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Marshall E. Blume

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The Wharton School
University of Pennsylvania

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[1] The Wharton School, University of Pennsylvania, blume@wharton.upenn.edu

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Abstract

The 1974 Amendments to the Securities Exchange Act of 1934 set forth the goal of establishing a National Market System (NMS) in which all equity trades would be integrated into a common computerized trading system. The paper argues that such a system cannot serve the needs of all investors—large or small, informed or uninformed. The recently approved Regulation NMS is an attempt to impose such a common trading system onto the equity market. Large institutions with their resources will find ways to evade it and are already fragmenting the market with "dark pools" of liquidity. This Regulation will certainly result in unintended consequences, to the detriment of the US equity market.

The trading markets for equities and derivatives are in a state of transition. Both the NYSE and NASDAQ are now private corporations and are behaving as such, as both pursue mergers and alliances across the entire world.[2] Investors can increasingly trade the same security anywhere in the world. Financial engineers are often able to repackage the same instrument in different wrappers, so as to allow investors to choose among trading markets and regulatory environments. As one example, an investor can buy the S&P 500 as a mutual fund, as an ETF, as a future contract, or even as a swap. These changes—competition among domestic and global markets and the design of securities themselves—will ultimately be the driving forces in the evolution of trading markets. Regulation may mitigate these forces, but as long as regulation is fragmented by product and country, these forces will prevail.

Regulators should facilitate competition and only impose regulations that restrict competition when the social benefits of such restrictions are proven and far outweigh the private compliance costs. The SEC has recently violated this principle in its Regulation National Market System (NMS). This new regulation makes the SEC the prime architect of market structure, reestablishes the SEC as a regulator of fees, and imposes barriers to new innovation. If Regulation NMS proves excessively costly, investors with the resources to access alternative markets and alternative investment vehicles will evade this regulation. Witness the Euro-dollar market that evolved as a means to negate the withholding tax on foreigners investing in the US.

The paper begins with a description of the National Market System (NMS) as it was viewed in the mid-1970s. The main feature of the mid-1970s NMS is that price-time

[2] Some parts of this article are based upon Blume (2002).

priority is maintained among all orders. Even this mid-1970s version of the NMS is fundamentally flawed, as it cannot satisfy the diverse trading needs of all investors.

In 2005, the SEC issued Regulation NMS. This regulation purports to implement a national market system, but the reality is that it complicates the trading of large orders, can be gamed, hinders competitions, and undoubtedly will have unintended consequences.[3] In the past, the SEC has recognized that the quality of an execution depends simultaneously upon many factors. The SEC has fundamentally changed this view: Regulation NMS dictates that trade price is the first determinate of the quality of an execution, and only after this price standard has been met can an investor consider other factors. Regulation NMS attempts to preserve price priority, but even here its dictates are riddled with exceptions. The use of the abbreviation NMS in its new regulation is misleading.

I. The National Market System

The 1975 Amendments to the Securities Exchange Act of 1934 set as a national goal that all securities should be traded in a national market system (NMS). More generally, these amendments stated that "[t]he linking of all markets for qualified securities through communication and data process facilities will foster efficiency, enhance competition, increase the information available to brokers, dealers, and investors, facilitate the offsetting of investors' orders, and contribute to the best execution of such orders."[4]

[3] Cf. Dissent (2005).
[4] Public Law (1975).

The legislation specifying this linkage was unclear as to how it was to occur. To address this void, Mendelson, et al., (1976) argued in an influential paper that a natural way, and perhaps the only way, to achieve an NMS was a consolidated limit order book (CLOB). A CLOB works as follows: All orders are anonymous. Some investors submit limit orders to the CLOB, which are executed according price and then time priority, or in short price-time priority. Other investors submit market orders to be executed against these limit orders. As all orders are executed through the CLOB and none through other channels, it is technologically straightforward to provide for price-time priority. A critical feature of a CLOB is that limit and market orders are the only types of orders allowed. Another critical feature is that all orders are anonymous.

An alleged advantage of an NMS, as epitomized in a CLOB, is that it eliminates fragmentation of markets as there is only one market. Yet fragmentation is at the heart of competition. New competition spawns fragmentation, but significant fragmentation will occur only if competition is successful. If competition is extremely successful, existing markets will decline and fail, resulting in less fragmentation.

Another alleged advantage of an NMS is that the all investors are treated equally. A small retail investor receives the same treatment as a large institutional investor. On the surface, this equal treatment seems eminently fair, but on closer analysis, it represents a naïve view of how trading takes place among different types of investors.

II. The Fallacy of an NMS

Implicit in the quest of an NMS is one or both of two assumptions: The first assumption is that *all* investors prefer such a market. Yet investors have different needs:

For instance, some investors place a high premium on speed of execution; some investors with large orders focus on market impact; and some investors prefer a non-anonymous trading market.

The second assumption is that an NMS offers externalities that greatly enhance national wealth. Such externalities might include enhanced liquidity that could lead to a reduced cost of capital. It is impossible to know whether such externalities exist as we have never had an NMS and thus have no empirical basis by which to determine whether such externalities do indeed exist.

Since 1975, our understanding of trading markets and the needs of investors has evolved. One of the earliest empirical studies of market structure was that of Demsitz (1968). He viewed the bid-ask spread as the "inventory markup of retailer or wholesaler" (p.36) and in one specification modeled the spread as a function of the share price, the number of transactions per day, and the number of markets in which the security trades. The number of transactions per day is a measure of sales turnover, and the number of markets is a measure of competition.

Today, we know that trading in security markets is much more complex than this simple retail model. Bagehot (1971), the pen name for Jack Treynor, introduced the notion of adverse selection into trading with the observation that some investors possess unrevealed information or are informed, while others are uninformed and trade for other unspecified reasons.[5] In an anonymous market, informed traders will only trade with a dealer when it is to their advantage. As a consequence, dealers will lose to informed

[5] Baghot also included a group of investor who believe incorrectly that they have unrevealed information. From a modeling perspective, this group is often treated the same as the uninformed.

traders. In order to cover these losses and remain in business, dealers must recoup these losses from trades with uninformed traders to their detriment.

Glosten and Milgrom (1985) formalized this insight. They postulate an anonymous market in which a market maker posts a bid for one share, a price at which it is willing to buy, and an offer for one share, a price at which it is willing to sell. The market maker acts competitively and thus sets the bid and offer at levels such that its expected profit is zero. Except for setting the depth to one share, this market is similar to a CLOB, where the bids and offers are limit orders.

When there is unrevealed information, a dealer must take into account in posting its bid and offer that the other side of the trade may be an informed trader. If a dealer buys from or sells to an informed trader, the dealer has lost, as the informed trader will only trade when it is to its advantage. To recover from such potential losses, a dealer must increase the spread between his bid and offer from what it would have been otherwise. The result is that informed traders profit on average when they trade, and uninformed traders lose on average. Even if dealers face none of the "retailer" costs in the Demsitz model, there would still be a spread to cover the adverse cost of trading with informed traders. If dealers do face these "retailer" costs, the already positive spreads will be greater by these costs.

As uninformed traders lose in an anonymous market, they have every incentive to identify themselves as uninformed, which is only possible in a non-anonymous market. As one example, firms such as the Vanguard Group or Barclays Global Investors routinely trade stocks from one fund or account to another in response to additions and

redemptions.[6] In the case of Vanguard, the trade price is the last trade. Since the last trade could be at the bid or offer, or in between, the average trade will be near the midpoint of the bid or offer. Both sides receive better prices on average than in the traditional markets. These trades are uninformed and should receive better prices than in an anonymous market.

Since the size of the spread in the market as a whole is adjusted upwards for the adverse selection of trading with informed traders, any broker-dealer who finds a way to trade only with uninformed traders at market spreads will profit. Consistent with this observation, at least one broker-dealer has developed a business of trading at market spreads with retail customers, who should face smaller spreads as they are likely to be less informed that institutional customers.

An NMS may not always satisfy the needs of an institution or large individual investor that wishes to execute a large order. In executing a large order, an institution will recognize that its trading strategy may impact prices as it trades and will behave strategically. Strategic questions include: Should it break the trade in a number of smaller trades, and if so, how many trades? Alternatively, should it ask a broker-dealer to commit capital to execute the entire order at one time? How urgent is it to execute the order? How best to minimize front running? The list goes on.

The difference between a small retail order and a large institutional order is that an investor with a large order, whether informed or not, worries that the very disclosure of its intent to trade a large number of shares will increase the cost of the trade. Such disclosure may immediately move prices to the disadvantage of the trader. More

[6] Neither the Consolidated Tape Association nor NASDAQ reports these trades. For mutual funds, Rule 17a-7 under the 1940 Act governs such crossings.

nefariously, some broker-dealers may use this information to trade ahead of the larger trade--front running. In this environment, institutions are naturally reluctant to display a bid or an offer of size to the market, even though if their orders are anonymous. Institutions will go to great length to hide their intent to trade in order to reduce trading costs, and Regulation NMS is unlikely to induce institutions to reveal more liquidity.

In their ever searching for cheaper ways to trade, institutions are always experimenting with new ways to trade. Dealers and consultants routinely provide advice as to how to reduce trading costs. Crossing networks--pejoratively termed "dark pools"—are proliferating. Computerized algorithmic trading is gaining popularity. One of the main features of computerized algorithmic trading is the capability to submit limit orders and if not exercised immediately to provide rapid cancellation. Some institutions are now using basket trading in which the institution reveals general characteristics of a basket of securities to a dealer, pays a commission, and receives the closing price of each security, but does not reveal the exact names until after the close.[7] Another technique is to trade at the subsequent volume weighted average price.

New trading markets continually develop. Most will fail, such as the Arizona Stock Exchange or Optimark. Some will succeed. A prime example is Instinet—the first of the ECNs and now owned by NASDAQ. A more recent example is Liquidnet. This last system violates many of the tenets of Regulation NMS. It restricts trading to a limited group of "good" guys, making the market less anonymous, and importantly excluding dealers. Technically, this market has no bids and offers as understood in Regulation NMS. Investors indicate that they wish to trade through a computer. When the computer determines that there is a match, the two investors decide on price and

[7] Kavajecz and Keim (2006).

quantity, often the mid point of the National Best Bid-Offer (NBBO). Liquidnet thus provides an alternative trading mechanism that will only succeed if it provides valuable trading services to institutional investors.

The basic structure of Liquidnet is inconsistent with the intent of Regulation NMS. It restricts liquidity and trading to a preselected group of investors, potentially violating the Fair Access Rule for an Alternative Trading System (ATS). It also permits institutional investors trading within Liquidnet to give an indication of trading in sub-pennys increments, which violates the "Sub-Penny Rule" of Regulation NMS. This last rule prohibits market participants from indicating an interest in trading at an increment of less than a penny, except for stocks priced less than a dollar. To its credit, the SEC has written exceptions to the Sub-Penny Rule by allowing the prices of executions to be in less than penny increments and has given Liquidnet an exception to the ATS rules. Thus, the SEC has allowed Liquidnet to continue its operations.

Investors are different. The concerns facing small retail investors are different from those facing large institutional investors. The same investor in one situation may prefer anonymity, while in another non-anonymity. There is always the concern of front running. "One size will not fit all." Those providing trading services should be given room to experiment to better meet the need of investors. Experimentation will lead to fragmentation, but such a fragmented market may over time better serve the public than a non-fragmented market frozen in time.

III. Regulation NMS

Regulation NMS places a straight jacket on innovation in the trading of equities. First, it dictates that the how securities should be traded, but with many exceptions. Second, it places substantial burdens on innovation, as most innovation will have to be approved by the SEC.[8]

The main element of the proposal is the no-trade-through rule, or what the SEC prefers to call the "order protection rule." The order protection rule provides only limited protection in that it only applies to the "top of the book." There is no mention of priority for time of entry, although each book would presumably maintain such priority. It is quite possible for a limit order to sit on the top of one book, while a substantial volume occurs at the same price on another book.

No longer can an investor choose to execute at an inferior price for other reasons, such as the quality of the settlement process, the certainty of execution, the non-displayed liquidity in the upstairs market, the availability of capital at a broker dealer, and concerns about confidentiality. Indeed, the regulation makes it easier to execute an agency trade than a principal or capital trade—an example of an unintended consequence. The reason is that the stated price of an agency order is before commissions and thus may fall at or within the NBBO, even though the actual price including commissions is outside the NBBO. In contrast, the price of a capital trade usually includes a markup and thus may be outside of the NBBO. To comply with the "order protection rule," a capital trade would have to sweep the top of the book, resulting in potentially more costs to the investor. An equivalent agency trade might not have to be broken up.

[8] Cf Dissent (2005, p. 33).

In order to implement its "order protection rule," the SEC has had to micro manage the trading process. It requires that limit orders and quotations posted by market have a minimum increment of a penny except for low-priced stocks. It still allows internalization of order flow as long as trades occur at or within the NBBO. Interestingly, it allows market centers that internalize to trade in fractions of pennies with the result that a market center can step ahead of the top of the book by a mill or less to execute a market order. The SEC justifies this stepping ahead as price improvement, although the price improvement is de minimis, representing at most a 10 cent savings on a 100-share order.[9] The real effect is that it gives market centers an advantage over the public.

One of the great accomplishments of the 1975 Amendments was to remove the SEC from setting fees: Regulation NMS reverses this accomplishment. The business model of some ECNs is to charge market orders an access fee and rebate part of this fee to the limit orders to encourage this additional liquidity. [10] This fee makes it more expensive for a market order to access a quote from an ECN. To reduce this additional expense, the SEC has imposed a maximum "de minimis" fee of three mils. The SEC has also changed the distribution algorithm for the allocation of market data fees.

Since the SEC vision of the ideal market does not correspond to reality, the SEC has already exempted some established trading practices, such as, among others, execution at a volume weight average price, certain types of stopped orders, and intermarket sweeps. It has even distinguished between manual limit orders and

[9] SEC (2005, p. 230).
[10] SEC (2005, p. 182).

automated limit orders. It has provided exemptions for flickering quotes, quotes that have been displayed less than one second.

To preserve its view of how the markets should be structured, the SEC now requires that virtually every change in market structure be submitted in advance for its approval. This micro managing of market structure will undoubtedly inhibit innovation to the ultimate detriment of investors. The SEC is often slow in approving new applications, and this slowness may be the kiss of death to innovations. Certainly, the cost to innovate will be greater.

IV. The Future

Regulation NMS represents a massive government effort to impose its views on how equities should be traded. The reasons that the SEC gave in justification of its decision changed from one revision to another. The final document emphasizes the protection of the long-term investors and issuers. Such a massive government effort will undoubtedly produce unintended consequences.

The SEC in its release recognizes some ways it can be gamed, but asserts that these games will not be profitable.[11] There will certainly be other ways to game the new regulatory framework that neither the SEC nor others have yet recognized. Quite apart from the deleterious effects of gaming, the Regulation will certainly have an impact on market structure. The advantage of being on the Floor of the NYSE will be reduced with the likely possibility that the Floor as we know it today will vanish. Specialists and Floor traders may retain some time advantage over outsides in submitting electronic order if the SEC approves, but they do not need to be on the Floor to use these advantages.

[11] SEC (2005, pp 260-1).

Perhaps of more consequence is the possibility that Regulation NMS will lead to increased concentration in the trading of securities. Either NASDAQ or the NYSE Group could become the dominant trading market, or the two could merge. Since Regulation NMS focuses on price alone as the first determinant of the quality of execution, an investor faced with the choice of sending a market order to either NASDAQ or the NYSE is likely to send that order to the market that promises the greatest probability of execution, which will ultimately be the market with the fastest response. That more market orders will be sent to the fastest market will attract more limit orders. On top of this natural tendency for trading to gravitate to the fastest market, there may be economies of scale in the cost of execution over all plausible levels of trading.

There are forces countering this tendency to send a market order to the fastest market. Regulation NMS facilitates internalization of order flow through an obscure but important component—the Sub-Penny Rule. As mentioned above, limit orders and quotations can only be in increments of pennies except for low-priced stocks, so that the displayed spread in these stocks is no smaller than a penny. However, broker-dealers can internalize order flow and trade with a market order at smaller increments than a penny. The SEC justifies this jumping ahead of the NBBO as price improvement. Thus, broker-dealers can trade on their own account at a trivial price improvement when they think it is in their interest. This advantage as well as knowledge of order flow may encourage some internalization of order flow.

In the past, regional stock exchanges have often maintained their small market share by facilitating the bypassing of rules and trading on the NYSE. It is likely that even

under Regulation NMS regional stock exchanges will be able to maintain some small share of trading for similar reasons. Under the "top of the book" protection, a matched trade to be executed at the best bid or offer might have to be broken up if it were sent the NYSE group or the trading facility of NASDAQ. If for instance there were substantial depth at the best offer and the matched price equal that offer, the buy side of the matched trade might not be executed. With its smaller depths, a regional stock exchange might allow a cleaner cross.

In short, Regulation NMS has placed innovation in a straightjacket and as an unforeseen consequence may lead to increased concentration in the trading of equities. If Regulation NMS causes the cost of trading to become onerous, institutions will find ways to evade its dictates of Regulation NMS. They can always trade US securities offshore through offshore offices. They can turn to the growing number of crossing networks, or "dark pools." They can choose to trade derivatives or swaps that have similar characteristics to equities. One should not underestimate the ability of financial engineering to circumvent regulation.

The SEC is venturing into uncharted seas.

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The Rodney L. White Center for Financial Research

The Wharton School
University of Pennsylvania
3254 Steinberg Hall-Dietrich Hall
3620 Locust Walk
Philadelphia, PA 19104-6367

(215) 898-7616
(215) 573-8084 Fax
http://finance.wharton.upenn.edu/~rlwctr

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