

An hourglass-shaped graphic with a globe in the top bulb and another globe in the bottom bulb. The hourglass is light blue and has a dark blue top and bottom. The globe in the top bulb is dark blue, and the globe in the bottom bulb is light blue. The text is centered within the hourglass.

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## *THE ELECTRONIC STOCK MARKET*

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Updated July 8, 2000

**Abstract.** This report provides a background against which the competing proposals and visions of the stock market's future can be evaluated. Sections describe (1) how buyers meet sellers in the major U.S. stock markets, (2) how electronic technology is transforming the markets, and (3) the proposals for modifications in market structures now being considered by Congress, regulators, and the industry.

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## The Electronic Stock Market

July 8, 2000

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# The Electronic Stock Market

## Summary

Stock markets exist to funnel capital from investors to the businesses that can best use it to create jobs and national wealth. The process is run by intermediaries who extract payments from users and suppliers of capital in exchange for services that make the market more efficient for both. A central marketplace with standardized procedures offers savings to investors and corporations, who in its absence would expend considerable resources searching for each other and negotiating terms.

The U.S. stock market has experienced a marvelous 18-year bull run, which has brought great wealth to both investors and market professionals. Despite this prosperity, however, there is widespread uncertainty and anxiety about the future of the intermediaries who currently make up the market. New electronic technology, in the form of cheap computers and communications and (above all) the Internet, is driving trading costs down to levels unimaginable a few years ago. Technology has the potential to cut out the middleman altogether in some situations: no one can be sure that even giant institutions like the New York Stock Exchange will survive the next 10 years.

Why should this be of concern to legislators and regulators? Perceived problems with the market's current structure and direction fall under the umbrella term "market fragmentation." One aspect of technological change has been the emergence of multiple venues for trading stocks, rather than a single marketplace. To some market observers and participants, this fragmentation is a good thing, a sign of innovation and competition. Others, however, believe that the dispersal of trading has negative consequences. They are concerned that price competition may be inhibited, so that investors pay more than they should. Further, some believe that the logical end of the computerization of stock trading is a single 24-hour global stock exchange. In the absence of a centralized U.S. market, such a market may be more likely to emerge in Europe or Asia.

In response to these issues, the Securities and Exchange Commission (SEC) is considering new regulations that would significantly alter present trading practices and market structures. Several private sector initiatives recently put forward would be no less radical. Some proposals would create a central facility for the display and execution of orders to buy and sell stock. Opponents of this idea argue that such a facility would be obsolete before it could be built and that it would stifle future innovation and competition. Another view is that while long-term market dynamics may favor a central marketplace, it should be allowed to develop without government direction.

Congress held seven hearings on the future of the stock market during the first half of 2000. Any new SEC rules will be carefully scrutinized. This report provides background against which the competing proposals and visions of the market's future can be evaluated. It will not be updated.

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# The Electronic Stock Market

Electronic technology is nothing new on Wall Street. Automation has been a top priority in the stock market since the late 1960s, when the New York Stock Exchange (NYSE) nearly choked on its paperwork. The automation process accelerated after 1975, when Congress outlawed fixed brokerage commissions and established as a statutory goal a national market system, to be achieved by electronic linkages among the various stock markets.<sup>1</sup> In those days, automation meant mainframe computers and private communications lines, both of which were expensive. As a result, the principal beneficiaries of the first wave of electronic technology – and deregulation – were (1) large institutional investors, whose dominance was assumed to be a permanent feature of the market by the mid-1980s, and (2) the brokerage business, many of whose member firms expanded from hereditary partnerships into diversified multinational corporations.

The current technological revolution in the stock market, by contrast, is based on relatively cheap telecommunications and computing power, and the Internet. The focus has shifted to individual investors, who include nearly half of all American households.<sup>2</sup> Individuals have gained access to the market on terms until recently available only to institutions and professional traders. Data on stock prices and trading volume, brokerage research on companies and industries, and company financial statements filed with the Securities and Exchange Commission (SEC) are available instantly over the Internet. About 15 million U.S. investors have online brokerage accounts, which may link them to automatic transaction systems where their trades can be completed in seconds. Competition among some 150 online brokers has cut commissions for small investors to levels once enjoyed only by pension funds and other large institutional investors with the market power to negotiate deep discounts.<sup>3</sup> Trades that a few years ago cost, say, \$90 can be done for \$15, while several firms have begun to offer free trades, with fewer and fewer strings attached. Day trading firms provide daredevil investors with a direct connection to the market's execution systems, where they can literally buy and sell with the click of a mouse and compete toe-to-toe with traders from Morgan Stanley and Goldman Sachs.

The re-emergence of the individual investor has coincided with an unprecedented boom in the U.S. stock market. Over most of the past decade, the value of corporate

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<sup>1</sup> Section 11A of the Securities and Exchange Act of 1934, as amended by the Securities Acts Amendments of 1975.

<sup>2</sup> This includes those who own stock directly, through brokerage accounts, through mutual funds, or in retirement or pension accounts.

<sup>3</sup> Wirth, Gregg. Online Brokers Slug It Out in a Sagging Market. *Investment Dealers' Digest*, June 19, 2000. p. 1.

stock has increased by a trillion dollars a year. The market has financed the Silicon Valley/dot-com “Gold Rush,” which some observers view as the foundation for a new economy. Revenues for the securities industry hit an all time record of \$183 billion in 1999, almost double the 1995 figure. Wages paid by brokerage firms also doubled, from \$30 billion in 1995 to \$60 billion in 1999.<sup>4</sup>

In these circumstances, one would expect to find a sense of triumph among U.S. securities market participants, or at least a degree of self-satisfaction. But the very opposite is the case. There is widespread uncertainty and anxiety about the future of the stock market. On every side there are proposals and initiatives for major change in market practices and institutions. For example:

- Nasdaq and the NYSE, the two largest U.S. stock markets, want to change from member-owned organizations – a structure that in the case of the NYSE dates back to the 18<sup>th</sup> century – into for-profit corporations with shares owned by the public. The present governance structures are said to be too cumbersome to meet new, technology-based competition.
- A group of the largest securities firms has proposed a central trading facility where orders from all markets would be displayed and could be executed. Such a facility has the potential to reduce the existing exchanges to order-takers or entry portals to the market.
- The SEC published in February 2000 a request for comment on six possible regulatory changes ranging from requiring disclosure of trading information now considered proprietary to the establishment of a centralized order display and transaction facility.
- The House and Senate held seven hearings in the winter and spring of 2000 on the theme of the stock market of the future. The underlying concern was expressed by Senate Banking Committee Chairman Gramm: “We live in a world where capital is highly mobile, and everyone is acutely aware that it is as easy, using a laptop computer, to trade on the financial exchanges in Germany as it is to trade on the New York Stock Exchange. If we want this goose that routinely lays the golden egg to stay in America, we have to try to provide an environment that will enhance its staying here.”<sup>5</sup>

There is no consensus that major regulatory or legislative changes are required. Such initiatives would be highly contentious – no matter how carefully designed, they would inevitably favor the commercial interests of certain groups over others. However, the divisions within the securities industry do not follow the usual pattern

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<sup>4</sup> These figures, from the Securities Industry Association, cover NYSE member firms that do business with the public.

<sup>5</sup> Opening statement at Senate Banking Committee hearing, 106<sup>th</sup> Congress, 2<sup>nd</sup> session, February 29, 2000, on the financial marketplace of the future.

of innovators versus the status quo. Most expect the status quo to be swept away by technology. No one is sure how stocks will be traded in 10 years.

This report provides a background against which the competing proposals and visions of the market's future can be evaluated. The following sections describe (1) how buyers meet sellers in the major U.S. stock markets, (2) how electronic technology is transforming the markets, and (3) the proposals for modifications in market structures now being considered by Congress, regulators, and the industry.

## Market Structure and Middlemen

Investors buying and selling stock generally do not meet directly in the stock market. Transactions occur through a series of intermediaries, or middlemen. The functions performed by intermediaries, and the systems they use to transmit, display, and execute orders to buy or sell, determine the structure of the market. The structure of U.S. markets is not homogenous: the stock exchanges and the over-the-counter market (that is, Nasdaq), each accounting for about half of total trading volume, employ intermediaries – and therefore process transactions – in markedly different ways. A third model of intermediation has emerged in recent years – the ECN, or “electronic communications network,”<sup>6</sup> essentially a computer that replicates the basic transaction mechanisms of the traditional markets. The main features of these three structures, and the characteristics of the major intermediaries, are set out below.

### Brokers

Stockbrokers provide innumerable specialized services for their various clients, but the most basic thing they offer is access to the market. A private individual, no matter how wealthy, cannot walk onto the floor of the NYSE and begin trading. As noted above, electronic technology and the Internet have greatly changed the terms of access to market data and to the transaction mechanisms themselves, especially for small investors. As a result, customers can choose from among many types and levels of brokerage service, perhaps more than ever before.

The interests of brokers and customers can conflict. As in any financial agent/principal relationship, the broker's incentive is to enrich himself, not necessarily the customer.<sup>7</sup> Customer funds may be misappropriated or deployed in ways that primarily benefit the broker. As a result, the brokerage profession is closely regulated, by state and federal law, and by industry self-regulation.

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<sup>6</sup> It is so new that there is no standard acronym: some of the leading firms in the business have “ECN” in their names, but they are subject to SEC Regulation ATS, for “alternative trading system.” ATS and ECN are interchangeable terms.

<sup>7</sup> Hence the oldest joke on Wall Street: a financier is trying to impress a visitor, both of them looking out a high window in lower Manhattan. “Over there,” says the host, proudly, “are the bankers’ yachts. And over *there* are the brokers’ yachts.” “And where,” asks the guest, “are the customers’ yachts?”

Brokerage regulation is a compendious subject, but perhaps its central tenet is what is called the duty of best execution, which means that the broker must fill the customer's order under the best terms reasonably available. A consequence of the impact of new technology on the market is that brokers may have several alternative venues to execute customer orders, each of which can claim to be the best. To see how this has evolved, it is necessary to look at the next (and final) layer of intermediation, which involves the firms at the heart of the market who complete trades by matching buyers and sellers or who execute customer orders by buying or selling as principals using their own capital.

## The Exchange Specialists

Trading on the floor of the New York Stock Exchange takes place at locations called specialist's posts. Each stock listed on the exchange is assigned a specialist, whose function is to make a market in that stock, which means bringing buyers and sellers together and maintaining continuous price quotations. The specialist is described as a broker's broker, part auctioneer, part air-traffic controller. Brokers with a customer's order in hand to buy or sell a particular stock go to the specialist for that stock. Before automation, this meant physically approaching the specialist's post; today, it still may, but more often orders are routed through electronic systems.

**Figure 1. Stock Transactions on the New York Stock Exchange**



Most transactions involve the specialist matching a buyer and a seller. On about 10% of trades, however, the specialist acts as a principal. Specialists are expected to step in with their own capital when there is a temporary imbalance of buying and selling interest, to smooth price transitions.

The monopoly specialist franchise is normally very profitable. In 1999, NYSE specialists earned a return on capital of 22.0%, compared to 9.4% for all NYSE member firms. Not only do all transactions pass through the specialist's post, but the specialist has a significant information advantage over other traders. About two-thirds of all orders are limit orders, orders to buy and sell only at a particular, specified price. (The rest are market orders, or orders to buy or sell immediately at the going price.) Limit orders are placed with the specialist, who holds them until they become marketable – until the market price hits the specified limit price. Only the specialist knows the total buying and selling interest represented by limit orders to trade away from the current market price. This knowledge confers market power: for example, if a stock's price is falling, the specialist who knows that a further drop will trigger large limit orders to buy clearly has a much better idea of where the price is likely to go than another trader who only sees the price drop.

To prevent abuse of the market power inherent in the monopoly franchise and superior information, specialists are closely monitored by the exchanges. The basic

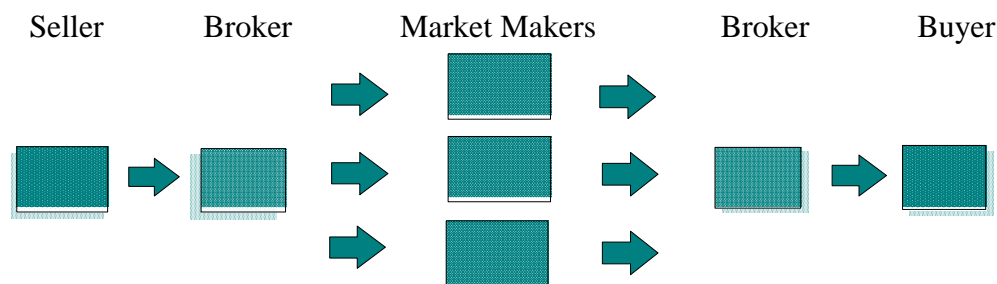


NYSE rule is that a specialist cannot trade for its own account if there is any other trader willing to make the same transaction at the same price.

## Nasdaq Market Makers

On the Nasdaq, instead of a single specialist for each stock, there are multiple market makers.<sup>8</sup> The market makers publish bid and ask quotations, the prices at which they are willing to buy or sell, which are transmitted electronically to all brokers and market makers in the system. (There is no Nasdaq trading floor, only a network of computer screens displaying quotations.) Market makers' income comes from the gap between the bid and ask prices, called the spread, which of course represents a trading cost to investors. Nasdaq is a dealer market: the market makers take part in all transactions rather than matching buyers and sellers. Where the NYSE relies on direct regulation, the Nasdaq model relies on competition among market makers to keep spreads as low as possible and to maintain orderly markets.

**Figure 2. Stock Transactions on the Nasdaq Market**



Another key difference between the NYSE and Nasdaq market structures is in the identities of the market making firms. NYSE specialist firms for the most part specialize in market making and never trade directly with public investors.<sup>9</sup> Nasdaq market makers, on the other hand, include many of the largest diversified securities firms, Wall Street's household names. Thus it is common for a customer's broker to work for the same firm as the market maker who executes the customer's order. The market maker, in this situation, fills the order out of its own inventory, in effect trading against its own customers. The trade is said to be "internalized."

Internalization of customers' orders is permitted by the SEC, despite the potential conflict of interest, provided that the market maker gives the customer the best price quoted anywhere in the Nasdaq system (called the National Best Bid or Offer, or NBBO), even if that price is better than the market maker's own currently-published quotations. Dealing on this "step up and match" basis is common among Nasdaq market makers. Many of them enter into arrangements with brokers to execute all the broker's customer orders, often in exchange for cash payments or

<sup>8</sup> There are an average of about 12 market makers per Nasdaq stock, but hundreds of firms may make a market in the largest, most active Nasdaq companies.

<sup>9</sup> The top five specialists make a market in 1,626 out of the 2,730 NYSE-listed stocks.

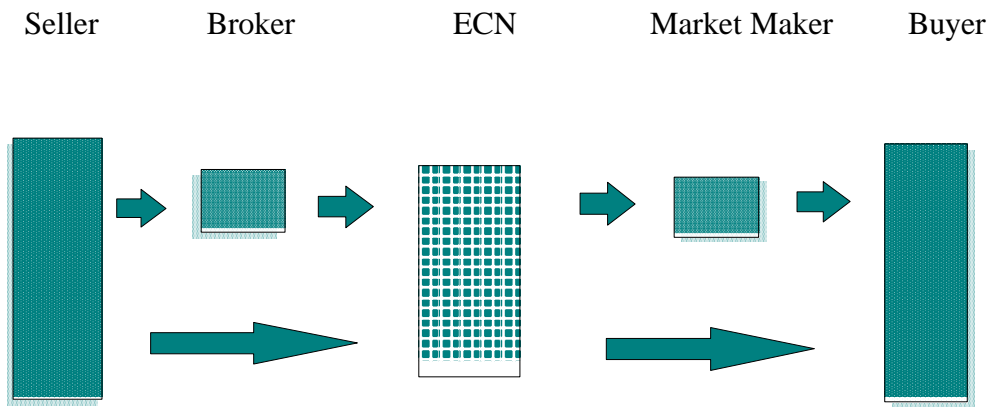
other consideration. Such payments for order flow are an important source of income for many discount brokerages, including some of the biggest online brokers. In a converse form of internalization, some brokerages have acquired market-making firms, to capture the dealer spread as well as commission from the same trades.

NYSE rules make internalization rare in that market. However, this may change, because one of the major rules – Rule 390, which prohibits member firms from executing transactions in NYSE-listed stock anywhere except on an exchange – is set to be repealed. In proposing the repeal of Rule 390, the NYSE asked the SEC to make a new rule requiring that internalized trades take place only at a price better than (not just equal to) the NBBO. The SEC approved the repeal in May 2000,<sup>10</sup> but declined to institute the new rule, which would have affected all markets, not just the NYSE.<sup>11</sup>

### ECNs

ECNs (electronic communications networks, also known as ATNs, alternative trading systems) are computer systems that collect limit orders, and either match them and execute them internally or, if no match is found, route them to an outside market maker for execution. Figure 3 illustrates the possible outcomes. If the trade is passed on to a market maker, the ECN has operated as an ancillary intermediary. If the trade is matched and executed internally, however, a layer of intermediation has been bypassed – buyer and seller have met directly without the interposition of a dealer. Unlike specialists and Nasdaq market makers, ECNs do not take positions with their own capital in the market; they simply offer a transactions facility.

**Figure 3. Stock Transactions on an Electronic Communications Network (ECN)**



<sup>10</sup> U.S. Securities and Exchange Commission. *NYSE Rulemaking: Order Approving Proposed Rule Change to Rescind Exchange Rule 390*. Release 34-42758. May 5, 2000.

<sup>11</sup> Such a rule remains under consideration as one of the options for dealing with market fragmentation, discussed below. See: U.S. Securities and Exchange Commission. *Commission Request for Comment on Issues Relating to Market Fragmentation*. Release 34-42540. February 23, 2000.

ECNs typically operate with a staff of a few dozen, compared to the thousands employed by Nasdaq and the NYSE, but in terms of transaction capacity they are not far short of the traditional markets. The nine ECNs now operating handle about 30% of Nasdaq volume, or about 200,000,000 shares per day. (They have a much smaller share of NYSE volume, but this could change with the repeal of Rule 390. Thus far, operational capacity has not been a constraint on ECN volume.)

Regulation of ECNs is a work in progress. They are regulated by the SEC as broker/dealers, although much broker regulation is clearly irrelevant to them, since they do not accept customer funds or act as fiduciaries. Under regulations adopted in 1998, ECNs have the option of registering with the SEC as exchanges: three have applied for exchange status, which has not yet been granted. Nasdaq and NYSE are self-regulators with large market surveillance operations – the SEC has not yet decided how much of this activity will be required of ECN/exchanges. Alternatively, ECNs may continue to operate as broker/dealers under Regulation ATS, which subjects them to some of the rules that apply to exchanges as their volume passes certain thresholds (reporting of price and volume data, rules for fair access to the system, approved structures of governance, and so on).<sup>12</sup>

ECNs offer significant advantages to their customers. When bids and offers are matched internally, the traders do not pay brokerage commissions<sup>13</sup> or dealer spreads: trading costs can be dramatically lower than in the traditional markets.<sup>14</sup> Turnaround times can be nearly instantaneous. However, what has brought ECNs into the mainstream of stock trading is not so much these cost and time savings, but an SEC regulation.

After a mid-1990s investigation of pricing practices on the Nasdaq, the SEC concluded that a “two-tiered” market was developing, where Nasdaq market makers used ECNs to trade among themselves and with a few large institutional investors at prices that were better than the published bid and ask quotations available to public investors.<sup>15</sup> In 1997, new order handling rules took effect, requiring Nasdaq market makers to make public any prices they quoted to an ECN. The result was that ECN prices became available on the same screens that carried Nasdaq market makers’ quotes: the benchmark NBBO (National Best Bid or Offer) price now includes ECN prices. To comply with the order handling rules, ECNs were integrated into SelectNet, Nasdaq’s automatic display and execution facility for large trades. (In

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<sup>12</sup> See CRS report RL30195, *Alternative Trading Systems: Can Computers Replace Stock Exchanges?*

<sup>13</sup> Customers who gain access to an ECN through a broker will pay commission, of course, but since the ECNs are registered brokers themselves, they can and do deal directly with public customers.

<sup>14</sup> ECNs make money by charging a fee for access to their systems – Island, the second largest ECN, charges 1/4 cent per share.

<sup>15</sup> See: U.S. Securities and Exchange Commission. *Report Pursuant to Section 21(a) of the Securities Exchange Act of 1934 Regarding the NASD and the Nasdaq Market*. August 6, 1996. p. 21.

addition, a rule recently approved by the SEC will give ECNs access to the Intermarket Trading System that links the exchanges.<sup>16)</sup>

Whether ECNs represent the future of the stock market is open to question. To all outward appearances, Nasdaq and the NYSE have performed superbly in recent decades, both as vehicles for business capital formation and as venues for the growing volumes of trading generated by the long bull market. Still, it is noteworthy that many of the largest securities firms (including retail brokerages, specialists, and market makers) have invested in ECNs – the pillars of the market appear to be hedging their bets. At the least, ECNs are emblematic of the way that cheap, off-the-shelf technology can now provide a reasonable substitute for the elaborate and expensive market mechanisms that have evolved over time. This is the backdrop for the debates underway in Congress, at the SEC, and among market participants themselves about the future of the market.

## Policy Questions

The SEC is considering a range of possible rule changes that would significantly alter the trading arrangements described above. Private sector proposals from Nasdaq and from major securities firms would bring equally significant changes. What are the problems these proposals mean to address, and what specific solutions are being offered?

### Problems with the Current Market Structure

Several problems in the current system of stock trading come under the umbrella term “market fragmentation.” The market is said to be fragmented by the practice of internalizing customer orders (which then never interact with the wider market), by brokers who accept payment for routing all their customer orders to a single market maker, and by the emergence of ECNs. The effect of all of this is to create several venues for trading the same stocks. This fragmentation is not always seen as a problem; to some it is a sign of competition that spurs innovation and produces improvements in technology and services. To those who do see it as a problem, however, market fragmentation has two kinds of harmful effects: (1) it diminishes effective price competition among market makers and (2) it scatters trading interest among various market centers, making the price-setting mechanism less efficient, and making U.S. markets as a whole more vulnerable to foreign competition.

#### Imperfect Price Competition.

When brokers accept payment for order flow from a market maker, the market maker agrees to execute all the brokers’ orders at the best available price (the NBBO), even if that price is better than the market maker’s current quotations. How does this harm the customer? In a market like Nasdaq, one would normally expect

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<sup>16</sup> U.S. Securities and Exchange Commission. *Order Granting Approval to Proposed Rule Changes Relating to ECN and ATS Participation in the ITS/CAES System*. Release 34-42536. March 16, 2000.

market makers to compete for order flow by offering the best prices, in the form of the narrowest spreads. However, if a substantial number of market makers are ready to match any price offered, a market maker who posts a better quotation will not attract more orders but will simply improve the general market price. When this happens, of course, it is good for investors. The problem is that in this environment there is little incentive for any dealer to be the first to offer a better price, since it will not reap the benefit of increased order flow.

Some believe that restoring true price competition among Nasdaq market makers requires that payment for order flow be restricted or banned. However, defenders of payment for order flow argue that it does not prevent dealers from competing on non-price factors, such as speed of execution or the quality of their proprietary order handling systems (and also that it allows brokers to charge lower commissions).

Initiatives to reduce market fragmentation assume that superior price competition occurs when all customer orders can interact directly, rather than when they are captured by competing market centers. This implies the superiority of a central marketplace in allowing customer orders to drive the price-setting process. This applies particularly to limit orders, where customers specify that they are willing to buy or sell at a particular price, rather than the current market price.

Limit orders allow investors to be price setters, rather than price takers. As noted above, however, market makers and specialists can profit from the knowledge of limit orders they hold that are not visible to other traders. They have an incentive to keep their limit order “books” private. In 1997, as part of the package of order handling rules that required publication of ECN price quotes, the SEC required market makers to expose limit orders that improve the market maker’s bid or ask quote. For example, if a market maker is willing to buy a stock at \$40 (the bid), and to sell at 40 1/4 (the ask), a customer limit order to buy at 40 1/8 improves the spread. The customer, in other words, is willing to pay more than the market maker for the stock. But the market maker will not sell at that price. Before 1997, the market maker could simply hold on to the limit order until the price of stock rose and the market maker’s own bid price reached 40 1/8. If the bid never reached that level, the order would not be filled at all. Under the new rules, the limit order to buy has to be made public, and someone willing to accept 40 1/8 could fill the order – getting more for the stock than the market maker was then offering. If other market makers’ ask quotes were also 40 1/4, the limit order would become the NBBO until it was filled.

The order handling rules require that limit orders that narrow the spread be displayed to the market within 30 seconds of receipt. A recent SEC study found that many market makers often fail to meet that deadline, or that they program their automated systems to wait until the 30<sup>th</sup> second before making displayable limit orders public.<sup>17</sup> Again, the longer the market maker holds on to the limit order, the more likely it is that prices will move to where it can fill the order itself and profit from the spread. The SEC calls this a “private option” – exercised by the market maker at the

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<sup>17</sup> U.S. Securities and Exchange Commission. *Special Study: Report Concerning Display of Limit Orders*. May 4, 2000. 23 p.

customer's expense – and regards deficiencies in limit order display as a failure to meet the duty of best execution.

Several of the market structure proposals discussed specifically below call for improved disclosure of limit orders. If limit orders away from the current price quotes were made public, traders other than market makers would have a better idea of the total buying and selling interest in the market, and price setting might become more efficient.

### **Diminished Liquidity.**

Another concern relating to market fragmentation is the effect on market liquidity. Financial markets are said to be liquid when buyers have no difficulty finding sellers, and when transactions can be expected to occur at close to the last reported price (in other words, when the appearance of a new buyer will not cause prices to rise dramatically, or a seller cause them to fall).<sup>18</sup> A basic principle of market economics is that the more informed buyers and sellers there are, the more efficient the market will be. That is, the more likely it is that prices set in that market will incorporate all relevant information held by traders. In the stock market, this means that in the long run capital will be allocated to the most productive users, with benefits accruing not only to investors but to the economy at large.

Some view the existence of internalization (where a single firm encompassing both a broker and a market maker effectively constitutes an isolated market) and the growth of alternative market centers such as ECNs as phenomena that siphon off liquidity from the central market. If these markets are setting their own prices, their lower volume will make them prone to short-term volatility when buyers outnumber sellers (or vice versa). If a number of satellite market centers are taking price cues from a central market or from each other, the concern is that the price setting mechanism will be less robust than if all orders meet in a single forum.

Very few would argue that fragmentation of the U.S. stock markets up to now has compromised the price setting process to a degree that threatens serious misallocations of capital or dangerous market volatility. The concern is about the trend: if ECNs can win increasing shares of Nasdaq and NYSE volume, and if NYSE firms in the post-Rule 390 market choose to internalize their customer orders rather than send them to the floor of the exchange, market fragmentation may begin to have visible economic consequences.

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<sup>18</sup> As an illustration of liquidity, imagine that a city ordinance permits the sale of used cars only to people who live on the same block as the seller. Such a market would be characterized by wildly inconsistent prices. Someone who had wrecked his car but could not afford a new one might have to offer quite a lot to induce one of his neighbors to part with a car. On the other hand, a seller of an identical vehicle might have to go very low to interest any of his neighbors. Some would-be buyers or sellers would find no takers at any price. Once the law is repealed and the newspaper classifieds are again filled with used car listings, the market becomes more liquid. The market now includes many buyers and sellers and comparison shopping is possible: prices for similar cars are likely to be fairly close together.

However, to accept these arguments against fragmentation is not necessarily to endorse a government remedy. Traders have a natural preference for liquid markets. Federal Reserve Chairman Alan Greenspan made this point in April before the Senate Banking Committee:

In the long run, unfettered competitive pressures will foster consolidation as liquidity tends to centralize in the system providing the narrowest bid-offer spread at volume. Two or more venues trading the same security or commodity will naturally converge toward a single market. One market offering marginally narrower bid-ask spreads will attract the business of others, improving its liquidity further, and reducing that of its competitors. This, in turn, will engender an even greater competitive imbalance, leading eventually to full consolidation. Of course, this process may not be fully realized if there are impediments to competition or if markets are able to establish and secure niches by competing on factors other than price.<sup>19</sup>

The role of government, in this perspective, is not to impose a particular structure on the markets, but to ensure that the eventual outcome is arrived at through true competition.

The perceived tendency of markets to centralize to deepen liquidity underlies concerns about foreign competition to U.S. markets. Consolidation of stock and derivatives markets has become common around the world in recent years, except in the United States. Earlier this year, the London and Frankfurt exchanges – Europe’s two largest – announced a merger. Wouldn’t a 24-hour market listing the shares of companies from all countries offer the greatest possible liquidity? Is a foreign “super-market” likely to become the main venue for trading U.S. shares?

The technical barriers to the establishment of such a market are relatively minor; the legal and regulatory barriers are rapidly falling. The main problem in creating a viable new market is attracting liquidity from existing markets. This may prove very difficult. Nasdaq and the NYSE are now the world’s most liquid stock markets, and have indicated a willingness to change to meet new competition, while ECN-like trading structures have not yet been tested in a prolonged bear market or a crash. Still, there is no doubt that a well-regulated foreign market that offered significantly lower transactions costs as well as access to capital on a global scale could find favor with U.S. traders and issuers of securities.

There are other dimensions to the issue of market liquidity. Structures that ensure liquid markets for high-volume stocks may not do so for less actively traded companies. Large and small traders have different liquidity requirements. A national market structured like an ECN – where buyers and sellers were matched automatically – might provide adequate liquidity for small investors, but would it suit the needs of large institutions that sometimes wish to liquidate portfolios worth hundreds of millions of dollars? The effect – the “market impact” – of the publication of such a large sell order might be significant price drops, imposing a high transaction cost on the institution.

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<sup>19</sup> Testimony of Chairman Alan Greenspan before the Senate Committee on Banking, Housing, and Urban Affairs. Hearing, 106<sup>th</sup> Congress, 2<sup>nd</sup> Session. April 13, 2000.

The NYSE was confronted by this problem decades ago, as institutional trades grew too large for the trading crowd on the floor to handle. The solution was the emergence of “upstairs trading,” where brokers known as block positioners find an opposite party before the order is sent to the floor for execution. As SEC Chairman Arthur Levitt put it in a 1999 speech, “For on-line investors, brokers are conduits to markets; for institutions, they are prospectors for liquidity.”<sup>20</sup> The point is that different market participants have different uses for market structures and intermediaries.

## Proposed Modifications to Market Structure

### The SEC’s Market Fragmentation Release.

In its February 2000 concept release,<sup>21</sup> the SEC set out for public comment six possible approaches to the issues discussed in this report. None of the six has been formally proposed yet, although the comment period has expired. The six SEC proposals were as follows:

- *Require greater disclosure by market centers and brokers concerning trade executions and order routing.* If such information were available from all brokers, customers (and regulators) could evaluate how well their orders fared when they were sent to particular market makers in exchange for order flow, when the broker attempted to find the best price on offer from all market makers, or when orders were routed to an ECN. If any of these had a material impact on the quality (price, speed, etc.) of trade executions, customers could choose their brokers accordingly.
- *Restrict internalization and payment for order flow.* The SEC could adopt the NYSE suggestion that internalization be permitted only at prices better than the current NBBO, or a similar rule that would make the practices more expensive for market makers.
- *Require exposure of customer market orders to legitimate price competition.* Rather than simply fill market orders at its current quote, a market maker could be required to seek price improvement. For example, if a buy order was received when the current ask quote was 40 1/8, the order could be exposed for a period of time at 40 1/16 to see if a seller could be found who was willing to accept less than the market maker’s ask quote.
- *Adopt an intermarket prohibition against market makers trading ahead of previously displayed customer limit orders.* In other words, market makers would not be allowed to trade for their own accounts at their own quoted prices if a customer limit order that

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<sup>20</sup> *Dynamic Markets, Timeless Principles.* Remarks by Chairman Arthur Levitt at Columbia Law School, September 23, 1999.

<sup>21</sup> See note 9 on p. 6 above.



improved those prices had been displayed by another market center but had not yet been filled. This prohibition would require intermarket linkages to display the size, time, and price of limit orders entitled to priority execution and to permit automatic execution of limit orders across market centers.

- *Provide intermarket time priority for limit orders or market maker quotations that improve the NBBO.* Currently, there is no guarantee that the first trader to offer a price improvement over the current NBBO will be the first to trade at that price: other market makers may simply “step up” and match the price. Time priority would mean that no trades could occur at the new price, or at an inferior price, until the price improver’s order had been filled (provided that the new price was widely disseminated and accessible through automatic execution).
- *Establish nationwide price/time priority for all displayed trading interest.* This takes the previous option a step further: a national linkage system (NLS) would be established that encompassed all markets, displaying customer orders and market maker quotes to the public, as well as to market participants. Orders at the same price would have to be filled strictly in the order in which they were posted on the NLS. Market makers would not be allowed to trade for their own accounts except at a price better than that displayed on the NLS. All trading interest on the NLS would be available to automatic execution, and the public would have access via brokers, exchanges, or ECNs.

### **The Central Limit Order Book (CLOB).**

In February 2000, three large brokerage firms (Merrill Lynch, Goldman Sachs, and Morgan Stanley) testified before the Senate Banking Committee in favor of a market system that resembles the SEC’s NLS option. This proposal is called a central limit order book, or CLOB, and would link the exchanges, Nasdaq market makers, and the ECNs into a unified electronic network. The linkages would assure that orders received in one market could be executed or matched with orders from other markets. Price/time priority would be required, meaning that all orders (including limit orders) would be recorded and displayed on a central facility that would regulate trade executions on a “first-come-first-served” basis.

### **Nasdaq’s SuperMontage.**

Nasdaq has proposed to the SEC a modification to its order display and execution system that seeks to lessen fragmentation. Under this system, called SuperMontage, Nasdaq trading screens would include more information than they do now: all trading interest in Nasdaq stocks at the current price (the NBBO) would be displayed, as would trading interest two price levels away from the current price. Market participants would thus be able to see the size of limit orders held by market makers to trade at prices other than the going price. SuperMontage would also have an automatic execution capacity, combining Nasdaq’s SelectNet system (which

handles large trades) and its Small Order Execution System (SOES). Execution through SuperMontage would be voluntary: displayed orders could be filled elsewhere, allowing Nasdaq market makers to continue to internalize their customer orders. The SuperMontage system would not require price/time priority in filling orders.

These three proposals have elements in common, but they have drawn support and opposition from different quarters. Nasdaq distinguishes its proposal from the CLOB, which it attacks as a mandatory, centralized system that removes the incentive for market makers to provide liquidity by committing their own capital. The ECNs are critical of SuperMontage, calling it an anti-competitive attempt to take away their trading volume in Nasdaq stocks.

All three proposals would create a market that in many respects resembles the ECN model, where limit orders are disclosed and where matching of customer trades without the participation of a dealer takes priority over market makers trading for their own accounts with their own capital. This is mixed news for the ECNs: on the one hand, it is a kind of recognition that they have identified an investor need that the traditional markets did not provide. On the other hand, if those traditional markets adopt enough elements of the ECNs' market structure, is there still a place for the ECNs themselves in the business?

## Conclusion

The SEC's national linkage system, the CLOB, and SuperMontage all aim to increase the information available to public investors and to consolidate trading that has become somewhat scattered. The twin goals are to increase transparency and liquidity, which everyone agrees are good things. The question then arises, why are these proposals necessary? Why have investors not insisted on a market with these characteristics?

There are two responses. The first is that investor preferences for liquid and transparent markets have been thwarted by the parochial interests of certain market institutions. One person's market imperfection is someone else's profit opportunity. U.S. securities law is not neutral on the question of market structure; in 1975, Congress enacted Section 11A of the Securities Exchange Act, calling for the establishment of a national market system of electronically linked exchanges, and giving the SEC full power to mandate such a system (or any of the systems now proposed).<sup>22</sup> The SEC has chosen to let markets evolve following their own lights, and the most visible result of the national market system legislation is the Intermarket Trading System (ITS), which links the exchanges. ITS is widely regarded as technologically archaic and carries only about 2% of exchange volume. Why? Clearly, the dominant NYSE has no incentive to share its trading with the small regional exchanges. Similarly, the market structure reforms now under discussion will be strenuously opposed (and possibly quashed) by market makers, exchanges,

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<sup>22</sup> Section 11A(C)(v) further specifies that Congress finds it in the public interest to create an opportunity "for investors' orders to be executed without the participation of a dealer."

brokers, and institutional investors, depending on how the particular interests of each are affected. Such a response, however, may provide justification for government intervention in market organization.

Second, however, it is possible to view the increase in market fragmentation as a temporary dislocation brought about by the rapid adoption of new electronic technology. Technology is not assimilated at the same pace throughout the market. For example, the SEC has for several years sought to convert stock pricing from the traditional fractions of dollars to decimals, in order that smaller spreads and price increments could be quoted. Decimalization was set to occur in 1999, but the SEC delayed, citing the demands on the securities industry of making its computers Y2K-ready. The SEC has still not set a firm date for mandatory conversion, but Datek, a leading online broker, recently announced that it will price securities in cents anyway (and donate to charity any profits arising from rounding decimals into fractions).<sup>23</sup> With today's technology, market innovators do not have to wait for regulatory fiat, or universal adoption. Eventually, if the innovation attracts customers, the rest of the market will catch up, and the long-term trends that promote increased transparency and a central pool of liquidity will likely resume, with or without new regulations.

Or perhaps not. A contrary interpretation is that decentralization is the wave of the future. Just as businesses have found that a network of small computers can be more powerful than a single mainframe, so a number of market centers offering quite different trading services may be as effective a provider of liquidity as a central market, if they are linked by electronic technology and widely accessible. Similarly, competition and investor choice may be adequate substitutes for government rules mandating transparency. If this is the way U.S. markets evolve, attempts to establish a centralized global exchange in London or Singapore are unlikely to make much headway with U.S. investors.

There is no shortage of speculation about the future of the stock market. It is a unique moment in market history. Demand for the market's products – by investors seeking a return on their money and by companies seeking equity capital – has never been higher. At the same time, the mechanisms by which those products are delivered have been transformed by new technology, and the transformation is likely to accelerate. Government oversight can help ensure that the passage does not compromise competition, investor protection, or economic efficiency, but the market's final destination still lies over the horizon.

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<sup>23</sup> *Datek Kicks Off Decimalization Next Week*. Reuters, June 26, 2000.