

**Why Haven't Dealers and Exchanges More Fully Automated the
Handling and Execution of Orders?**

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I. Introduction

Over the past three decades, virtually all of American industry has been engaged in a headlong rush to automate as many of its business processes as it possibly can. Rapidly expanding computer processing power at lower and lower prices has meant that businesses of all sorts have been able to cut their costs and increase their profitability by widescale deployment of computer hardware and software. Efficiency and cost improvements typically are realized by analyzing the functions traditionally performed by various workers in the enterprise and automating any function that can be more quickly and reliably performed by a computer. This obviously causes some dislocation for the affected workers, but viewing it positively, the real result should be that human capital is freed to engage in other more productive endeavors such as creating new projects or businesses. The process of automation, productivity increase and business reinvention has been the driving force behind the tremendous, low-inflation growth of the American economy over the past decades. Indeed, it has been the driving force behind the growth of the world economy over the past three millennia.

There is an ongoing mystery, however, regarding the securities (and futures) industry. Namely, while many aspects of the business have been automated over the past twenty or thirty years, the central function of handling and executing orders is still surprisingly manual. The nation's predominant equity markets and four of its five existing option markets still have largely human-intermediated order handling and matching mechanisms. This situation is particularly remarkable in that handling and executing securities and futures orders is, at its core, a recordkeeping process that is almost ideally suited to be done by computers, which are cheaper, faster, less prone to mistakes, and much less open to fraud than we humans are.

Having said all this, there are several very good reasons why traditional exchanges and broker-dealers have resisted complete automation and why we may now be at something of a standstill in the evolution of our market structure. This paper attempts to outline some of those reasons and to suggest a few possible approaches. In short, the problem appears to be that a variety of well-intentioned, sometimes necessary, rule initiatives over recent years, including enactment of customer priority rules, trade-through rules, limit order display and handling rules and other rules designed to protect customers, may now be working in a roundabout way to achieve the opposite of their intended effect. Because of decimalization, if these rules and others

were followed to the minutest detail, it would be dramatically more difficult, or even impossible, for dealers and exchange professionals to trade profitably. Designated liquidity providers therefore have had to rely on their inherent time and place advantage in the manual marketplace – specifically, that they can see orders before others can see them and can take their time (sometimes up to 90 seconds) to decide whether to interact with these orders or not -- in order to reap a reward for the services they provide. Having this discretion even for a few seconds, creating a “gradient of firmness” of quotes, is enough to generate substantial profits. But complete automation of order handling and execution, by eliminating latency and creating a perfectly clear time sequence of trading events, would eliminate this advantage. Even if it ultimately would be in the public interest, exchanges and their constituents understandably are reluctant to hand over large satchels of money for technology that may reduce profits and eliminate certain market participants altogether.

Since the established dealer and exchange structures may have little to gain from more complete automation of the order handling and execution process under the current rules, we are all stuck unless two things happen (the first a carrot and the other a stick). First, we must think of innovative ways to restore the economic incentives for existing exchanges and their professional traders to provide liquidity to the marketplace (for example, by eliminating or reversing customer priority rules, which create only an illusion of customer benefit; by eliminating ITS and replacing exchange-level trade-through rules with augmented best execution duties; or by enhancing liquidity payments and specialist participation rights in electronic trades). Second, we must not impede the development of new electronic markets that will force existing players to automate in order to compete with the speed, certainty and cheaper trade processing costs that these new markets offer.

II. An Ideal Market Structure

The Commission’s last comprehensive look at market structure was its concept release calling for comments on market fragmentation, issued in February 2000 (“Market Fragmentation Release”).¹ The Market Fragmentation Release was prompted, among other things, by some

¹ See Commission Request for Comment on Issues Relating to Market Fragmentation, Exch. Act. Rel. 34-42450, 65 Fed. Reg. at 10577 (Feb. 23, 2000).

market participants calling for the creation of a single, nationwide limit order book (“CLOB”) that would centralize execution of orders in a single regulated monopoly facility. While the goals of the CLOB proposal were laudable – i.e., automatic execution and nationwide price/time priority, it was broadly and rightly opposed on a number of grounds. Like ITS or the much-delayed option market linkage, a CLOB would have been unwieldy and difficult to administer. It would have reduced or eliminated the vitality of competing market centers and it would have eliminated incentives for developing new services and innovative products. It also would have created a capacity choke point and a single point of failure in the national market system.

On the other hand, a number of commenters and perhaps some members of the Commission staff seemed to agree that many of the benefits that might have been afforded by a central limit order book could be duplicated and enhanced by expanding and improving on current market structures. Under this alternate scenario, there would continue to be multiple liquidity centers competing on price, but these liquidity centers would be linked not via a CLOB mechanism but by “smart” systems operated by brokers and market centers that would route each order to the market posting the best electronically accessible price. In the two years that have elapsed since the issuance of the Market Fragmentation Release, it has become even clearer that this simple approach is workable and would provide great benefit to the national market system. In this ideal market structure, liquidity centers would maintain electronically accessible limit order books operated by clearly formulated and equitable rules based upon principles of price/time priority. As these rules would be completely codified in software, there would be no room for subjective interpretation. Broker-dealers, pursuant to their fiduciary duty of best execution, would route each of their orders (for instant, automatic execution) based on a composite view of the order books of the liquidity centers.

This market structure would put all market participants on a level playing field, it would assure transparency and price competition, and it would provide best execution of customer orders. Automated routing and execution of orders would not only increase fairness and transparency, it would also dramatically lower costs of execution, because of the inherent efficiency and cost advantage of computerized processes. Of course, the relatively high brokerage and execution costs (hidden and not hidden) arising under the current system are passed on to customers and other users of the capital markets.

If the market structure just outlined is technologically feasible and would offer significant benefits to the public, why hasn't it happened? In the two years since the issuance of the Market Fragmentation Release, there has been too little movement toward further opening and automation of the nation's securities markets – the increased prominence of the ISE for options trading being an exception. In fact, in the equity markets there are troubling signs recently that the “dead hands” of existing market structure bureaucracies like the ITS and the CTA/CQ market data plans are stifling the competitive promise of the ECNs, the regional exchanges and other upstarts. This illustrates one of the central points of this discussion: the unfortunate fact that well-intended rules and structures imposed on market participants (in this case, dealers and exchanges) to protect the public usually end up years later as a rationale to avoid further innovation or to stave off new competitors.

III. The Economic and Regulatory Disincentives to Automation

The reason that conventional brokers and exchanges have not embraced the model of open, fully electronic liquidity centers linked by automated order routing systems is that they have no economic incentive to do so. Unlike almost any other business one can think of, under the rules as they are now, dealers, exchanges and their constituents have good reason to fear that they will make *less* money and become *less* profitable if they automate. Because of the ill-defined time sequences and communication latencies inherent in manual order execution, professionals who have been granted market maker privileges in exchange for the associated burdens can see orders before others can see them and can take seconds or minutes to decide whether to interact with these orders or other orders that are available. Although there are rules that describe what can be done and when, given the known sequence of events in time, nonetheless the market and the regulators seem to acknowledge that within some time window the precise timing of events may be interpreted by the subjective experience of the participants in place. Indeed this imprecision and the resulting informational advantages to certain inside market participants have repeatedly been woven into the very fabric of the market structure, and manual mechanisms like ITS, the planned option market linkage, 30 or 90 second trade reporting rules and the like create relative oceans of time in which events, prices and transactions are subject to discretion.

On the other hand, the more computerized these processes become, the less room there is for subjective interpretation, and computers following the rules strictly as they are will eliminate much of the profits that are generated by the current “give” in the system. Thus, asking the exchanges and their constituents fully to automate the order handling and execution process amounts to asking them to spend money in order to lose money.

The situation for the dealers and the exchanges is made worse by the fact that rules and structures have been agreed by or imposed on them over the years that, now, in a decimalized environment, make it hard for them to profit *other* than through the informational and time and place advantages created by an inefficient trade matching mechanism. Customer priority rules, trade-through rules, linkage rules, order handling and display rules, firm quote rules and other market rules are all examples of this. Some of these rules are essential and benefit customers but some of them have simply forced market makers to earn (justified) trading profits by less transparent means.

Customer priority rules on option exchanges are a good example of this phenomenon. Under these rules customer orders are always given priority over professional orders at the same price. The customer benefit is illusory however, because in order to compensate for the structural disadvantage suffered by members due to the customer priority policy, option orders that are handled on the floor are subject to, shall we say, somewhat uneven treatment. Moreover, to compensate for the customer priority rules, option exchanges have passed a host of other, often vague rules that make their markets less fair, less transparent, and less automated for customers. These include rules prohibiting customers from creating and transmitting orders electronically (requiring artificial manual delays in order processing), rules kicking customer orders out of automatic execution systems and to the floor for manual handling in various ill-defined circumstances, rules purporting to require customers to express all of their trading interest in a single order rather than working a trade through multiple small orders (leading to more manual processing of the resulting larger size orders), rules prohibiting customers from sending in orders on the same side of the market in the same option class faster than 15 seconds apart, rules preventing customers from sending two-sided orders, and on and on. Most or all of these rules have been justified on the grounds that they are necessary in light of the fact that customers are given trading priority over professionals. Thus, rather than having a level playing field, we get a playing field half of which is tilted toward customers and half of which is tilted

toward market makers, and the net cost or benefit, and to whom, is impossible to ascertain. All we know is that we all bear the cost of the lack of clarity and lack of automation.

Another example of a well-intended rule with unintended consequences is the ITS trade-through rule. Under the current structure, non-automated exchanges who participate in ITS may post artificially attractive quotes (or may be slow in updating their quotes so that their quotes become artificially attractive), which, through the operation of the trade-through rule, block away exchanges from posting quotes or executing orders that would lock or cross the first exchange's market. The specialist on the away exchange is forced to choose between three unappealing options when this happens: (1) it can execute an incoming order at the first exchange's price (risking a loss, which it must then pass on to other customers on other trades); (2) it can execute the order at its own price (and risk having to compensate the first exchange for a trade-through, which cost again will be passed on to other customers on other trades); or (3) it can use ITS to send a firm commitment to trade to the first exchange. If the specialist on the away exchange chooses to send a commitment to trade, this essentially becomes a free option, lasting up to two minutes, against the sender and in favor of the recipient. Again, the specialist on the losing end of this option will pass the cost of it to other customers on other trades.

ITS and the trade-through rule punish market center participants that offer automatic execution and place them at an inherent disadvantage to slower, less automated markets. First, automatic execution markets cannot tolerate a 30 second to two minute delay in execution while an away market offering a seemingly better fill is tested through the transmission of a commitment to trade. And by virtue of the fact that their quotes are updated faster, the automatic execution market may often seem to be trading-through another market, when in fact that other market is in the process of updating its quotes. Finally, automatic execution markets are unable to take advantage of the "free options" discussed above that are enjoyed by the less automated exchanges.

This dilemma is now impacting those ECNs who trade a substantial volume of ETF products. As a lower cost surrogate for mutual funds, ETFs are extremely useful products for small investors, and over the past several years these investors have been able to use ECNs to get immediate, certain, low cost execution of ETF orders. This apparently is coming to an end as the ECNs face a choice of either removing their quotes from the national market system or being

stuck participating in ITS and being blocked by other ITS participants who post quotes that are not immediately and electronically accessible, if they are real at all.

Although a provisional three cent *de minimis* exemption to the trade-through rule has been created – but only for certain ETFs -- this is not sufficient to address this problem. It may be true that the recipient of the ETF order via ITS gets a free option and that the value of that option is between 1 and 2.5 cents.² It is not clear, however, how a particular broker-dealer's customer who desires to buy or sell a security can be certain to do so when the only electronically accessible price is more than three cents away from the manually displayed one. The customer is now faced with a choice of not trading, or sending an order to an exchange that a minute or two later will either give him a fill or, more likely, return the order unfilled. Telling the customer that the value of the free option that he would be giving away if he sends the order to a manual market is less than three cents does not really speak to his predicament. He wants to trade and has no way of getting a sure fill. The regulatory structure thus continues to reward the traditional exchanges for not being fully automated and at the same time prevents customers from deciding that they are willing to pay extra to get a real, immediate execution.³

In sum, since dealers and exchange professionals are forced to abide by customer priority and other rules that make it difficult for them to earn a profit, they are forced to exploit the profit opportunities that arise from the frictions and inefficiencies of a non-automated market. We fear that by forcing them to yield these advantages, we may harm the system altogether and suffer a loss of liquidity. Likewise, the logic of mechanisms like ITS creates an active *disincentive* for marketplaces to automate and to offer instant, computerized execution. Thus are we stuck with a status quo in which order execution is inefficient, uncertain and slow, and it is impossible even for sophisticated customers to predict what will happen to any particular order if it gets handled manually. Moreover, trading costs are far higher than they should be, and the hodgepodge of rules and execution mechanisms and linkage structures and market data plans and fees and

² ETFs, representing baskets of stocks, are much less volatile than individual equities. The value of the free option would be higher than three cents for individual stocks with higher volatility.

³ As outlined below, we suggest that the Commission eliminate the trade-through rule altogether and instead make it easier for customers to determine if their brokers are, on the whole, obtaining best execution for their orders.

rebates and quote display montages and order execution statistics and everything else is all so complicated that no one can really tell what is going on. We need to find a way forward.

IV. Creating Incentives to Automate: Carrot and Stick

As noted above, although we all know it must happen sooner or later, the dealer and exchange community have much to fear from more complete automation of the order handling and execution process. It will be costly, it will be complex, it will require a great deal of legal and regulatory work drafting new rules and getting them approved, and it will displace certain firms and workers who will not be able to adapt to a more electronic marketplace. And given the rules as they stand today, the reward at the end for the insiders for all this work and expense is that they will largely lose their inside status and their ability to profit therefrom. Unless this incentive scenario is altered, we can expect the traditional players (quite reasonably) to continue to use regulatory and political processes to preserve the status quo, and to make only painstaking and grudging concessions toward automation.

If the marketplace expects the dealer and exchange community to automate and therefore to provide the resulting benefits of faster, more certain order handling and execution at much lower costs, the marketplace must give something in return. Regulators and consumers of exchange and dealer services must think of ways to allow the liquidity providers to profit in return for the obligation imposed upon them to maintain stable markets. Elimination of customer priority rules is certainly one change that should be explored. In fact, we should consider giving market makers priority or partial priority in exchange for their liquidity guarantees.

Another change that must be examined is elimination of intermarket trade-through rules (and elimination of the associated linkage systems, or retention of them merely as mechanisms for intermarket principal trading). As noted above, trade-through rules slow the markets, create unfair advantages for certain participants and punish marketplaces who wish to offer immediate automatic execution. Moreover, it is simpler and more consistent with general legal and regulatory principles to place the burden of best execution solely on brokers – the fiduciary agents of the customers – rather than on the service bureaus whose responsibilities should be simply to execute matching trades in a fair and consistent manner. Thus, elimination of exchange level trade-through rules should be accompanied by an enhanced emphasis on the duty

of broker dealers to seek best execution of their customers' orders, either explicitly requiring order by order routing or at least requiring a simplified disclosure of execution quality statistics that would allow customers to more easily judge the overall quality of executions offered by their brokers (in addition to the current statistics required under Rule 11Ac1-6, the Commission should consider requiring each broker prominently to publish two numbers each quarter: 1) a single volume-weighted average realized spread for all orders executed by the broker calculated by marking trades to the mid-price of the market ½ hour after the trade; and 2) a single volume weighted average spread between the daily VWAP price of each stock bought or sold for customers by the broker and the marketwide end-of-day VWAP price).⁴

Another change that might be adopted to create incentives for dealers and exchange professionals to give up their time and place advantages in favor of automating their markets would be to change execution cost structures so as to clearly charge liquidity takers and reward liquidity providers, perhaps even paying specialists a premium over other liquidity providers to recompense them for their duty to provide continuous, stable markets. In any event, whatever the particular changes are the goal should be to create liquidity incentives that could be seen and evaluated, as opposed to the current “informal” advantages exercised by dealers and exchange professionals, which are difficult to measure.

In addition to the positive incentives that must be created for the traditional players to automate, negative incentives will help as well. Specifically, regulators and politicians should not block the development of new markets and market mechanisms that will act as powerful catalysts for change even on existing markets. In both the securities and the futures markets, new electronic marketplaces – and sometimes even just the mere threat of new electronic marketplaces – arguably have been the main driving force in the market structure progress that has been made in the past decade. While federal regulators such as the SEC and the CFTC have a duty to ensure that new marketplaces are fundamentally sound and offer protection to the public, the Commissions must continue to be careful not to allow traditional constituencies to defeat nascent competition by misusing their self-regulatory powers. Nor should regulators and

⁴ In any event, it is too simplistic to focus on trade-throughs to the exclusion of other important determinants in execution quality. There are many situations where certainty of execution (and other factors) is more important than execution price, at least within a certain range. Customers and their brokers should be able to decide the relative importance of various factors so long as customers are fully informed about the decisions they make.

SROs insist that new market centers with new market structures strictly comply with timeworn rules that make no sense for those new markets.

V. Conclusion

For all the progress that has been made in automating certain aspects of the securities business, the essential function of order handling and execution is still largely mysterious to the public and is still very often subject to the discretion of costly human intermediaries who operate under rules and mechanisms that are little changed from three decades ago. Only by reexamining certain of the rules under which the dealer and exchange community operate so as to restore some of their profit opportunity, yet at the same time declining to protect these players from competition from new entrants, may it be hoped that the industry and the investing public will soon reap the same productivity increases and cost reductions that have been enjoyed by other American industries as a result of automation and increased deployment of technology.