RegNMS is only the latest development in the ongoing battle over securities market structure.

The Thirty Years War

By Craig Pirrong
University of Houston

The Securities and Exchange Commission recently fought the latest battle in the Thirty Years War over the structure of American securities markets. In December 2004, amidst much fanfare and controversy, and after much anticipation, the agency reproposed new rules under Regulation NMS. In early April, despite congressional and industry opposition, a divided commission (with Chairman William Donaldson voting with the two Democratic commissioners) approved the new rule. Within days of its adoption, the regulation had already affected the structure of American securities markets.

The centerpiece of the proposal is a "trade-through rule" (formally titled the "Order Protection Rule") that requires market centers to route orders to any market center currently showing a better price on an automated trading system or else match that better price. In addition, the SEC approved an "Access Rule" intended to facilitate the operation of the trade-through rule.

There are some benefits to the new rule. Unfortunately, in the face of an intense lobbying effort led by the New York Stock Exchange, the commission adopted a version of the rule that will likely have a far smaller favorable impact on competition in securities markets than would have resulted if the SEC had approved another alternative, the "depth of book" proposal, that it had advanced last December.

The SEC's caution in 2005 continues its decades-old tradition of reluctance to challenge the NYSE's dominance. It is likely, therefore, that there will be future regulatory battles fought over the same ground.

REGULATION NMS

RegNMS (as the rule has been dubbed in policymaker shorthand) traces its existence to the Securities Act Amendments passed by Congress in 1975. The amendments reflected congressional concern that the market for stocks was inefficiently fragmented. As a result of the fragmentation, an investor buying stock on one exchange might pay a higher price than was being offered on another exchange or in the over-the-counter market. Congress wanted a unified National Market System to eliminate fragmentation, and charged the SEC with the task of creating the rules necessary to make such a system a reality.

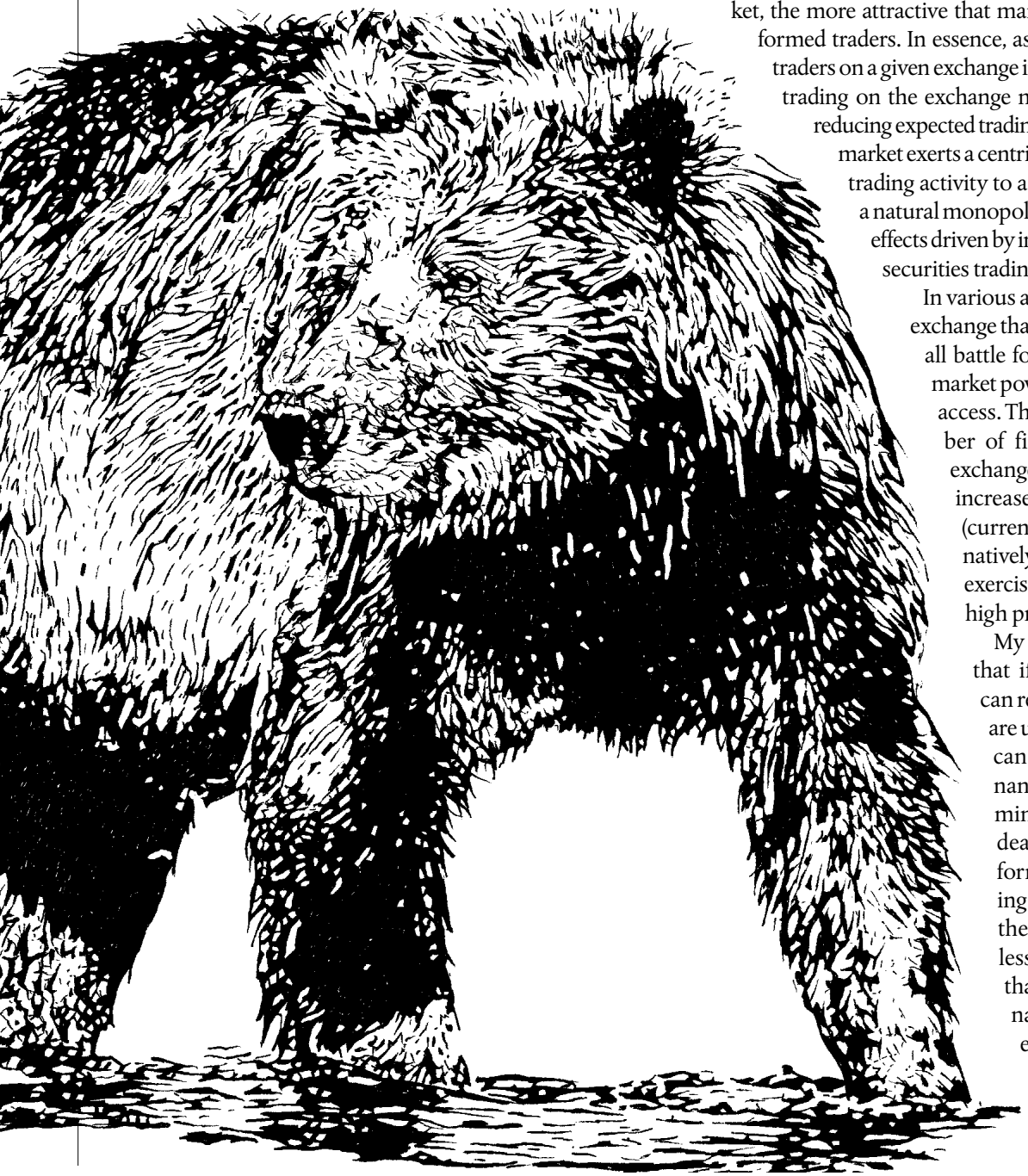
Congressional action resulted in a variety of proposals to revamp the American stock market. Some of the proposals were quite radical, such the creation of a Central Limit Order Book (CLOB) where all trading would occur, thereby taking the place of the NYSE, the regional exchanges, and over-the-counter dealers. Other proposals represented only minor tweaks to the status quo. The SEC decided against radical restructuring and instead implemented some modest initiatives to improve linkages between market centers.

Technological and market changes have made the 1975-era rules an anachronism. In particular, dramatic advances in computer and communications technology, the resultant development of sophisticated automated trading and order routing systems, and the massive growth of institutional stock trading have rendered the existing rules obsolete. The new policy represents the agency's response to the changed technological landscape. In particular, the trade-through rule is intended to take advantage of the existence of automated trading systems that are readily and almost instantaneously accessible from around the country and around the world. This rule requires routing of orders to those systems if one of them offers the best price on a security. The companion access rule regulates the

Craig Pirrong is professor of finance in the Bauer College of Business at the University of Houston. He may be contacted by e-mail at cpirrong@uh.edu.

terms of access to the systems. Together, the two rules are intended to forge a stronger link between the automated systems as well as between those systems and the more traditional floor-based exchanges such as the NYSE.

The issues involved are complex, so before plunging into an appraisal of the specifics of the SEC action, it is useful to step back and get an understanding of some of the basic economics of securities market structure. This analysis suggests that there is a reasonable rationale for the SEC's rules (and Congress's action in mandating the NMS), but also points out the pitfalls in its approach. In particular, the new rules may help to mitigate the market power in the trading of securities that results from network effects inherent in trading. But the rules also raise conundrums well-known in the regulation of other network industries such as telecommunications and electricity generation.



MORGAN BALLARD

SECURITIES MARKET MACROSTRUCTURE

To understand the issues that market participants, Congress, and the SEC have been grappling with for decades, consider the economic factors that drive securities market structure. The most important factor is that some traders have better information than others about the value of a particular security. The potential for informed trading creates a well-known adverse selection problem—the better-informed make money off the less-informed.

The less-informed want to minimize their losses to the well-informed. One way to accomplish this is to trade where a large number of other uninformed traders do. Numerous economic models and much empirical evidence indicate that uninformed traders minimize their losses by sticking together. This means that trading activity attracts trading activity—there is a network effect. The more uninformed traders there are in a particular market, the more attractive that market becomes to other uninformed traders. In essence, as the number of uninformed traders on a given exchange increase, the expected costs of trading on the exchange move lower. The prospect of reducing expected trading costs by going to the biggest market exerts a centripetal force that tends to tip all trading activity to a single market. Thus, there is a natural monopoly element (based on network effects driven by information considerations) in securities trading.

In various articles, I have shown that the exchange that prevails in the winner-take-all battle for market share can exercise market power. It can do so by restricting access. The NYSE has limited the number of firms that can trade on the exchange since the 1860s and has not increased the number of members (currently 1,366) since 1929. Alternatively, a for-profit exchange can exercise market power by charging high prices.

My academic work also shows that if some uninformed traders can reliably demonstrate that they are uninformed, satellite markets can compete against the dominant exchange by "cream skimming"—that is, by limiting their dealings to the verifiably uninformed. This implies that trading that takes place away from the central exchange should be less informed than the trading that takes place on the dominant exchange. Numerous empirical studies bear out this implication. This means that fragmentation, though widely decried, is actually a second-best

market response to the existence of market power that results from network effects.

CLOB This model also sheds light on how, in theory, it is possible to mitigate network effect–based market power. In theory, an open-access CLOB, which was first proposed around 1975 and which gained new support in 1999–2000 through the efforts of the "MGM" group led by Morgan Stanley, Goldman Sachs, and Merrill Lynch, would lead to a first-best outcome. The difficulty is translating the theory into practice. It is certainly technically feasible to create an automated CLOB. It is far harder to ensure that the CLOB is truly open access, that it does not exercise market power resulting from its monopoly status by charging super-competitive prices, and that it has appropriate incentives to invest and innovate.

In essence, a CLOB is a public utility. As a result, it raises all the difficulties inherent in public utility regulation. How are prices to be set? How can the utility be incentivized to reduce costs and innovate? How can open access be assured? How much will it cost to monitor the CLOB's performance of its obligations? Who owns and governs the CLOB?

Those practical difficulties explain a good deal (though not all) of the opposition to the CLOB concept that began when the idea was first advanced, and that continues to this day. The difficulties have also motivated attempts to find other ways of mitigating market power.

BETTER INFORMATION One approach—adopted by the SEC in the 1970s and that underlies the revised RegNMS today—is to improve the information investors have about trading opportunities available in different trading centers/exchanges and to require those handling investors' orders to direct the orders to the exchange/market center offering the best price. That is, this approach attempts to create a virtual central market by linking multiple markets through information and the imposition of duties on those handling orders.

The centripetal pull of a single market is strongest when investors do not know the exact price quoted on each competing market, but instead must make their decisions based on the prices at which they expect they can trade in the various venues. They expect that they will get the best price at the market with the most traders, hence the strong draw to the biggest market. In contrast, when investors can see the prices that are being quoted at the various exchanges, they can choose to go to the one offering the best price, even if that is not the biggest exchange.

Consider, for instance, an investor who wants to buy 100 shares of some stock. There are two exchanges. Traders on one exchange are quoting an "ask" price of $10.05 per share—that is, there is someone on that exchange that has entered a "limit order" indicating that they are willing to sell at this price. Traders on another exchange are quoting an ask of $10.03 per share. If the investor can see—and access—both markets, the investor will choose to direct his order to the exchange currently quoting $10.03, even if that is the smaller exchange. In contrast, if the investor could not observe the quotes directly, she typically would choose to route the order to the bigger exchange. All investors acting this way result in the survival of a single exchange. Thus, improved information on price quotes can make it easier for small exchanges to compete with a large one.

Fragmentation is a second-best market response to the existence of market power that results from network effects.

This was the logic underlying two of the major initiatives growing out of the 1975 act—the Consolidated Quotation System (CQ system) and the Intermarket Trading System (ITS). Under the CQ system, all exchanges are required to report their current best bid (the highest price at which someone has entered a limit order to buy) and best offer (the lowest price at which someone has entered a limit order to sell). This information is then disseminated to the marketplace.

The ITS was created by several exchanges in 1978. The system gives each participating exchange electronic access to the best quotes displayed on each of the other exchanges and provides a system for routing orders from one exchange to another. Moreover, the ITS participants agree not to "trade through" a price displayed at another exchange. For instance, if exchange A is currently displaying a best bid of $15.00, and an order to sell is sent to exchange B, exchange B should not permit execution of a stock sale at $14.95. Instead, the bid at exchange B should be adjusted to $15.00, or exchange B should route the order to exchange A for execution at that price.

Although improved "quote transparency" and intermarket linkages can weaken the centripetal pull of the biggest exchange, for a variety of reasons it may not eliminate it. For instance, the best bid and best offer are only for a limited number of shares (determined by the investors or traders submitting the limit orders). This number of shares is the "quoted depth" of the market. For example, if investors on exchange A have submitted limit orders to buy a total of 1,000 shares at a price of $20.00, and all other offers to buy are at lower prices, then 1,000 shares is the quoted depth at the best bid. An individual or firm that wants to buy more than 1,000 shares cares not only about the best bid, but also cares about the buy limit orders submitted at lower prices because some of the big sell order may be executed at the lower prices.

Moreover, not all potential buying or selling interest is represented in standing limit orders. Some traders on exchange A may be willing to sell, but prefer to wait to reveal their interest until a buy order arrives. Because of this latent liquidity, a sell order for 5,000 shares may be executed at the best bid even if the quoted depth is only for 1,000 shares. Similarly, a market order to sell 500 shares may be executed at $20.05 because of latent liquidity. Such an order is said to experience "price improvement." Thus, the best bid or offer do not reveal completely the expected cost of executing an order on a particular exchange, and as a result investors may still prefer to submit orders to the bigger market in anticipation of reducing execution costs by tapping the hidden liquidity.

Relatedly, an investor may worry that if he submits an order to the smaller exchange offering a better price, another investor's order may arrive first, thereby depriving him of the opportunity to trade at the displayed price. The late-arriving investor's order may then be executed at a much worse price than would have been available on the larger exchange. Therefore, investors may reduce execution cost risk by directing their orders to the bigger exchange, even when it is not quoting the best price.

There are other reasons that quote transparency may not result in best execution. First, quotes may change rapidly and an investor may decide to send an order to exchange B when it is displaying the best quote only to have another exchange offer a better quote after the order has been sent. This cannot happen in a CLOB. Second, many orders are handled by agents; most individual investors trade through brokers. Although brokers and dealers have responsibilities to get investors the best prices, they may not always do so. In many cases, it is costly and very difficult for investors to monitor whether brokers get the best prices. Again, this is not an issue with a CLOB.

In theory, intermarket linkages mitigate those problems. If a buy order is submitted to exchange A even though exchange B is displaying a lower offer price, a requirement that exchange A route the order to exchange B or match exchange B's price would help ensure best execution. That is the idea underlying the ITS and the promise of ITS participants not to trade-through prices at other exchanges. However, this also involves an agency problem; exchange A has no incentive to route the order to exchange B. Thus, an enforcement and monitoring mechanism (which is costly) is required to make the system work. However, the procedures in place to obtain redress for a trade-through under the ITS are cumbersome and costly, and there are many loopholes in the system's rules. Consequently it has been recognized almost since its introduction that ITS only weakly links markets.

Existing intermarket linkages fail to replicate a true CLOB in other ways as well. Single, centralized markets like a CLOB typically operate under a "first-come, first-served" rule; if two investors submit limit orders at the same price, the party submitting the order first gets to trade first. This is referred to as "time priority." However, time priority is not respected under the ITS and other forms of intermarket linkage. In the earlier example, if exchange B is bidding $15.00 and exchange A is bidding $14.95, and a sell order comes into exchange A, a trader at A can bid $15.00 and execute the order even though exchange B bid that price first. Such "quote matching" and violations of time priority reduce traders' incentive to quote good prices.

In sum, fundamental economic considerations can create inefficiencies in securities markets. Network effects arising from the rational choices of traders tend to cause trading to consolidate on a single exchange that can then exercise market power by rationing access either explicitly (through membership limits) or through price. A "public utility" regulatory approach can perhaps mitigate the market power problem, but it creates other inefficiencies. Improving information about prices and enforcing market linkages can also loosen a dominant exchange's stranglehold on order flow and thereby encourage more competition.

Decades ago, the SEC foreswore the public utility approach and adopted the information-and-linkages alternative. However, the CQ system and the ITS have not overcome the advantages of the major exchange in the United States—the NYSE still dominates trading in the equities it lists.

ENTER REGULATION NMS

The new RegNMS represents an effort to strengthen intermarket linkages. Whereas the ITS was a voluntary program of dubious effectiveness, the SEC adopts in its place a mandatory no-trade-through mechanism with a more rigorous enforcement mechanism.

Specifically, the new trade-through rule requires market centers to "establish, maintain, and enforce written policies and procedures that are reasonably designed to prevent trade-throughs of protected quotations in NMS stocks." The rule also requires trading centers to surveil their markets to ensure the effectiveness of their trade-through enforcement mechanisms and to act promptly to correct deficiencies therein. That puts the onus of monitoring and enforcing the trade-through rule on exchanges rather than on investors. Although the rule does have some exceptions, it notably requires prevention of trade-throughs even on large "block" transactions that were not covered under the ITS.

The rule reflects the technological revolution in stock trading. In particular, the rule protects only "automated" quote trade-throughs. An automated quote can be executed automatically and immediately by electronic trading systems. Moreover, traditional floor-based exchanges have automated trading capability (such as the NYSE's Direct+ system). Thus, a quote posted on the ArcaEx electronic trading system would be protected against a trade-through, but a manual quote on the floor of the NYSE would not be protected.

The limitation of protection to automated quotes reflects a widely perceived need for speed by stock traders. Consider a situation in which the NYSE is posting a "manual" bid of $22.05 and the best automated bid is $22.03. If manual quotes are protected, the next sell order for the stock should be directed to the NYSE. However, obtaining an execution against the manual quote is frequently time consuming, and at times the quote at the NYSE can change (to say, $22.00) by the time the order is executed, meaning that the seller loses the opportunity to sell at $22.03 and sells at $22.00 instead. Thus, the new rule advantages electronic trading systems.

DEPTH OF BOOK The most controversial component of the proposed rules relates to the seemingly benign issue of just what is the "best price" that cannot be traded through. This issue arises mainly because of recent changes in the way stock prices are quoted. For the NYSE's first 200 or so years, stocks were traded in increments of $0.125 ("an eighth"); you could buy a stock at $15.125, but not at $15.10. In 1997, the increment was reduced to $0.0625 ("a teeny"), and in 2000 the increment was reduced further, to $0.01 in a move referred to as "decimalization."

This seemingly innocuous change has had a profound impact on the market. The depth at the best bid and best offer is typically smaller with decimalization than was the case when stocks were traded in eighths or teenies. For instance, consider a stock traded in eighths that is quoted at $20 bid, $20.125 offered. There are bids for 5,000 shares and offers for 4,500 shares. Keep everything the same, but now decimalize the market. Some of the traders previously bidding $20.00 will bid more. Some of the shares bid at $20 with eighths will be bid at $20.01, some will be bid at $20.02, some will be bid at $20.03, and so on. Typically, the 5,000 shares previously bid at $20 would be spread out at prices between $20 and $20.13. It could be the case that the best bid is $20.07, but that only 200 shares are bid at that price. Similarly, the best offer may fall to $20.09, but with only 100 shares offered at that price.

Under decimalization, the best bid and best offer (BBO) are no longer as important as when stocks trade in eighths. A trade-through rule that protects only the BBO provides only a weak link between markets. Consider a situation where exchange A's best bid is at $20.05 for 1,000 shares when exchange B has bids for 100 shares at $20.00, 500 shares at $20.03, and 400 shares at $20.04. A sell order for 1,000 shares is directed to exchange A. If only the BBO at exchange B is protected, exchange A could send an order of 100 shares to exchange B, which would be executed at $20.00. However, exchange A could then match the remaining 900 shares against its quote for $20.05. Only a subset of the orders on exchange A and B would be linked. An alternative approach is to protect all quotes. Under this alternative, upon receiving the 1,000 share sell order, exchange A would be required to direct all 1,000 shares to exchange B for execution at $20, $20.01, $20.03, and $20.04. Such a requirement would link all of the orders displayed in the two markets.

Recognizing this problem, in December 2004 the SEC proposed two trade-through alternatives. The first protected only the BBO. The second protected "the depth of book"; under this system, all displayed orders would be protected. In the previous example under the depth-of-book proposal, exchange B's orders at all prices between $20 and $20.04 would be protected against trade-through; under the BBO alternative only the order at $20 would be protected.

The agency's reluctance to propose a single alternative reflected the controversy surrounding this issue. The NYSE stated its support for the BBO alternative but vociferously opposed depth-of-book protection. The venerable exchange's public rationale was that depth-of-book makes it difficult to implement its proposed hybrid market combining automated and manual trading. There may be another agenda at work, however. Depth-of-book protection would subject the NYSE to greater competition because it provides a stronger linkage between markets. Under depth-of-book, the NYSE will retain control of a smaller portion of the orders directed to it.

In the final rule, the SEC adopted the best-of-book approach favored by the NYSE and jettisoned the depth-of-book alternative. As I discuss in more detail below, this choice will limit the pro-competitive effects of RegNMS.

BEYOND PRICE Linking markets through the trade-through rule has other implications that the SEC addresses. Those implications reflect the fact that although execution price is clearly an important consideration for traders, it is not the only one. Some traders value speed of execution; for some, fractions of a second matter. Moreover, traders obviously care about the transaction fees on the markets where their orders are executed.

By itself, the trade-through rule would mean that only the quoted price matters; the market posting the best quote would get order flow regardless of its speed or quality of execution or the fees that it charges. This dampens the incentives of an exchange to invest in technology to improve the speed and quality of its execution because it would obtain no additional business by doing so. Traders would have no way of communicating their preference for speed and quality. Moreover, when only quotes affect who gets market order flow, the exchange with the best quote faces a perfectly inelastic demand for its services. It could exploit this inelasticity by raising the fees it charges to access and execute against its quotes. Indeed, an exchange could charge high fees, and then use the revenues to subsidize those submitting limit orders to provide them an incentive to quote high bids and low offers to attract market orders that would then be charged high fees.

Although some commentators on the proposal suggested that the agency specify a maximum response time to address the execution speed problem, the SEC decided instead to permit market centers to bypass the quotes of other automated markets that fail to respond immediately. (The agency interprets such failure as meaning repeated failures to respond to an order within a second.) To avoid abuse of this "self-help" mechanism, the SEC requires that exchanges establish policies and procedures governing bypass and monitor compliance therewith.

To combat the possibility of exorbitant fees, the SEC, as part of RegNMS, is implementing price ceilings. Under the Access Rule, a market center can charge no more than $0.003 per share for accessing its quotations. Not surprisingly, the price controls are quite controversial among those commenting on the regulation.

Another feature of the trade-through rule is that there are no exemptions based on transaction size. Consequently, big "block trades" that are often executed in a bilateral "upstairs" market cannot trade-through protected limited orders. Empirical evidence shows that many block transactions are less informed. While you might think that traders of big blocks would be informed, the upstairs block markets are face-to-face markets. Reputation is essential in that setting, whereas this is less true on the floor or in an automated market.

Consider a trader who frequently sells big blocks to upstairs dealers, and the upstairs block positioners consistently lose money on the deals because the trader is selling as a result of the adverse information he has about the stocks he is trading. It will not take too long for this trader to get a reputation for being informed, and then the upstairs dealers will not deal with him. In contrast, there is more anonymity on the floor (the informed trader can trade through many different brokers who cannot reveal the identity of their customer)—and even more in an electronic system. Informed traders, who tend to trade in mid-size transactions, typically direct their orders to exchanges. The upstairs dealers specialize in auditing the trading motives of block traders and knowing the reputations of those they deal with. Upstairs traders attempt to build a reputation for not "bagging the street." This makes informed trading upstairs harder (though not impossible).

Thus, forcing some block volume into market centers via the trade-through rule should lead to greater liquidity in those markets, lower trading costs for those who are not verifiably less-informed (and who therefore cannot readily access the block market), and higher trading costs for those who can access the block market. Those efforts will make the block market a less desirable place to trade, likely bringing even more business to exchanges.

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AN APPRAISAL

RegNMS does not depart from the information-and-linkage philosophy the SEC adopted 30 years ago, but updates regulations to strengthen links in a way that reflects current trading technologies. This philosophy has been controversial since 1975, and remains controversial today.

At the root of the controversy are conflicting visions of competition in securities markets. One vision—expressed most forcefully by the NYSE and SEC Commissioner Paul Atkins—favors competition among different marketplaces for order flows. In this view, (a) exchanges should compete for order flow and each exchange should have the right to execute all of the orders directed to it, and (b) orders submitted to different exchanges do not compete against one another directly.

The other vision advocates that regulation should encourage direct competition between orders, regardless of the exchange to which orders are directed. A CLOB ensures that all orders compete head-to-head, and that there is no competition between exchanges. The information-and-linkages approach attempts to preserve competing exchanges while permitting competition between orders submitted on different exchanges. As Commissioner Atkins (pejoratively) characterizes it, this approach attempts to create a "virtual CLOB."

Because of the powerful gravitational pull of network effects, I am skeptical that competition for order flow between exchanges, without any mandated linkages, will achieve a reasonably competitive securities trading market. To be sure, (a) improvements in information technology that make it cheaper to monitor multiple markets and to direct orders automatically to those offering the best prices, and (b) the growth of institutional trading, have combined to weaken the power of network effects. Nonetheless, the NYSE has maintained its very large market share in listed stocks in the face of those developments. Ten years ago, the NYSE captured about 82 percent of the volume in the equities it lists, and today the figure is almost 80 percent. Electronic trading systems have very limited inroads into the listed market even as they have become dominant in NASDAQ stocks.

As noted earlier, academic research has documented that most off-NYSE trading of the shares it lists (on the "third market" and at regional exchanges) is less informed than that taking place on the exchange itself. This indicates that the competition from other trading venues is of the cream-skimming variety. Cream-skimming competition is better than none at all, but it is not full-blooded competition for the entire order flow; the third market is only second best. Relying on competition between markets alone is a recipe for very limited competition indeed, and for the continued dominance of the NYSE.

Some have suggested that competition would be improved by eliminating any rule against trade-throughs (including the ITS rules) altogether under the theory that such rules protect the NYSE. In this view, the NYSE typically quotes the best price, but is slow. Many investors, freed from the requirement of directing orders to the exchange with the best quote, would opt for speed, thereby reducing the NYSE's market power. However, the new trade-through rule does not protect "manual" quotations, and that allows investors to choose speed over price in some cases. Moreover, even if this theory is correct, it may save investors from the frying pan by pitching them into the fire. That is, the no-linkage approach may indeed undercut the NYSE floor market, but it will not banish network effects. This approach would likely create a dominant electronic market that exercises market power. The dominant exchange may not reside in a stately building on Wall and Broad—its central workings may be a server farm in Jersey City—but it likely would exercise market power all the same. Trade-through prohibitions

would facilitate competition between electronic trading venues.

EXCEPT ALL OTHERS That said, I have serious reservations about a public utility CLOB. A mandated CLOB would require detailed regulation and oversight of the pricing of CLOB services and access policies. Furthermore, I have yet to see any concrete proposal regarding the ownership and governance of a CLOB. As demonstrated by attempts to create "regional transmission organizations" to ensure open access in another network industry (electricity transmission), this is a very difficult issue. Given the heterogeneity of the stakeholders in securities markets (exchanges, brokers, buy-side firms, sell-side firms), creation of a CLOB and its governance mechanism would take years, if it happens at all. Moreover, a CLOB would impede innovation in securities trading. Given the technological dynamism of all trading markets (including both stocks and derivatives), this would be unfortunate.

Thus, to paraphrase Churchill on democracy, the information-and-linkages approach appears to be the worst alternative, with the exception of all others that have been tried from time to time. Information-and-linkages encourages competition between individual orders, regardless of where those orders are directed originally. This helps to weaken the network effects that impede competition for order flow. Competition between orders is weaker, more cumbersome, and requires more costly oversight to achieve than would be the case with a CLOB, but stronger and more efficient than would be the case in the absence of intermarket linkages.

Moreover, by permitting the survival of multiple trading venues, this approach encourages competition on other dimensions, including trading fees, execution speed and quality, and technology, thereby reducing (and perhaps eliminating) the need for any regulation of fees, access, or standards. The regulation involves costs (notably the costs to monitor and enforce the trade-through rule) and does not result in competition between all orders, but those costs are clearly less than the cost of overseeing a CLOB.

Insofar as the specifics are concerned, the most objectionable part of the SEC's decision is its choice of the best-of-book approach instead of the depth-of-book alternative. Depth-of-book would have encouraged more competition than the best-of-book rule. The NYSE strongly objected to protecting book depth, claiming that this would render impracticable its goal of a hybrid between electronic and floor markets, and would require the NYSE to go fully electronic. Although this may be true, the real objection likely is unspoken—namely, that the increased competition inherent in depth-of-book would have eroded the NYSE's competitive position.

Moreover, even if it is true, arguments favoring perpetuation of the floor resemble old-time cavalrymen's declamations against tanks in the 1930s. We now have extensive experience with electronic trading. Equity trading around the world—with the exception of the United States—is largely electronic. Foreign exchange, fixed income, and derivatives trading (including the trading of equity options) are going electronic as well.

Derivatives markets are especially illuminating examples. Traders have had choices between electronic and traditional trading systems for about a decade. In virtually every case, the market has tipped to the electronic system. Those systems have proven cheaper and they level the informational playing field that favors floor traders in a manual system. This hurts floor traders even as it makes investors and traders better off—which helps explain the opposition of floor-based exchanges.

Moreover, the information-and-linkages approach would be far more effective in a fully electronic trading environment. It is far easier to link electronic markets than to link floor-based markets, or to link electronic markets with floor-based markets. It is also far easier to embed trade-through protections in electronic systems; such systems can be programmed to route orders directly to other systems offering better prices, and it is much cheaper to audit compliance of an automated system because the relevant information is captured automatically and time stamped accurately. Furthermore, electronic trading offers other operational efficiencies.

Electronic trading is no longer experimental. It is the rule; viewed globally and across instruments, floor trading is now the exception. The threat of depth-of-book to the continued existence of the trading floor is no reason to shy away from it. If floor trading cannot survive the competition posed by the depth-of-book, it would be inefficient to protect and perpetuate it by introducing weaker intermarket linkages. Indeed, it is likely that floor trading persists only because network effects and weak linkages insulate incumbent floor-based exchanges from competition.

The proposed RegNMS does not enforce time priority across markets. In theory, enforcement of time priority would enhance market liquidity and competition, but in the decimalized world time priority has become largely moot even on a single exchange—improving the best quote by a mere penny eliminates the previous best quote's time priority. The proposed regulation does attempt to prevent the "pennying" problem from becoming worse by mandating that no market center quote sub-penny price increments.

The price controls in the regulation are problematic, but there is a straightforward way to avoid the adverse consequences of such control while at the same time addressing the concern that led the SEC to propose them. Specifically, quoted prices should reflect access fees, and the trade-through rule should mandate that orders be routed to the market quoting the best price inclusive of the fees. For instance, if one market has an offer at $20.00 but charges $0.005 to access this quote, its displayed offer should be $20.005. Similarly, if this market has a bid at $19.95, its displayed bid should be $19.945. Such quotes would reflect the total cost of executing against them; a market charging a high fee would display worse prices (all else equal) and attract fewer trades. This would encourage competition on access fees.

There is some market evidence that speaks to the anticipated effect of the proposal. The price of NYSE memberships eroded steadily (from about $1.5 million in June 2004 to less than $1 million in January 2005) when it became clear that the SEC was moving toward adopting the trade-through rule and was seriously considering the possibility of implementing the depth-of-book proposal. To the extent that (a) membership

prices capitalize the rents attributable to market power, and (b) this erosion is attributable to the impending SEC action (which is plausible but difficult to prove definitively), the decline in membership values foretold more intense competition on adoption of the rule. Seat prices bounced back to $1.5 million following press reports that Chairman Donaldson was backing away from the more aggressive depth-of-book approach and congressional criticism of the regulation; this rebound supports the hypothesis that depth-of-book would create more competition than mere best-of-book.

Even in its weaker form, RegNMS has had an immediate impact on the organization of the securities markets. Mere days after the SEC's action, the NYSE announced its acquisition of Archipelago, the owner of the electronic ArcaEx stock trading venue. This strategic move clearly indicates that the NYSE recognized the competitive threat of electronic trading in a RegNMS world. The acquisition of an acknowledged leader in electronic stock trading will permit the NYSE to bolster its electronic trading capabilities more rapidly in the event that the Order Handling Rule erodes the exchange's competitive position vis-à-vis computerized rivals. The competitive threat would have only been greater, and the need for a NYSE response commensurately more pressing, had the commission adopted the depth-of-book approach. Moreover, depth-of-book would have increased the intensity of competition between electronic venues. If the NYSE indeed goes electronic, as is increasingly likely, the case for depth-of-book will become even stronger.

RegNMS also imposes the trade-through rule on the NASDAQ market. This has sparked some of the congressional criticism and more than a little opposition from industry participants. Given the differences in structure between NASDAQ and the listed market, most notably the competitive success of electronic trading systems in trading NASDAQ, the competitive benefits of extending the rule to NASDAQ are likely to be small.

CONCLUSION In sum, there is merit to RegNMS—but competition in securities markets would have been enhanced even more had the SEC chosen the depth-of-book system. Press reports suggest that Chairman Donaldson opted for the less aggressive best-of-book alternative because of fears that the more radical depth-of-book approach would have had unintended consequences for the structure and operation of U.S. securities markets. (Donaldson formerly chaired the NYSE.) Concerns about unintended, adverse consequences led Commissioner Atkins to oppose even the meeker best-of-book alternative; he stated that "we're flailing around with no philosophical direction or factual basis, having failed to identify a true problem for investors and risking doing real, lasting damage to the most efficient and complex capital markets in the world."

We have seen this before. In the aftermath of the passage of the 1975 amendments, similar fears induced the SEC (chaired by Harold Williams) to take an extremely cautious approach in developing the National Market System.

A couple of points need to be made in response. First, although it is true that the new regulation could do a much better job of identifying its "philosophical direction and factual basis," they do exist. Network effects are pervasive in, and weaken competition in, securities markets. Stronger linkages between market centers can therefore improve competition in securities trading. Rather than relying on its tried-and-true *deus ex machina* of the "small investor" to justify its policy choices, the agency would be better served by making explicit the sound economic basis for stronger intermarket linkages.

Second, there are numerous examples from the past 30 years of regulatory changes leading to substantial increases in competition in securities trading. These include the elimination of the brokerage commission cartel in 1975, the "Big Bang" in the United Kingdom in 1986, the SEC Order Handling rules of 1997, and the ending of the agreement among options exchanges not to compete on listings. In each case, many prized oxen were gored, and good. But in each case, it is clear that the overall effect of the changes was to increase competition, resulting in substantial increases in trading volume and large benefits to investors.

This is not to say that adoption of RegNMS will end all debate over securities market structure. I agree with Commissioner Atkins that in the future the agency will be embroiled in controversies over the pricing of quote data (although less than would have erupted if the SEC had selected depth-of-book), access standards and the pricing of access, exceptions from the trade-through rule, and oversight of its implementation. Such controversies are endemic to any network industry. They echo the disputes that arise repeatedly in telecommunications and electricity transmission. The main difference is that whereas the network aspects of these latter industries are well understood and explicitly acknowledged, they are insufficiently recognized in the securities business. Network industries pose severe challenges to any property rights and regulatory regime, and the securities industry is no different. Those challenges lead to continual disputes over market structure, pricing, and access—disputes that become particularly intense when technological changes like those observed recently in securities markets undermine the status quo.

Therefore, the proposed rules are not the final battle in a Thirty Years War. I fully expect that in 2075, some professor will write an article about the latest clash in an ongoing Hundred Years War over securities market structure regulation. R

READINGS

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