage in these practices earn excess returns, competition will tend to redistribute those returns to investors in some way. For example, brokers often give investors a discount on commissions when the order is crossed internally. Similarly, firms that pay for order flow usually offer lower commissions.⁹ Financial firms can also share lower trading costs and payments for order flow with investors by offering better financial planning and other personalized services, more market information, bonuses for opening new accounts, and myriad other ways limited only by investor demands and the creativity of marketing executives.

The combination of payment for order flow and low commissions might even represent an informational efficiency. Financial firms convert factors that are difficult for investors to monitor and verify (Did I really get the best price available at the time I placed my order?) into factors that are easier to monitor and verify (Did I get the lowest possible commission?) Financial firms can avoid such rebates to customers only if they can collude effectively across all margins.

III. Empirical Evidence Suggests No Systematic Problem

The *Request for Comments* raised concerns that internalization, payment for order flow, and market fragmentation, in general, may harm price discovery. Price discovery occurs as information regarding the value of the stock to buyers and sellers is impounded through trading into the price. Price improvement occurs when the price at which an order is executed is better than the previously displayed best bid or offer. Substantial evidence indicates that the market centers, in particular the NYSE, are the primary sites of price discovery and most likely to price improve.¹⁰ Research into this question indicates that order flow to the NYSE increases significantly when a trader on the NYSE posts a better price. Order flows to exchanges that compete with the NYSE also increase substantially when a trader on one of those exchange posts a price better than that offered on the NYSE.¹¹ Similarly, Nasdaq broker-dealers attract greater order flow when they offer prices that improve on the spread.¹²

This empirical research casts doubt on the supposition that many traders who post the best price do not see their trades executed, therefore losing the incentives to price improve. The

⁹ E.g., Robert Battalio, "Third Market Broker-Dealers: Cost Competitors or Cream Skimmers?," *Journal of Finance* 52:1 (March 1997), pp. 341-52; Robert Battalio, Robert Jennings, and James P. Selway, III, "Payment for Order Flow, Trading Costs, and Dealer Revenue for Market Orders at Knight Securities, L.P.," NASD Working Paper 98-03 (August 1998).

¹⁰ Joel Hasbrouck, "One Security, Many Markets: Determining the Contributions to Price Discovery," *Journal of Finance* 50(4) (September, 1995), pp.1175-1199.

¹¹ Marshall E. Blume and Michael A. Goldstein, "Quotes, Order Flow, and Price Discovery," *Journal of Finance* 52:1 (March 1997), pp. 221-244.

¹² Mark Klock and D. Timothy McCormick, "The Impact of Market Maker Competition on Nasdaq Spreads," NASD Working Paper No. 98-04 (October 1998), pp. 11-12.

evidence shows that price improvement is rewarded with an increase in market share. Anecdotal claims to the contrary are not supported by empirical research.

IV. “Fragmentation” Produces Offsetting Benefits

Even if markets are fragmented to some degree, the opportunity for competition produces some benefits that could offset the costs of fragmentation that are the focus of the SEC’s concern. Competition between market centers creates pressure to cut transaction costs, and it also provides opportunities for market centers to differentiate themselves in order to attract investors with different types of transaction demands. As investor demands change, competition also gives market centers an incentive to respond with continuous experimentation and innovation.

A. Cost competition

When traders can take their business elsewhere, market centers have incentives to keep both explicit and implicit transactions costs low. For example, it is widely known that in 1989, Goldman Sachs redirected some of its order flow from the NYSE to the Midwest (now Chicago) Stock Exchange to pressure NYSE specialists to cut their fees.¹³ Finance research finds that bid-ask spreads are lower when competition among markets increases.¹⁴ Recent research shows that the entry of so-called “third-market” competitors, who often pay for order flow, is associated with narrower bid-ask spreads.¹⁵ Commission Chairman Arthur Levitt has also cited the example of options markets, where trading of options in multiple market centers has reduced spreads by between 15 and 42 percent.¹⁶

B. Differentiation

The extent to which trading activity is fragmented can be attributed in part to differentiation in trader demands and the type of executions provided by competing markets. In addition to trading costs, including commissions and the bid-ask spread, a trading system or exchange must compete on the basis of how well it meets investor demands regarding the types of assets, order size, and even the time of transaction.¹⁷ Consequently, different types of traders may seek to trade in different markets depending on the liquidity effects and transactions costs associated with their particular demands.

¹³ Marshall E. Blume and Michael A. Goldstein, “Quotes, Order Flow, and Price Discovery,” *Journal of Finance* 52:1 (March 1997), p. 224.

¹⁴ Jeffrey L. Davis and Lois E. Lightfoot, “Fragmentation Versus Consolidation of Securities Trading: Evidence from the Operation of Rule 19c-3,” *Journal of Law and Economics* (April 1998). Tom McInish and Robert Wood, “Price Discovery, Volume, and Regional/Third Market Trading,” Working Paper, Memphis State University (1992).

¹⁵ Battalio (1997), op.cit., p. 347.

¹⁶ See www.sec.gov/news/spchindx.htm#chair.

¹⁷ Marco Pagano, “Trading Volume and Asset Liquidity,” *Quarterly Journal of Economics* 104 (1989), pp 25-74, finds that differences in initial risk exposures due to different trader endowments may result in alternative markets for trading the same asset.

While many like to point to ways in which the securities markets differ from other markets, such as the market for food, there are important similarities. For example, customers may be willing to pay more for food at a convenience store because they can obtain it faster or in a smaller quantity than at a grocery store. Investors' demands for securities are similarly differentiated. Some investors value immediacy, and they realize an implicit cost when slow execution of their orders exposes them to risks associated with changing market conditions and holding inventory.¹⁸ Individuals or institutions that use an exchange, or any other trading system, face some combination of explicit and implicit costs as a result of these factors. Investors seek to use the trading system or exchange that minimizes their total costs, while satisfying their preferences for immediacy and quality executions.

The definition of execution quality varies with the investor, and it encompasses the elements of price, speed of execution, anonymity, transparency, liquidity, and transactions costs, both explicit and implicit. Explicit costs of trading include brokerage commissions, exchange fees, and the bid-ask spread. In addition to implicit costs associated with inventory holding or slow executions, other implicit costs include the potential price impact of a large trade and the associated effect on price discovery. Different investors will choose to trade in the markets providing them with the combination of execution quality and transaction costs that best fits their preferences.

Recent studies in finance find that no one market or particular type of trading system dominates in all aspects of market quality.¹⁹ As a result, the current "fragmented" environment, which allows for different types of markets to coexist and compete, affords investors and their agents the ability to route their orders to the market that best fits their individual demands.

Since investors' demands vary and are known best by the investors themselves, a market structure that allows for competition among market centers and dealers, and then allows investors to choose among the competitors, is in the public interest. Exchanges or brokerages can then compete on the basis of best execution. In order to attract order flow, exchanges and brokerages have incentives to disclose their competitive advantages over other trading mechanisms. For example, brokerages that advertise that they do not accept payment for order flow, but rather route customer orders to the market posting the best price, would likely increase their market share of customers for whom execution price is paramount.

V. Costs of Proposed Remedies Could Outweigh Benefits

Even if market fragmentation creates some costs that outweigh any associated benefits, it does not automatically follow that Commission intervention will make investors better off.

¹⁸ Sanford J. Grossman and Merton H. Miller, "Liquidity and Market Structure," *Journal of Finance* 43, (1988), pp. 617-633.

¹⁹ Robert Battalio, Brian Hatch, and Robert Jennings, "Dimensions of Best Execution for Market Orders: Assessing Differences between the NYSE and the Third Market," Indiana University Working Paper, December 1, 1999.

New government regulations also impose their own costs that could easily offset any possible benefits. To improve investor welfare, any new regulation must produce benefits that exceed the additional costs. A review of the options for addressing market fragmentation, spelled out in Section C.2 of the *Request for Comments*, reveals that many would impose substantial net costs. To illustrate the potential for new regulation to create substantial costs, we consider the two least restrictive proposals, as well as the most restrictive one.

A. Require greater disclosure by market centers and brokers concerning trade executions and order routing

While this is the least interventionist option, its costs should not be ignored. Disclosure is not free. Disclosure involves administrative costs, and it could generate other, unintended consequences. As Nobel laureate George Stigler noted in his classic analysis of the economics of information, “Ignorance is like subzero weather: by sufficient expenditure its effects on people can be kept within tolerable bounds, but it would be wholly uneconomic entirely to eliminate all of its effects.”²⁰

Mandatory disclosure also assumes that all investors want, and are willing to pay for, the same information. It therefore precludes the possibility that some investors might prefer to have less information and lower costs. Long-term investors, for example, may regard information on best execution as relatively trivial. If all securities firms and market centers were required to disclose a list of information on execution and order routing, firms would have no incentive to specialize in serving investors who have little use for such information. In essence, uniform disclosure discourages differentiation in information provision that allows firms to satisfy investor demands for information and lower costs.

The best way to ensure that disclosure of trade execution and order routing policies passes a cost/benefit test is to avoid mandating it. If the value of this information to some or all investors exceeds its costs, then some or all market centers and brokers will find it profitable to provide it. Willingness to disclose such information becomes yet another competitive advantage in the quest for order flow from investors who actually want to know how their orders are handled. At least some market centers and brokers will engage in disclosure unless all somehow manage to collude in hiding this information from investors. Even if collusion were to occur, the appropriate regulatory response is to prohibit the collusion, not mandate disclosure by everyone.

B. Restrict internalization and payment for order flow

Several decades ago, Nobel laureate Ronald Coase lamented, “[I]f an economist finds something – a business practice of one sort or another – that he does not understand, he

²⁰ George J. Stigler, “The Economics of Information,” *Journal of Political Economy* Vol. 69 No. 3 (June 1961), pp. 213-225.

looks for a monopoly explanation.”²¹ A similar phenomenon has occurred with internalization and payment for order flow. While the Commission has not explicitly claimed that these practices are evidence of monopoly, much discussion implicitly assumes that they indicate some type of market failure and serve no useful purpose.

Payment for order flow occurs when brokers sell customer orders to trade stocks to specific dealers or trading sites. The orders are then executed at no worse than the National Best Bid or Offer (NBBO). The SEC is concerned that internalization and payment for order flow harm price discovery, because pockets of orders are executed away from market centers and the information content of those orders does not make it to the market where price is being determined. Specifically, information regarding the characteristics of that order flow, such as the volume of orders, their size, sequence, *et cetera*, is not a factor in the price discovery process and therefore is not impounded into the NBBO. This is important, since the NBBO is the price at which internalized and purchased order flow will most frequently be executed. Thus, potential negative effects on customers derive from the possibility that the NBBO itself will not be as good as it could be.

Studies have found that internalization and payment for order flow do result in “cream-skimming,” or diversion of retail market orders that are generally low risk and low cost executions to the exchange or brokerage that makes payment.²² However, scholarly research has yet to uncover empirical evidence that prices, spreads, or trading costs in the market centers are worse as a result of these practices.²³ There is no evidence to date that price efficiency — the degree to which prices reflect relevant information about the value of the stock — is harmed by internalization or payment for order flow.

While internalization and payment for order flow do result in a diversion of orders from market centers such as the NYSE or Nasdaq, the quality of execution does not appear to be compromised, since payments are associated with lower commission rates for customers. Given competition among brokers for customers, simple economics suggests that over time, profits derived from payment for order flow will be competed away. This is consistent with the evidence that some or all of the payments brokers receive for order flow are ultimately rebated to investors in the form of lower commissions or other benefits.²⁴ Financial firms can rebate the profits to investors by offering better services, better market information, or any other services or financial rewards that investors value.

²¹ Ronald H. Coase, “Industrial Organization: A Proposal for Research,” in V.R. Fuchs (ed.), *Policy Issues and Research Opportunities in Industrial Organization* (New York: National Bureau of Economic Research, 1972), p. 67.

²² Jonathan R. Macey and Maureen O’Hara, “The Law and Economics of Best Execution,” *Journal of Financial Intermediation* 6 (1997), pp. 188-223.

²³ Blume and Goldstein (1992), Charles Lee., “Market Integration and Price Execution for NYSE-Listed Securities,” *Journal of Finance* 48 (1993), pp.1009-38, Battalio (1997), and Battalio, Greene and Jennings (1997).

²⁴ See Section II.B above.

In fact, recent research finds that liquidity is not necessarily worse as a result of payment for order flow, and entry of so-called third-market competitors is associated with narrower bid-ask spreads.²⁵ Even with payment for order flow, broker-dealers still have incentives to offer prices that improve on the spread in order to attract order flow.²⁶ And evidence suggests that quotes that emanate from outside the market centers may still emit information that enhances the price discovery process.²⁷

Given these facts, it would be premature to conclude that internalization or payment for order flow are simply anticompetitive devices that should be restricted without further thought. At a minimum, a more comprehensive and rigorous understanding of the costs and benefits of the practices is necessary to justify any further regulation.

C. Establish price/time priority for all displayed trading interest

The Commission's most interventionist option would establish a "National Linkage System" (NLS) (also called a "central limit order book" or CLOB by many in the industry²⁸) that would display orders and quotations of all market centers. This system would also give trading priority to the first trader who improves on the best displayed bid or offer; the first party to improve the price would be first in line to trade with anyone else. A market maker could be a principal to a transaction only if it offered terms that improved on the best terms displayed in the NLS.²⁹

If a goal of the congressionally mandated National Market System is to encourage a competitive market, then the National Linkage System would be counterproductive, because it would effectively eliminate competition between market centers.³⁰ A diverse assortment of competing trading venues would be replaced with some industry participants' vision of the "one best system."

A significant problem with this proposal is that it assumes that price is the most important criterion to all investors, and so the trader who offers the best price goes to the head of the line. Advocates of this proposal have been beguiled by static economic models of perfect markets, in which price competition is the only form of competition that exists. But the perfect market model focuses on price competition not because other forms of competition are inherently inferior, but rather because the purpose of the model is to aid researchers in understanding the factors that determine equilibrium prices. For the sake of simplicity and clarity, all other complicating factors (such as nonprice forms of competition) are assumed to be held constant. If the goal is to understand fully how competition works in real-world markets, however, models that explicitly incorporate other forms of competition are

²⁵ Battalio (1997), op. cit., p. 347.

²⁶ Mark Klock and D. Timothy McCormick, "The Impact of Market Maker Competition on Nasdaq Spreads," NASD Working Paper No. 98-04 (October 1998), pp. 11-12.

²⁷ Hasbrouk (1995), op. cit., p. 1192.

²⁸ Matthew Andresen, "Don't CLOBber ECNs," *Wall Street Journal* (March 28, 2000).

²⁹ *Request for Comment*, pp. 16-19.

³⁰ Marshall Blume and M. Goldstein suggest that "full integration through a consolidated limit order book would eliminate the competition among markets that now exists."

required.³¹ And if the Commission's goal is to determine which policies best serve investors, then it must explicitly recognize that different types of investors care about many factors in addition to prices. Even the concept of "best execution" is multi-faceted, including not just price but also speed of execution, anonymity, transparency, liquidity, and transactions costs.³²

By reducing or eliminating the rewards for differentiation, a monolithic market focused solely on price competition also destroys incentives for market centers to innovate and improve their execution quality, including factors such as speed of execution. If market centers can compete on these factors, then they can gain competitive advantages through continuous improvement. If market centers cannot compete on these factors, then they have little reason to improve. For this reason, the creation of a central limit order book would likely entail ongoing, dynamic efficiency costs far higher than those implied merely by elimination of the differentiation that currently exists among market centers.³³

In evaluating the NLS, the Commission would do well to consider the analogous debate over the merits of centralized power exchanges vs. bilateral contracting in competitive electricity markets. Some argue that since electricity is a homogeneous commodity, all buyers and sellers of electricity should be forced to transact through a centralized exchange that would generate efficient prices to equate supply and demand. Proponents of bilateral trading pointed out that while physical electricity is homogeneous, electricity transactions can have quite diverse characteristics:

While it is true that one generator's power is physically identical to that produced by other generators, there is plenty of room for diversity in the terms and conditions of the contract under which the power is bought and sold. Different buyers may want to contract for power a few hours ahead, a day ahead, or weeks or months ahead. They may want very firm delivery commitments that cannot be interrupted except in dire emergency, or they may be quite willing to accept interruptions in exchange for a lower price. Some buyers or sellers might want to deal only with the most reputable parties, while others might be willing to accept a greater risk that the other party will default in exchange for a better price or other contract terms. Some might be willing to bear a great deal of price risk, while others may want various types of price guarantees.³⁴

In general, the debate in various states over centralized power exchanges appears to be settled the way it was settled in California: a power exchange was created, but only

³¹ See Shelby Hunt, *A General Theory of Competition* (New York: Sage, 2000), and Jerry Ellig (ed.), *Dynamic Competition and Public Policy: Technology, Innovation, and Antitrust Issues* (New York: Cambridge University Press, forthcoming).

³² See Section IV.B above.

³³ This prediction is consistent with the finding that the dynamic costs of economic regulation in other industries are often far larger than the static efficiency losses created by misallocation of resources. See Clifford Winston, "Economic Deregulation: Day of Reckoning for Microeconomists," *Journal of Economic Literature* 31 (September 1983), pp. 1263-1289.

³⁴ Jerry Ellig and Robert Michaels, *Electricity Passes the Market Test: Price Spikes in the Summer of 1998* (Mercatus Center, November 1998).

utilities were required to use it, and only then for a limited time, because they are believed to possess market power in electricity generation. Other traders are free to use the power exchange or engage in their own deals. An analogous approach in securities trading would be to allow public order books as an option. In a sense, this voluntary option already exists now in the form of Electronic Communication Networks.

The regulatory desire to create “perfect” national markets also overlooks the fact that theoretical models of centralized, frictionless markets are metaphors that help describe what real markets actually accomplish. We do not have a centrally-organized, national market for computers, used cars, or furniture, but existing marketplace institutions generally manage to move these resources to the buyers who value them most highly. In the absence of regulatory mandates, a “National Market System” for such commodities will only arise if the transaction cost savings outweigh the additional costs associated with setting up such a system.

D. Commission proposals will impose net costs

Market fragmentation probably creates net benefits. Even if it creates net costs, they are likely small. The benefits of the regulatory options the Commission considers are unlikely to outweigh the associated, substantial costs. However, the Commission could pursue several market-based options that offer significant potential to reduce any costs that market fragmentation creates while imposing little or no new costs of their own.

VI. The Real Problem, and Market-Based Solutions

The SEC is concerned that competition in trade execution has contributed to fragmentation by permitting trading mechanisms that free ride on price discovery at the major exchanges. Ironically, some of the competition that gives rise to fragmentation can be traced to the response of market participants to federal policy. At the behest of the government, the Intermarket Trading System, Consolidated Tape Association (CTA), and CQS were developed by the exchanges. Exchanges bear the costs of their continued operation. And while these systems themselves are slow and error prone, the National Market System mandate has created the fragmentation problem by preventing the exchanges that do the most price discovery from exercising proprietary ownership over their quotation and price data. In addition, government regulations — including the affirmative obligation of market makers to “maintain fair and orderly markets,” mandatory quotation disclosure through the Consolidated Quotation System (CQS), and mandatory disclosure of transaction prices — have enabled the alternative markets to expropriate effectively some of the returns from exchange price discovery.³⁵ In essence, government mandates are the primary vehicles on which free-riding occurs.

³⁵ See Hans Stoll, “Reconsidering the Affirmative Obligation of Market Makers,” *Financial Analysts Journal*, Charlottesville 54 (Sep/Oct 1998), pp. 72–82 regarding externalities associated with the affirmative obligation. Regarding information dissemination, see Marshall E. Blume and Michael A. Goldstein, “Quotes, Order Flow, and Price Discovery,” *Journal of Finance* 52(1), (March 1997), pp. 221-244.

CTA and CQS are systems required by regulation to promote the price discovery process. However, CTA and CQS deliver information on trades that have already been executed and spread quotations on transactions of a particular size. As such, these systems are an imperfect proxy for the process of price discovery, simply because they focus on limited data generated from a more complex process.³⁶ If left to their own devices, markets will develop better mechanisms to accomplish price discovery. In a quest to gain market share, markets have developed and introduced other systems in recent years to facilitate trading that provide greater accuracy and more complete information. For example, the OptiMark Trading System allows traders to post the full depth of their demand curve, by posting the prices they are willing to buy and sell for an array of quantities. This illustrates that innovative and improved systems are possible without government mandates regarding quotation systems and information linkages across exchanges.

In this and other proceedings, the Commission has emphasized its preference for allowing competition to determine the structure of markets:

...[T]he Commission has not attempted to dictate the ultimate structure of the securities markets. Instead, it has sought to establish, monitor, and strengthen a framework that gives the forces of competition sufficient room to flourish and that allows the markets to develop according to their own genius. The Commission remains committed to allowing the forces of competition to shape market structure in the first instance.³⁷

In keeping with this emphasis, we believe that the Commission can best minimize the downside of market fragmentation by maximizing reliance on competition to promote price transparency and intermarket linkages.

A. Competition in Information Provision

At the end of March, the comment period closed for the Concept Release on *Regulation of Market Information Fees and Revenues*. In that document, the Commission expressed concern that the level of fees charged for market data might unreasonably deprive some investors of access to critical information they need to make sound decisions. The Regulatory Studies Program filed comments in that proceeding. Although we question whether the networks providing market data are pricing any investors out of the market, we are convinced that the root cause of any market power problem is that Congress and the Commission assumed that consolidation of market data on each security and option must be a monopoly. Although that may have been a valid assumption 25 years ago, it is a doubtful one to maintain today. To ensure that investors have the most affordable, useful, responsive, and innovative stock price data, the Commission should work to replace the monopoly in market data with competition. Such a move is the most effective way the Commission can promote the type of price transparency that links markets and gives all investors access to the best bids and offers available.

³⁶ Blume and Goldstein (1997), p. 225.

³⁷ *Request for Comments*, p. 13.

Such competition could occur under a system that gives market centers proprietary ownership of their price and quotation data, so that it is impossible for other market centers to free ride on the price discovery performed by the major exchanges. Alternatively, the Commission could foster competition within a system of property rights more like those that exist currently, in which market data are essentially a common pool resource. While we believe that proprietary ownership of data would promote the most robust competition among market centers, either competitive option would be preferable to the status quo or the regulatory alternatives.³⁸

B. Market-Based Linkages

The *Request for Comments* notes that the Intermarket Trading System (ITS) suffers from “restricted ECN [Electronic Communication Network] access and slow and inefficient execution procedures.”³⁹ These drawbacks are but symptoms of a larger, more basic problem. The ITS was a one-shot attempt to design a permanent system to link evolving markets. In an era of fast-changing information technology and investor demands, the Commission and the financial industry would do well to promote a flexible, evolving system of linkages between markets, rather than trying to devise the “one best system” that will eventually become as obsolete as ITS is now.

Market-based linkages can take several forms. The most obvious method would be for exchanges and other market centers to forge their own, bilateral links. Island ECN has proposed this type of arrangement in lieu of ITS. The ECN’s executives complain that they cannot slow down the operation of their own system to mesh with the ITS’ one to two minute response time. Instead, Island is willing to establish a direct link with any market center or dealer, and it has also offered to staff a telephone desk guaranteed to respond at least as quickly as ITS.⁴⁰

Another possibility is that brokers will develop their own, direct links to multiple markets. Instead of routing orders through one market center to another, a broker could simply search all market centers for the one offering the best prices or other execution attributes. Charles Schwab noted in February 2000,

Various firms, including the one we bought earlier this month, have developed routing technologies (message switches) that send orders to the market that quotes most aggressively. (Indeed, the ingenuity of these private vendors takes this technology one step further, considering not only which market was first to quote the best price, but also which market has been the most aggressive in quoting the best price throughout the trading day.) If customers perceive a need, this

³⁸ For a full elaboration, see Regulatory Studies Program, “Public Interest Comment on the Securities and Exchange Commission’s Concept Release on Regulation of Market Information Fees and Revenues” (March 30, 2000), available at www.mercatus.org.

³⁹ *Request for Comments*, p. 12.

⁴⁰ Island Press Release (April 3, 2000) and authors’ subsequent interview with Island executives.

technology will become more widely available and we'll see more routing along these lines, thereby incenting more aggressive quote competition.⁴¹

It is worth noting that not all investors or traders need access to intermarket linkages or routing technologies in order for efficient price discovery to occur. As long as such linkages are available to some traders, those traders can earn arbitrage profits by engaging in transactions that introduce new information into prices and transmit price adjustments across market centers. Further, even those who engage in internalization and accept payment for order flow use the market centers to manage their inventory and to obtain price improvement when it is available.⁴² Since traders access multiple markets to perform arbitrage, inventory management, and market making, information flows between the markets in both directions: price discovery occurs and orders executed off the market benefit as a result.

Telecommunications technology no doubt makes other options possible — including options that would let individual investors use their own computers to direct their orders to the market center offering the best quotes. At best, a single intermarket system would duplicate the results of a decentralized, bilateral system. At worst, it would supplant a great deal of the creativity, experimentation, and innovation that a decentralized system naturally fosters.

There are two ways the Commission can foster experimentation with multiple approaches to intermarket linkage:

- Refrain from pressing the industry to develop a monolithic replacement for ITS.
- Approve proposals from individual market centers and dealers to create their own links to other market centers and dealers.

VII. Conclusions

The type of “market fragmentation” that concerns the Commission occurs whenever a security trades in multiple locations, and those locations are not linked in a way that would let a trader in one location fill an order displayed in another location. The Commission also expresses special concern about two sources of fragmentation: internalization and payment for order flow.

The *Request for Comments* hypothesizes that fragmentation can lead to two types of problems. First, fragmentation is alleged to create a free-rider problem on investments in information, because price matching increases the odds that a price-improving trader's order will go unexecuted. Second, fragmentation is alleged to make it easier for traders

⁴¹ Prepared Testimony of Charles Scwhab, before the Senate Committee on Banking, Housing, & Urban Affairs (Feb. 29, 2000).

⁴² Blume and Goldstein (1997), p. 227, suggest that inventory risk may lead market makers to send their purchased orders to the market with the best bid or offer.

who fail to match the best offer to get order flow, even though they do not offer the best price.

The *Request for Comments* essentially seeks the answers to two questions:

1. To what extent is market fragmentation a genuine problem?
2. What, if any, regulatory response is appropriate?

The Regulatory Studies Program's analysis offers six observations that can help answer these questions:

1. The existence of competing traders willing to match the best price is a characteristic of most competitive markets, regardless of whether they are fragmented in the Commission's sense of the term or not. Therefore, fragmentation cannot be the cause of free-riding on price improvers' investments in information.
2. Even in theory, price matching can only cause free rider problems if markets are so efficient that securities prices reflect all relevant information about future performance — including information that is not public. Empirical research, however, rejects this strong version of the efficient markets hypothesis, so free riding is unlikely to be a problem.
3. Other empirical research casts doubt on the claim that substantial numbers of traders who quote prices that improve on the spread fail to have their trades executed. In practice, dealers increase order flow substantially when they quote prices that improve on the spread.
4. Market fragmentation may create costs, but it also brings benefits, including better transaction prices, lower transactions costs, and a diverse array of market centers catering to the different needs of different types of traders.
5. Even if market fragmentation creates costs that exceed the accompanying benefits, proposals for new government regulation possess their own costs that could easily offset any possible benefits.
6. The principal type of free riding on price improvement that exists is due to federal policies and regulations preventing the exchanges that do most of the price discovery from appropriating the returns from their production of information.

Based on this analysis, we conclude that none of the regulatory changes in the *Request for Comments* are justified. Instead, the Commission could better serve investors by promoting competition in market data provision and market-based trading linkages among market centers.

Appendix I

RSP Checklist

SEC Request for Comments on Market Fragmentation

Element	Commission Approach	RSP Comments
1. Has the Commission identified a significant market failure?	<p>SEC discusses two types of fragmentation problems alleged to reduce traders' incentives to offer price improvement: (1) Price matching, and (2) institutional factors that supposedly force some investors to trade at prices inferior to those available elsewhere in the market.</p> <p>Poor</p>	<p>Price matching is normal behavior even in competitive markets that are not fragmented. In theory, price matching might create free riding on traders' investments in information only under highly specific assumptions that are not true in contemporary U.S. financial markets. The claim that fragmentation forces some traders to accept inferior price terms is supported by no empirical research, and published empirical studies suggest that this is not a systematic problem.</p>
2. Has the Commission identified an appropriate federal role?	<p>The SEC claims authority to impose a wide variety of regulations intended to prevent fragmentation under its authority to regulate financial markets granted by the Securities and Exchange Act Amendments of 1975.</p> <p>Good</p>	<p>The Commission presents a convincing case that it has legal authority to implement its proposed guidelines. The vast majority of securities transactions are clearly interstate if not international in nature.</p>
3. Has the Commission identified alternative approaches?	<p>The Commission offers a variety of alternatives, ranging from mandated disclosure of execution and order routing information to a centralized limit order book.</p> <p>Satisfactory</p>	<p>All of the alternatives considered are within the current regulatory paradigm. The Commission failed to consider voluntary, market-based approaches to information dissemination and establishment of trading links that would avoid some of the costs associated with more traditional regulatory approaches.</p>

<p>4. Does the Commission attempt to maximize net benefits?</p>	<p>The tone of the Commission’s questions about alternative regulatory proposals suggests that the Commission may be searching for an approach that will maximize net benefits. Whether the Commission’s ultimate decision will be justified by cost-benefit analysis remains to be seen.</p> <p>Satisfactory</p>	<p>The absence of voluntary, market-based solutions in the menu of alternatives reduces the odds that the Commission will succeed in maximizing net benefits.</p>
<p>5. Does the proposal have a strong scientific or technical basis?</p>	<p>The justification for Commission action must rest on a theory of market failure, but the Commission has done a poor job of explaining why the problems it seeks to solve satisfy the economic definition of market failure.</p> <p>Poor</p>	<p>The proposal ignores significant economic scholarship on the nature of free riding on price quotations and the welfare-enhancing properties of differentiation through nonprice competition when traders and investors are heterogeneous.</p>
<p>6. Are distributional effects clearly understood?</p>	<p>Commission’s principal distributional concern is whether investors whose orders are sold or internalized receive the best available prices when they buy or sell.</p> <p>Poor</p>	<p>Commission’s preoccupation with this perceived problem ignores two significant facts: (1) Internalization and payment for order flow often involve lower commissions for investors, and (2) Investors care about other aspects of the trade in addition to price.</p>
<p>7. Are individual choices and property impacts understood?</p>	<p>Commission assumes that market data must remain a common pool resource rather than property of the market venue that generates the information. Proposed solutions all seek the “one best way” of dealing with perceived problems.</p> <p>Poor</p>	<p>Commission’s analysis ignores the possibility that its own policies in regard to market data create incentives for negative aspects of fragmentation and opportunities for some market centers to free ride on other market centers’ price discovery. Further, its one-size-fits-all solutions to fragmentation would limit individual choice in selecting market characteristics that meet diverse investor demands.</p>