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FOR THE CLOSING OF THE NYSE FLOOR
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*The world is moving so fast these days that the
man who says it can't be done is generally
interrupted by someone doing it.¹*

The New York Stock Exchange (NYSE) is an anachronism. Formed in the early years of the industrial revolution,² the NYSE is the archetype of the U.S. system of stock exchanges, indeed, the model for stock exchanges the world over. Nonetheless, it is an idea whose time has come and gone. This Note does not advocate eliminating the exchange of stock. Instead, this Note offers a much more "modest proposal."³ This Note proposes the elimination of the least efficient⁴ link in the communication process between buyers and sellers of stock and derivative financial instruments—the physical exchanges—in favor of a completely automated communication and exchange process.

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1. Elbert Hubbard, *quoted in* THE CONCISE COLUMBIA DICTIONARY OF QUOTATIONS 211 (Robert Andrews ed., 1987).

2. The precursor to the NYSE was formed on May 17, 1792 pursuant to the so-called "Buttonwood Agreement," which created a cartel among stock brokers of the time. NYSE, FACT BOOK 1992, 81 (1993) [hereinafter FACT BOOK 1992]; see also ROBERT SOBEL, THE CURBSTONE BROKERS 9-10 (1970).

3. Cf. Milton H. Cohen, *The National Market System—A Modest Proposal*, 46 GEO. WASH. L. REV. 743 (1978) (emphasizing the need for gradual development of a national market system).

4. "Efficient" and "efficiency" are used throughout this Note in an economic sense, that is, efficient in the use of resources. 5 OXFORD ENGLISH DICTIONARY 84 (2d ed. 1989) ("Economic efficiency relates to output per unit cost of the resources employed; contrasted with technical efficiency, which means output of energy per unit of energy applied."). The words have a second meaning relating to a market's ability to discover information and to reflect that information in the price of a commodity. This is the basis of the "efficient capital market hypothesis." See generally Ronald J. Gilson & Reinier H. Kraakman, *The Mechanisms of Market Efficiency*, 70 VA. L. REV. 549 (1984). For a contrary view of market efficiency, see generally Lynn A. Stout, *The Unimportance of Being Efficient: An Economic Analysis of Stock Market Pricing and Securities Regulation*, 87 MICH. L. REV. 613 (1988).

The exchange of stock is a process of communication.⁵ In days gone by, the entire process—from the investor,⁶ to the broker, all the way to the floor of the stock exchange—occurred manually. The fate of all transactions in stock lay, quite literally, in scraps of paper and in face-to-face communication.⁷ Gradually, most of the links in the communication chain have been automated, with varying degrees of success.⁸ The only significant manual link left in the chain is the transaction on the floor of the stock exchange itself.

The Securities Exchange Commission (SEC) has argued for a more fully automated system, in the form of a "National Market System."⁹ This idea was part of an effort to modernize the exchange of securities¹⁰ ordered by Congress in 1975 when it amended the Securities Exchange Act of 1934 to include section 11A.¹¹ The idea failed to come to fruition,¹² at least in part because it was thought that the technology was not available to create such a system.¹³ Such considerations may no longer

5. The Securities Exchange Commission (SEC) has described a central market system as "a system of communications by which the various elements of the marketplace, be they exchanges or over-the-counter markets, are tied together." Future Structure of Securities Markets, 37 Fed. Reg. 5286, 5287 (1972).

6. This Note will use the term "investor" as shorthand for buyers or sellers of equity securities or their derivative instruments.

7. See *infra* Part I.A.

8. See *infra* Part I.B.

9. See Request For Comment on Issues Relating to the Development of Order Routing and Market Linkage Systems, Exchange Act Release No. 14,885, [1978 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 81,625 (June 23, 1978); Development of a National Market System, Exchange Act Release No. 14,416, [1978 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 81,502 (Jan. 26, 1978).

10. See INSTITUTIONAL INVESTOR STUDY REPORT OF THE SEC. AND EXCH. COMM'N, H.R. DOC. NO. 64, 92d Cong., 1st Sess. xxv (1971); see also Donald E. Farrar, *The Coming Reform on Wall Street*, HARV. BUS. REV., Sept.-Oct. 1972, at 108 (discussing the SEC's push for a "centralized, competitive, electronically linked marketplace").

11. Act of 1975, Pub. L. No. 94-29, 89 Stat. 110 (codified as amended at 15 U.S.C. § 78k-1(a)(2) (1988)). This amendment was intended to "facilitate the establishment of a national system." 15 U.S.C. § 78q-1(a). The SEC was given broad powers to accomplish this goal. *Bradford Nat'l Clearing Corp. v. SEC*, 590 F.2d 1085, 1091 (D.C. Cir. 1978).

12. The SEC, however, recently has embarked on an ambitious study of the future of market structure, the Equity Market 2000 study. Request For Comment on U.S. Equity Market Structure Study, Exchange Act Release No. 30,920, [1992 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 85,012 (July 14, 1992); see also Roberta S. Karmel, *The Market 2000 Study*, N.Y. L.J., Oct. 15, 1992, at 3.

13. It is not clear, however, whether such a system was technically difficult even when first proposed. As long ago as July 1, 1976, the NYSE claimed a "message switch is by no means a new computer application." NYSE, A NATIONAL MARKET SYSTEM 59 (1976). In April 1978, the NYSE told the SEC that it could develop a universal switch within three to six months. See LOUIS LOSS & JOEL SELIGMAN, 5 SECURITIES

exist. The emergence of digital fiber-optic communication¹⁴ and of the supercomputer¹⁵ makes the creation of a national automated securities exchange system a much easier task. Even former officials of the New York Stock Exchange agree that complete automation is inevitable.¹⁶

Technical considerations notwithstanding, the brokers and specialists on the exchange floors argue that the human element is vital to maintain an orderly and efficient market.¹⁷ There is nothing, however, inherent in the nature of the communication process on the floor that requires a human touch. This Note argues that brokers and specialists are an anachronism and that any legitimate function they perform can be performed over the computer network.

In support of this proposition, Part I of this Note describes and analyzes the stock exchange communication process as it has existed in the past and as it currently exists, paying particular attention to the role of the floor broker and the stock specialist.¹⁸ Part II examines certain alternatives, evaluating such systems as to their potential as a replacement for the physical exchanges. Part III suggests an SEC rule granting specific exemption from exchange reporting requirements to low-volume automated systems in the hope of spurring innovation in the business of trading securities.

REGULATION 2506 n.70 (1990) (citing Letter from NYSE to Mr. George Fitzsimmons 15-19 (Apr. 17, 1978) (on file with the SEC, File No. 57-735a)).

14. See generally Lee May, *High-Speed Computer Networks Urged as Boon to Business, Schools*, L.A. TIMES, Nov. 21, 1991, at A5 (discussing recent congressional approval of a \$1 billion, five-year project to develop a digital fiber-optic "supercomputing" network). Of course, fiber-optic lines are not infallible. See *Severed Phone Lines Halt Some N.Y. Trading*, L.A. TIMES, Jan. 5, 1991, at D2 (tracing disruptions in trading to problems with fiber-optic cable).

15. See Don Clark, *Intel Rolls Out New Supercomputer Today*, S.F. CHRON., Nov. 18, 1991, at B2 (announcing the unveiling of a contender for the world's fastest computer).

16. See Robert J. McCartney, *Big Board, Big Birthday, Big Questions; NYSE Marks 200 Years, But Faces Cloudy Future*, WASH. POST, May 19, 1992, at C1.

Sometime within the lifetime of the NYSE's own top officials, analysts say, the Big Board is likely to dispense with the trading floor altogether and replace it with a vast network of computers. . . . "I don't know if it'll be 10 years [from now], but, at some point in time in the future, that's what will happen," said William Freund, who was the NYSE's chief economist from 1968 to 1985 and now is chairman of the economics department at Pace University's business school. "The competition will drive the exchange in that direction," he said.

Id.

17. Saul Hansell, *The Wild, Wired World of Electronic Exchanges*, INSTITUTIONAL INVESTOR, Sept. 1989, at 91, 92-94.

18. See *infra* Part I.C.

I. THE CURRENT SYSTEM

*All professions are conspiracies against the laity.*¹⁹

Equity securities, that is, corporate stocks and their derivative instruments,²⁰ currently are traded in a variety of ways. Stocks are either traded on the floors of the seven stock exchanges registered with the SEC,²¹ on the "over the counter" (OTC) market,²² or on one of several "proprietary" trading systems.²³ The most popular of the derivative instruments, the

19. George Bernard Shaw, *quoted in* OXFORD DICTIONARY OF QUOTATIONS 496 (3d. ed. 1979).

20. There are three major types of financial instruments which derive their value from equity securities: stock index futures, options, and stock index options. A future is a contractual obligation to buy or sell a certain commodity, in this case an equity security, at a future date for a specified price. An option is similar, except that its exercise is at the "option" of the holder, that is, it may go unexercised, while a future is a binding contract on both sides. A stock index future is a future which is based on the price of a market basket of securities, or "stock index," rather than the price of a single security. The obligation incurred is to pay, in cash, the difference in price between the contracted price and the actual price of the stock index as of the future date, rather than deliver the basket of securities itself. A stock option is simply an option to buy a particular stock at a particular price. Finally, a stock index option is the option, but not the obligation, to participate in the movement of a stock index. For a description of these instruments, see generally Lewis D. Solomon & Howard B. Dicker, *The Crash of 1987: A Legal and Public Policy Analysis*, 57 *FORDHAM L. REV.* 191 (1988).

21. Exchanges register with the SEC under the provisions of the Securities Exchange Act of 1934, § 6, 15 U.S.C. § 78(f). The seven exchanges currently registered are (in order of stock dollar volume) the New York, the American (also in New York), the Midwest (in Chicago), the Pacific (in Los Angeles and San Francisco), the Cincinnati, the Philadelphia, and the Boston. 5 *LOSS & SELIGMAN, supra* note 13, at 2510-12. "The Chicago Board Options Exchange has the authority to trade stocks, but has not yet done so." Request for Comment on U.S. Equity Market Structure Study, Exchange Act Release No. 30,920, [1992 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 85,012, at 82,910 n.14 (July 14, 1992).

22. This trading is accomplished primarily through the National Association of Securities Dealers Automated Quotation (NASDAQ) system. The "NASDAQ system, which began operations in 1971, is now one of the largest stock markets in the world, with trading valued at \$694 billion in 1991." Request For Comment on U.S. Equity Market Structure Study, Exchange Act Release No. 30,920, [1992 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 85,012, at 82,907 (July 14, 1992).

23. "Proprietary" or "third market" trading systems such as Instinet and POSIT are automated systems which match buyers and sellers of securities at the then-current price on the exchange on which the security is listed. See *Proprietary Trading Systems*, Exchange Act Release No. 26,708, [1989 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 84,406 (Apr. 11, 1989) (describing in detail the proprietary trading systems of the United States); see also Request for Comment on U.S. Equity Market Structure Study,

future on the Standard & Poor's 500 index, is traded on the Chicago Mercantile Exchange (CME).²⁴ Of all these trading methodologies, the one which occupies the central role, both in terms of volume and price discovery, is trading stocks on the floor of the NYSE. Stock indices are keyed to prices on the NYSE, the other exchanges typically guarantee that they will meet the prices given on the NYSE, and the volume on the NYSE dwarfs the volume on all other stock exchanges combined.²⁵ The NYSE is the "400-pound gorilla" of the exchanges, and thus will be the target of this Note's assault on the exchange system itself.

A. *The Communication Process, B.C.*²⁶

The communication process between one investor and another used to occur entirely through human contact. An investor would approach a broker, either in person or on the telephone, and request that a stock be bought at the market price (a "market order"). The broker would forward the order, typically by telephone, to the brokerage firm's trading room near, but not in, the NYSE. The order then would be transferred to the firm's booth on the floor of the NYSE. A floor broker would then pick up the order and physically carry it to the specialist's post. The floor broker then would execute the trade, either with another floor broker or with the specialist. This system would work exactly the same for a "limit order," except that the floor broker would either carry it to the specialist, who would either physically record the order in his specialist book for later

Exchange Act Release No. 30,920, [1992 Transfer Binder] Fed. Sec. L. Rep. CCH ¶ 85,012, at 82,915 (July 14, 1992).

24. "The S&P 500 contract [based on the underlying value of shares in each of the well-known Standard & Poor's 500 firms] is so popular that, for example, during 1986 its daily dollar volume of transactions was approximately 60 percent greater than the value of actual stock trading on the New York Stock Exchange." Solomon & Dicker, *supra* note 20, at 201 (footnotes omitted).

25. 5 LOSS & SELIGMAN, *supra* note 13, at 2510-12. For a history of the primacy of the NYSE, see Walter Werner, *Adventure in Social Control of Finance: The National Market System for Securities*, 75 COLUM. L. REV. 1233, 1238-41 (1975).

26. Before Computers.

execution, or hold it before giving it to the specialist.²⁷

The process took a minimum of five human contacts to get the order to the floor and execute it. It would take four²⁸ more contacts to report the results back to the investor. There also had been four²⁹ human contacts from the seller to the floor, and four contacts back to the seller. A total of seventeen human contacts were necessary to execute one trade on the floor of the NYSE. There also was a similarly labor-intensive process for the clearance and settlement of these trades off the floor of the exchange.

Predictably, the labor-intensive nature of this system resulted in a major breakdown. The "back office crisis"³⁰ of 1967-70 indicated the inefficiency of a manually operated system. Volume on the NYSE exploded during that period.³¹ The clearance and settlement systems of the major brokerage houses were simply unable to keep up:

The operational crisis in the securities industry first reached major dimensions in August of 1967. Newspaper reports of that period recall the feverish efforts of the Wall Street community to keep up with each day's business: Stock certificates and related documents were piled "half-way to the ceiling" in some offices; clerical personnel were working overtime, six and seven days a week, with some firms using a second or even a third shift to process each day's transactions.³²

This volume of paperwork resulted in an error rate which undermined investor confidence in the integrity of the markets.³³ Even as late as July 1969, one of every 8.4 transactions resulted in a failure to deliver the proper securities on the

27. For a more detailed description of both processes, see 5 LOSS & SELIGMAN, *supra* note 13, at 2508-09.

28. The same links of the chain, minus the trade itself.

29. Again, eliminating the trade to avoid double counting.

30. 6 LOSS & SELIGMAN, *supra* note 13, at 2897.

31. "The average daily reported volume on the New York Stock Exchange (NYSE) between 1964 and 1968 grew from 4.89 million shares per average day in 1964 to 12.97 million shares in 1968, reaching a high of 14.9 million share per average day during the month of December 1968." 6 LOSS & SELIGMAN, *supra* note 13, at 2899.

32. SEC, STUDY OF UNSAFE AND UNSOUND PRACTICES OF BROKERS AND DEALERS, H.R. DOC. NO. 231, 92d Cong., 1st Sess. 219 (1971).

33. 6 LOSS & SELIGMAN, *supra* note 13, at 2900.

official settlement day.³⁴ Coupled with a stock market slump in 1969-70, this loss of confidence led to a decline in trading volume which, paradoxically, caused a precipitous decline in brokerage firm profitability.³⁵ Some 160 brokerage firms disappeared from the scene in 1969 and 1970, either going out of business or merging with other firms.³⁶

The back office crisis, though it has long since subsided, serves to remind us of two problems with the current stock exchange system. One is the inherent fallibility of human interaction. Anyone who has ever played "telephone" would not be surprised at the error rate involved with so many human interactions. People make mistakes.³⁷ To the extent that we can eliminate human error in the trading of securities, the integrity of the system will be that much stronger.³⁸

Second, the back office crisis reminds us that change is inevitable. If one were to ask a 1965 securities industry back office worker whether the system was fundamentally flawed, chances are that the worker would have replied in the negative. Human nature resists change, particularly when change eliminates your job. The same was true of the buggy-whip industry, and the same may be true of the floor broker and specialist. While one should not ignore their arguments altogether, one may wish to view the brokers' and specialists' arguments through the prism of history.³⁹ Virtually all workers whose jobs have become obsolete have argued that the services

34. *Id.* (citing Address of Hamer Budge, Sept. 4, 1969 (on file with the SEC)).

35. STAFF OF SPECIAL SUBCOMM. ON INVESTIGATIONS OF THE HOUSE COMM. ON INTERSTATE & FOREIGN COMMERCE, 92D CONG., 1ST SESS., REVIEW OF SEC RECORDS OF THE DEMISE OF SELECTED BROKER-DEALERS 7 (Subcomm. Print 1971); 6 LOSS & SELIGMAN, *supra* note 13, at 2902.

36. See HOUSE COMM. ON INTERSTATE AND FOREIGN COMMERCE, SECURITIES INDUSTRY STUDY, H.R. REP. NO. 1519, 92d Cong., 2d Sess. 10 (1972).

37. Of course, there is room for error in the execution of the manual steps involved in an automated system as well. Moreover, automated systems carry the potential for temporary "down time" or total computer failure, or "crashes," which may be a larger threat to the integrity of the market than any number of small human errors.

38. The dollar cost of correcting errors will also be reduced. In 1983, the average cost to correct an erroneous price was \$75 per trade. NYSE, Filing and Order Granting Accelerated Approval of Proposed Rule Change, Exchange Act Release No. 19,896, 48 Fed. Reg. 29,642, at 29,643 (1983) (proposed June 20, 1983).

39. See generally Joel Seligman, *Future of the National Market System*, 10 J. CORP. L. 79, 81-82 (1984) (noting that certain NYSE rules are outdated, and that major obstacles to a national market system are mainly political). As Professor James Lorie noted, the NYSE could not be expected to "take the leadership in the euthanasia of the floor community." *Id.* at 82 (footnote omitted).

they perform are critical, and that the system would come crashing down if they were eliminated.⁴⁰ Rarely have these predictions come true.

B. The Communication Process, A.D.⁴¹

Technology has made, and will continue to make, major inroads into the trading of securities.⁴² The exchange of stock is a dynamic and innovative business. Investors often will develop new and presumably better trading strategies which require some flexibility on the part of the exchanges themselves.⁴³ A ubiquitous example is "index arbitrage." Index arbitrage is a transaction whereby traders simultaneously purchase or sell a market basket of securities while taking an offsetting position in the index futures market (which represents the expected value of a market basket of securities) to take advantage of a temporary discrepancy in price.⁴⁴ Automation of the trading markets has been a necessary

40. For instance, William Donaldson, chairman of the NYSE, stated that the "floor and the information net that [it] provides, and the negotiation that is inherent in the auction system is a superior system. We don't think a machine can do that for you." *Business World* (ABC television broadcast, May 17, 1992). Alternatively, unions have responded to technology-related job displacement by negotiating for some of the new work accompanying technological innovations. See generally Aleia G. Rosenberg, Comment, *Automation and the Work Preservation Doctrine: Accommodating Productivity and Job Security Interests*, 32 UCLA L. REV. 135 (1984) (discussing union proposals to make the replacement of workers with automation a mandatory subject for collective bargaining under the NLRA).

41. After the Designated Order Turnaround System (DOT).

42. Both the SEC and the Commodities Futures Trading Commission (CFTC) currently have regimes in place to monitor the development and operation of self-regulatory organizations' automation systems. Automated Systems of Self-Regulatory Organizations, Exchange Act Release No. 29,185, 56 Fed. Reg. 22,490 (1991); Self-Regulatory Organization Automated Systems, 55 Fed. Reg. 17,932 (1990).

43. An example is the new Wunsch Software System, which will allow investors to balance the dollar amounts of buy and sell orders in the system and avoid possible cash flow problems. *Arizona to Offer Balancing in New Software Release*, WALL STREET LETTER, Sept. 14, 1992, at S8.

44. Arbitrage only occurs when the price of a commodity is different in one market than in another market. Arbitrageurs buy in the cheap market and sell in the expensive market, thereby increasing demand (and increasing price) in the cheap market and increasing supply (and decreasing price) in the expensive market. See Mary Kuntz & Jill Dutt, *It's Man vs. Machine on Wall Street; Computer Trading Sparks a New Debate*, NEWSDAY, Nov. 5, 1989, at 95. The potential for arbitrage, i.e., the price discrepancy, may be indicative of an inefficient or inaccurate market. The arbitrage should tend to equalize prices, thereby increasing efficiency.

precondition for index arbitrage.⁴⁵

The advent of automated communication systems has brought mixed results. Those aspects of the system which are automated work much more efficiently than they did before automation.⁴⁶ The negative results have come about as a result of the collision between state-of-the-art technology and a Nineteenth-century market structure with a human link.⁴⁷ In order to understand how the automation process could be improved, one must look at the major automated systems currently linking the investors to the exchanges, and the exchanges to each other.

1. *SuperDOT*—The NYSE uses an automated order routing system called the Designated Order Turnaround (DOT) system, which, with its current enhancements, has been dubbed "SuperDOT."⁴⁸ Originally designed to accommodate orders up

45. See Solomon & Dicker, *supra* note 20, at 217–18. Without the electronic link, floor brokers must physically walk to trading posts to execute trades and manually write a floor ticket for each trade. *Id.* at 218. Since the profitability of arbitrage depends on timing, only the large brokerage firms with many floor brokers can continue without automation. *Id.*

46. For example, compared to the NYSE, which may charge as much as eight cents per share for trading on the floor, a full-time automated system developed by Madoff Investment Securities executes trades for its clients at no charge. *Business World*, *supra* note 40. "Madoff is now the Big Board's largest competitor, trading five percent of the stock exchange's entire share of volume." *Id.*

47. Talk of automating the stock exchanges inevitably raises the specter of program trading, a form of automated index arbitrage which was blamed, at least in part, for the Market Crash of 1987. Kuntz & Dutt, *supra* note 44. In October of 1987, exogenous market factors, including the U.S. government's announcement of a higher-than-expected trade deficit and an announcement by Congress regarding pending anti-takeover legislation, precipitated a price decline on the NYSE. Once that occurred, price discrepancies between index futures and the underlying securities led index arbitrageurs to sell stock, putting pressure on prices. REPORT OF THE PRESIDENTIAL TASK FORCE ON MARKET MECHANISMS 15–16 (1988) [hereinafter MARKET MECHANISMS REPORT]. This volume overcame the capacities of the DOT system, and investors could no longer be confident that futures prices accurately reflected stock prices. Panic-stricken portfolio managers then unloaded massive amounts of securities on the market because of their inability to insure their portfolios through the futures market. *Id.* at 15–44.

It is possible that, had a national market system for securities been implemented prior to 1987, the Crash could have been substantially ameliorated. A more efficient linkage between the two systems might have prevented the price discrepancies which accelerated the price decline. Donald E. Weeden, *October Crash Proves Need for National Market System*, WALL ST. J., Apr. 12, 1988, at 34.

48. Other exchanges have similar order routing systems. For example, the American Stock Exchange's equivalent to the DOT is the Post Execution Reporting (PER) system. 5 LOSS & SELIGMAN, *supra* note 13, at 2559. The regional exchanges also have automated order execution systems; the Midwest Stock Exchange, the Pacific Stock Exchange, and the Philadelphia Stock Exchange operate the MAX, SCOREX, and PACE systems, respectively. *Id.* at 2560; Seligman, *supra* note 39, at 111–13.

to 199 shares,⁴⁹ SuperDOT currently accepts orders of a much larger magnitude.⁵⁰ Seventy percent of the NYSE trading volume occurs through SuperDOT.⁵¹

SuperDOT eliminates eight of the seventeen human interactions in the completion of a trade. The broker can key the transaction directly into SuperDOT, which routes the order in a single link directly to the specialist's post, replacing the links from the broker to the New York trading room, from the trading room to the floor booth, and from the floor booth to the specialist's post, a significant breakthrough. One advantage of the SuperDOT system is that it eliminates the cost of a floor broker and the attendant support staff in the floor booth and the trading room. Additionally, it eliminates the human errors that may have occurred in the eliminated communication links.⁵² Finally, SuperDOT greatly enhances the efficacy of the clearance and settlement functions, the "back office" functions described earlier.⁵³ SuperDOT reports the trade directly to the National Securities Clearing Corporation (NSCC)⁵⁴ to begin the clearance and settlement process.

For all SuperDOT's advantages, there are at least two disadvantages. First, the system is relatively slow. "[T]he system is often not fast enough to permit a broker to confirm to the customer the price at which an order was executed during the phone call in which the order was placed."⁵⁵ Clearly, SuperDOT is light years ahead of the previous human-link

49. 5 LOSS & SELIGMAN, *supra* note 13, at 2554.

50. SuperDOT currently accepts member firm preopening market orders up to 30,099 shares through the Opening Automated Report Service (OARS), pairing buy and sell orders and presenting the imbalance to each specialist up to the opening of a stock, thus assisting the specialist in setting opening prices. FACT BOOK 1992, *supra* note 2, at 22. During 1992, SuperDOT processed an average of 180,000 orders per day. *Id.* The system provides for rapid execution and reporting of market orders—in 1992, market orders were executed and reported back to the originating firm on average within 30 seconds. *Id.* SuperDOT also is used for two recently approved off-hours trading processes known as Crossing Sessions I and II. These allow firms to trade at the NYSE closing prices, either individually or in multiple stock bundles of more than one million dollars, after regular trading has closed. *Id.* at 23.

51. Hansell, *supra* note 17, at 172. 45.3 billion shares were traded on the NYSE in 1992. FACT BOOK 1992, *supra* note 2, at 22. Of these, 23.9 billion were routed on SuperDOT. *Id.* Presumably, this represents a larger percentage of trades than of shares traded because of SuperDOT's limitation to smaller trades.

52. Such errors are quite costly. See *supra* note 38.

53. For a discussion of the back office crisis, see *supra* notes 30–36 and accompanying text.

54. For a history of the development of the Securities Industry Automation Corporation, the NSCC's precursor, see Seligman, *supra* note 39, at 87–88.

55. 5 LOSS & SELIGMAN, *supra* note 13, at 2556.

communication system, but in the computer age, users expect immediate response times.⁵⁶

Second, the system still relies on floor brokers and specialists to execute the trade.⁵⁷ The NYSE might argue that this is a positive aspect of the system because of the possibility for negotiation. According to the NYSE, thirty-eight percent of all trades are executed "between the quotes," in other words, at a better price than could be obtained if the face-to-face dickering that occurs on the floor was unable to occur.⁵⁸ Presumably, this allows the traders to exercise judgment regarding price and quantity in executing trades.

Even assuming that better prices are obtained by such a system, the fallacy of this reasoning remains: the statement *assumes* the existing system, *absent* the face-to-face dickering.

56. *Id.* at 2556-57. Moreover, the system previously relied primarily on printers on the floor of the NYSE as the interface to the humans at the specialist post. On "Black Monday," October 19, 1987, the SEC found that "certain printers were creating delays from two to 75 minutes in market or limit orders." *Id.* at 2557; see also GENERAL ACCOUNTING OFFICE, PRELIMINARY OBSERVATIONS ON THE OCTOBER 1987 CRASH 70-75 (1988).

57. Robert J. McCartney, *Big Board, Big Birthday, Big Questions: NYSE Marks 200 Years, But Faces Cloudy Future*, WASH. POST, May 19, 1992, at C1.

Signs are numerous that the exchange, for all its expensive high-tech innovation, needs to do more to adjust to the twin technological revolutions in computers and telecommunications. In an era where computer-driven trading strategies in Tokyo can trigger a stock purchase in London only seconds later, the traders who hustle around the NYSE floor each day still write orders with pencils on slips of paper that litter the floor by the closing bell.

Id.

58. This holds true, however, only when the quote spread (the difference between the price at which a specialist is willing to buy and the price at which he is willing to sell) is greater than the smallest spread possible. New York Stock Exchange, Inc.; Order Approving Proposed Rule Change, Exchange Act Release No. 20,350, 48 Fed. Reg. 51,722 (1983) (approved Nov. 4, 1983). Thus, to the extent an automated system was able to reduce spreads, this advantage of the human interaction on the floor would be mooted.

Consistent with academic usage, this Note refers to the difference between the bid and ask price for a security as the "spread." See, e.g., Dale A. Oesterle et al., *The New York Stock Exchange and Its Out Moded Specialist System: Can the Exchange Innovate To Survive?*, 17 J. CORP. L. 223, 276-77 (1992). On the floor of the Chicago Mercantile Exchange (CME), however, traders use the word "spread" as a term of art to denote the difference in price between two similar, but not identical contracts. A notable example is the so-called "TED spread," or the difference in price between Treasury bill futures and Eurodollar futures. The spread between these two commodity futures is actually traded as a commodity itself. Traders distinguish this form of trading from arbitrage, defining arbitrage as trading on the difference in prices of the same or similar commodities between exchanges. Interview with John F. O'Donovan, Eurodollar futures broker, Chicago Mercantile Exchange, in Oden, Mich. (Nov. 29, 1992).

To the extent that this dickering occurs, and there is reason to believe that it is rare,⁵⁹ investors must be putting forth a quote assuming some room for dickering. If the dickering were eliminated, then the rigors of competition would lead to investors and brokers entering their "real" bottom line price into the system for execution, rather than entering "negotiation positions." Thus, there would be no need for the dickering, and no need for the brokers who use it to justify their existence.

2. *The Intermarket Trading System*—While the vast majority of stock trades occur on the NYSE, there is still trading which occurs on the seven regional exchanges. There is, therefore, interest in ensuring that a trade executed on the exchange offers the best price at any given moment.⁶⁰ The markets' response to this concern is the Intermarket Trading System (ITS). ITS is a communications link between the market centers which allows a broker or specialist on the floor of one exchange to transmit orders to a broker on one of the other exchanges.⁶¹ The system is very labor-intensive—it requires a human to see the market order and respond in order to execute a trade.⁶² For this reason and others related to its technological simplicity, the ITS has been compared to "two tin cans and a string," or "a tom-tom in the space age."⁶³ The brokers and specialists like the ITS because it maintains their central role in the trading process. More importantly, the ITS has had comparatively little impact on exchange trading.⁶⁴

59. Quote spreads have been consistently narrowing over time. In 1983, the quote spread was less than 1/4 point 60.7% of the time; in 1992, it was less than 1/4 point 86.4% of the time. FACT BOOK 1992, *supra* note 2, at 19.

60. Or, at least, at the best price offered by any exchange at the moment. In fact, this is a requirement under the SEC's "trade through" rule. See NYSE Rule 15A, N.Y.S.E. Guide (CCH) ¶ 2015A (May 1993).

61. Seligman, *supra* note 39, at 94. For a thorough account of the ITS, see *id.* at 94–95; 5 LOSS & SELIGMAN, *supra* note 13, at 2564–67.

62. This is with the exception of the NASDAQ SOES system and the Cincinnati stock exchange's "black box" NSTS system, where the trade is executed automatically. See *infra* Parts II.A & II.B.

63. Richard E. Rustin, *Driving Force: As Big Board President, John J. Phelan Pushes Changes in Wall Street*, WALL ST. J., Sept. 2, 1980, at 16, quoted in Seligman, *supra* note 39, at 94 & n.75.

64. 5 LOSS & SELIGMAN, *supra* note 13, at 2566. ITS today accounts for only a small percentage of consolidated share trading volume. *Id.* The ITS has not had an impact on primary market spreads, and there did not appear to be a significant difference between the level of price volatility for ITS stocks and non-ITS stocks. *Id.* (citing SEC, A REPORT ON THE OPERATION OF THE INTERMARKET TRADING SYSTEM 1978–1982, at 48–49 (1982)).

C. *The Human Element: Floor Brokers and Specialists*

The common element of all the major automation systems in the stock market is that they retain a role for the floor broker and the specialist. Why? What value do the floor broker and the specialist add to the process? The first argument advanced for retaining the floor brokers and specialists is simply because they are human. Not that they are human beings, and therefore deserving of keeping their jobs,⁶⁵ but that they are human beings and therefore are capable of exercising judgment in a way that computers are not. As has been pointed out:

To stand on an exchange floor is to feel that you're in the center of the universe. It's a crucible of molten information, with currents of supply and demand swirling through eddies of news and rumor. You can see, hear, smell and feel the other traders. Screens may be accurate to the last decimal point, but they don't raise their voices when they're excited or sweat when they're afraid. All of these telltale details come together on a trading floor every day to tell the story of why prices are moving the way they are.⁶⁶

The answer to that criticism is simple: the key to the market is information. While the computer may provide less tactile, emotional information, it and the other technologies which may accompany it eventually will provide the trader with infinitely more information. It's a new way of doing business, but so was the spreadsheet.

1. *Floor Brokers*—Specifically in the case of the floor broker, the value added to the trading process is expertise and judgment. In theory, the floor broker acts as the agent of an investor, negotiating the trade for the investor, and executing it at the best terms available. In reality, the broker is merely a conduit, indicating to the market the investor's willingness to trade. The only term of trade at issue is the price, and most of the time the price is set by the market and is not reflective of the "negotiating skill" of the broker.⁶⁷

65. After all, we are talking about capitalism.

66. Hansell, *supra* note 17, at 179-80.

67. See Farrar, *supra* note 10, at 114.

The concept of a central continuous auction market underlying major stock exchanges relies on centralization of the flow of orders to ensure that all buying interest in a given security is exposed to all selling interest in that security at any

The broker's judgment becomes important in deciding how to time the market. The hallmark of a good broker is knowing when to make a trade, and, to a lesser extent, with whom. Timing the trade can be critical, particularly when a broker is trying to buy or sell a large order without disrupting the market.⁶⁸ However critical timing is, there is little reason why a skilled trader cannot use the same judgment in executing trades over the computer.⁶⁹ Trading over the computer will require a different, but complementary, set of skills from those utilized by traders on the exchange floors. It is likely that there would be some turnover in personnel making the trades.⁷⁰ However, given the entrepreneurial spirit inherent in the capital markets, not only would the job be done, but it would be done more effectively at a computer screen:

Traders want control. They want to know every last scrap of information about the market, and they want to move on it instantly. In a simpler age, the best spot for a trader was on an exchange floor watching supply meet

point in time. In theory, a "crowd" of broker-dealers holding orders to buy or sell, say, General Motors stock, congregates at the post on the exchange's trading floor where GM is traded. . . .

Although "crowds" of half a dozen or more brokers . . . do form from time to time when that stock is active, they are anything but typical of the public auction at which most exchange transactions take place. Usually, a public order to buy 100 shares of XYZ Corporation "at the market" is taken by a broker-dealer to the post and executed in a "crowd" that contains only one other person—the specialist franchised by the exchange to make a market in XYZ stock.

Id.

68. Interview with John F. O'Donovan, *supra* note 58.

69. See Ivy Schmerken, *Wall Street's Quiet Revolution; Technology*, WALL STREET & TECH., June 1992, at 35–36.

Entrepreneurs like Evan Schulman of Lattice Trading, in Boston, are inventing an electronic broker that can route orders to multiple crossing networks and to various electronic exchange execution systems "You want to develop a system that gives money managers real-time control over orders," says Schulman. That's the advantage that the specialist has. "With a wave of his fingers he can change your quote," says Schulman. If the investment manager had real-time control over his orders, coupled with the ability to change limit prices, retrieve orders and cancel them, says Schulman, "then the specialist [wouldn't] have to be at the end of the line anymore."

Id.

70. See Clyde H. Farnsworth, *Going 'Floorless' in Canada*, N.Y. TIMES, Aug. 9, 1992, § 3, at 15 (stating that about 20% of floor workers lost their jobs when the Vancouver exchange floor closed).

demand, poised to shout an order the moment opportunity occurred. Today a trader has to monitor a dozen different markets, news from around the world and complex quantitative analytics, and the best spot to do this is a trading desk surrounded by a bank of screens. In that environment, traders are finding that trading through a computer is faster and more precise than calling the floor.⁷¹

Using modern programming techniques, including but not limited to expert system technology⁷² and virtual reality,⁷³ brokers also could engage in much more sophisticated trading strategies over the network, without the need for real-time human involvement. The crux of such a system would be the analyst entering "rules" into the computer program which would guide the computer's actions in any given situation. The rules could be as simple as "execute the trade if the price reaches 100," or as complex as "buy round lots of X corporation at thirty-five unless the seller is institution Y, in which case, buy at thirty-three [because institution Y is likely to place enough additional shares on the market to drive the price down

71. Hansell, *supra* note 17, at 176-77.

72. Expert system technology is a form of artificial intelligence that utilizes heuristic, or "rule of thumb," reasoning extracted from an interview process with experts in the field, called "knowledge engineering." Expert systems have been developed in such fields as medical diagnostics and engineering. See generally WILLIAM R. ARNOLD & JOHN S. BOWIE, *ARTIFICIAL INTELLIGENCE: A PERSONAL, COMMONSENSE JOURNEY* 82-113 (1986). For a discussion of the future of artificial intelligence in futures and options trading, see *The Future of Computers for Trading Futures*, *FUTURES: MAG. COMMODITIES & OPTIONS*, Sept. 15, 1991, at 8.

73. See, e.g., Mark Potts, *Virtual Reality; Sci-Fi Technology on Verge of Billion Dollar Boom*, *WASH. POST*, Aug. 16, 1992, at H1.

It appears to be a landscape made up of paint chips—rolling hills of blue and red squares The lone inhabitant of this odd, computer-created vista maneuvers among the chips, as if in flight

[E]ach colored square represents a stock, its price and activity determining its position and color. . . . By wandering through this surreal, computer-generated field, a stock trader can see in an instant how individual stocks are performing, relative to others. That may allow the trader to buy and sell shares more quickly than a competitor studying a more traditional list of prices—an edge that can mean millions of dollars in profit in fast-paced financial markets. Already being tested on Wall Street, the system is one of the first commercial applications of virtual reality computing.

in the near future].⁷⁴ The only limits to the trading strategies which may be employed under such a system are the technical limitations of the system and the imagination of the trader.

2. *Specialists*—What do the specialists do? Clearly, they are more than simple communication conduits.⁷⁵ They do act as brokers, trading for other investor's accounts, but they act as "market makers," also buying and selling securities for their own account when no investors are available on the other side of a transaction. In connection with this "market making" activity, specialists have three functions beyond that of the broker: (i) they are charged with a negative trading obligation, (ii) they are responsible for setting the opening prices, and (iii) they are charged with an affirmative trading obligation.

The negative trading obligation prohibits the specialist from trading more than is necessary to maintain an orderly market.⁷⁶ It is imposed upon the specialist because of his unique market position and knowledge.⁷⁷ This obligation adds nothing to the market; rather, it merely prevents the specialist from acting to harm the integrity of the market.⁷⁸ In theory, it is similar to the obligation to disclose or refrain from trading⁷⁹ placed on corporate insiders by the Securities Exchange Act of 1934, in the sense that specialists, like corporate insiders, have access to information which they could use to defraud the market.

The advantage of having a specialist responsible for setting opening prices, like the advantage of the broker, lies in his judgment and expertise. The opening price of a security, and perhaps to a larger extent, the closing price, is a very important signal to the market. Thus, these prices can have a significant impact on the subsequent performance of the market. Moreover, the closing price has a major real world impact on settlement vis-a-vis the futures market. A single tick can mean

74. Christopher Keith, *The Overdue Revolution; Equity Trading in the Post-Electronic Age: A Working Plan for a Customer-Based System*, INVESTMENT DEALERS' DIG., Sept. 30, 1991, at 14.

75. For a detailed description of the NYSE specialist system, see Oesterle et al., *supra* note 58; see also Ralph James & Estelle James, *Disputed Role of the Stock Exchange Specialist*, HARV. BUS. REV., May-June 1962, at 133; Nicholas Wolfson & Thomas A. Russo, *The Stock Exchange Specialist: An Economic and Legal Analysis*, 1970 DUKE L.J. 707.

76. NYSE Rule 104.10, N.Y.S.E. Guide (CCH) ¶ 2104-10(3) (Nov. 1992).

77. 5 LOSS & SELIGMAN, *supra* note 13, at 2517-18.

78. See JOEL SELIGMAN, TRANSFORMATION OF WALL STREET 342-44 (1981).

79. This obligation is addressed in Rule 10b-5. 17 C.F.R. 240.10b-5 (1992). See, e.g., *Basic v. Levinson*, 485 U.S. 224 (1988); 7-8 LOSS & SELIGMAN, *supra* note 13, at 3485-728.

the difference of literally millions of dollars for certain investors. The experienced hand of a knowledgeable specialist is certainly one way to accurately set opening prices and control closing prices.⁸⁰ Like the broker's experience and judgment, however, there appears to be no significant reason why this judgment cannot be made in an automated environment. It also should be noted that even the vaunted specialist's judgment is not infallible. Errors in price setting during the October 1987 market break are thought to have led to greater uncertainty in what was already a highly volatile period.⁸¹

Finally, the specialist has certain affirmative trading obligations.⁸² These obligations are: (i) the specialist must maintain an adequate level of capitalization to permit him to trade against the market,⁸³ that is, to be a "buyer of last resort," at least against mild market downturns⁸⁴ and (ii) the specialist must actually trade against the market, within reason, when necessary to maintain an orderly market. It is unclear exactly how often the specialist performs this second obligation, or how effective or necessary it is when she does.⁸⁵

The specialist's affirmative trading obligations are incurred in exchange for the privilege of being a specialist—a very lucrative privilege indeed. Specialists make their money, in addition to charging brokerage commissions, by the traditional method—buying low and selling high.⁸⁶ Specialists have an

80. Interview with John F. O'Donovan, *supra* note 58.

81. MARKET MECHANISMS REPORT, *supra* note 47, at 46–47, 53.

82. NYSE Rule 104.10, N.Y.S.E. Guide (CCH) ¶ 2104-10 (Nov. 1992).

83. Under NYSE Rule 104.20, the specialist "must be able to assume a position of 150 trading units (15,000 shares) in each common stock in which he or she is registered; 30 trading units in each convertible preferred stock; 1,200 shares in each of the 100 share trading unit nonconvertible preferred stocks; and 300 shares in each of the 10 share unit nonconvertible preferred stocks. In addition, each specialist or specialist unit must have net liquid assets equal to \$1 million or 25 percent of position requirements." 5 LOSS & SELIGMAN, *supra* note 13, at 2514–15; see also NYSE Rule 104.20, N.Y.S.E. Guide (CCH) ¶ 2104.20 (Dec. 1991).

84. See MARKET MECHANISMS REPORT, *supra* note 47, at 49–50.

It is understandable that specialists would not sacrifice large amounts of capital in what must have seemed a hopeless attempt to stem overwhelming waves of selling pressure. Nevertheless, from the final hours of trading on October 19 through October 20, [1987, the "1987 Crash"] a substantial number of NYSE specialists appear not to have been a significant force in counterbalancing market trends.

Id. at 50.

85. MARKET MECHANISMS REPORT, *supra* note 47, at 49–50.

86. See Oesterle et al., *supra* note 58, at 276–77.

explicitly granted monopoly on making the market in a given security.⁸⁷ This extraordinary position in the market allows them to make money on their trades over eighty percent of the time.⁸⁸ While there is no direct evidence that specialists abuse this position, the monopoly power inherent in the position itself is too dangerous to countenance without a demonstrable benefit to the market as a whole. Moreover, while specialists may create enough benefit to the market to allow them to exist under the current regime, the benefits do not seem substantial enough to maintain the physical exchanges solely for the purpose of perpetuating the role of the specialist.⁸⁹

In 1971, the SEC evaluated the usefulness and the discipline of specialists with regard to their affirmative trading obligation.⁹⁰ The study found that specialists frequently fail to provide sufficient depth, in other words, purchase or sell enough securities for their own account, to maintain an orderly market.⁹¹ This may be because specialists have a compelling economic interest in failing to provide such depth. Specialists who best fulfilled their affirmative trading obligation averaged about a twenty-nine percent return, while bearing considerable risk; however, those specialists who allowed greater price fluctuations earned about 191% while assuming less risk.⁹² The study concluded that competition, rather than regulation, would be the best method for ensuring market depth.⁹³

87. See NYSE Rule 390, N.Y.S.E. Guide (CCH) ¶ 2390 (Mar. 1989). This rule generally prohibits stock exchange members from acting as market makers in competition with NYSE specialists. See Seligman, *supra* note 39, at 80. But cf. 17 C.F.R. § 240.19c-1, .19c-3 (1992) (exempting certain securities from the scope of Rule 390).

88. The NYSE characterizes this phenomenon as the "specialists' stabilization rate." "The NYSE expects each specialist to stabilize stock price movements by buying and selling from his own account against the prevailing trend of the market. Specialists' stabilization rate, the percentage of shares purchased at prices below or sold at prices above the last different price, was 78.3% [in 1992]." FACT BOOK 1992, *supra* note 2, at 19.

89. In fact, Professor Poser, while arguing against the adoption of a national market system, argued for the elimination of the present specialist system in favor of an institutionalized specialist function. Norman S. Poser, *Restructuring the Stock Markets: A Critical Look at the SEC's National Market System*, 56 N.Y.U. L. REV. 883, 956-57 (1981).

90. SEC, INSTITUTIONAL INVESTOR STUDY (1971).

91. Farrar, *supra* note 10, at 114.

92. *Id.* at 114-15.

93. "It is one thing to prevent a man by rule from beating his wife; it is quite another to try in the same way to require him to be kind to her." *Id.* at 115.

Even if we were to assume, arguendo, that specialists *do* play a useful role in the market,⁹⁴ this still would not justify maintaining the physical exchanges just to keep the specialists in operation.⁹⁵ Any useful role that the specialist does play can continue to be played in an automated exchange system. Any dealers who want to hold themselves out as market makers in a particular security could be subject to the obligation. Alternatively, if no one wanted to hold themselves out as a market maker, the SEC could monitor, through sophisticated computer tracking systems, those who deal at a specified volume in a given security and impose the obligation on them.⁹⁶ Moreover, the profitability of being a specialist would not disappear under an automated network, and thus, the obligations need not either. Hence, in a competitive environment, the affirmative trading obligation may not even be necessary:

There is every reason to believe, however, that competition between market makers in a single marketplace would provide the needed inducement for dealers to place their capital on the line. Market making can be very remunerative, especially for dealers who participate in a large volume of trading. Under a competitive regime, any dealer whose quotes and depth are not competitive would simply forfeit to others the opportunity to participate in all, or at least part, of that volume.⁹⁷

Of course, this all assumes that the role of an identified specialist continues to be necessary given a truly automated, universal network. That may not be the case. The capital market itself, through competition, may provide the necessary liquidity.⁹⁸

94. See Cohen, *supra* note 3, at 775-78.

95. See Oesterle et al., *supra* note 58, for a forceful argument for the reform of the NYSE specialist system.

96. The SEC may not have the resources to do this effectively, however.

97. Farrar, *supra* note 10, at 115.

98. Jonathon Macey & Hideki Kanda, *The Stock Exchange as a Firm: The Emergence of Close Substitutes for the New York and Tokyo Stock Exchanges*, 75 CORNELL L. REV. 1007, 1014-20 (1990).

II. THE ALTERNATIVES

*There is only one religion, though there are a hundred versions of it.*⁹⁹

The SEC, in the past, has argued for a Universal Message Switch (UMS), which would replace and significantly expand the SuperDOT system.¹⁰⁰ The UMS would operate much like the SuperDOT system in that it would transmit order information directly to the floor of the exchange. The UMS, however, would transmit the order to *all* exchanges. Thus, the ITS, which currently transmits orders among exchanges would become obsolete immediately, and argument over "best execution" would become a thing of the past, as orders would automatically be transmitted to the exchange offering the best price.¹⁰¹

Arguments also have been put forth for a Combined Limit Order Book (CLOB), which would automate and universalize the specialists' limit order books.¹⁰² To understand the CLOB, one must understand the current limit order book system. The foregoing discussion has centered on so-called "market orders," or orders to be executed at whatever price prevails in the market when the order hits the floor. Investors also can place "limit orders," or orders to be executed contingent on the market achieving a price set by the investor. Currently, the specialist at the NYSE would execute the order if it reached the set price *at the NYSE*. There is potential for the order to remain unexecuted on the NYSE, even though it may have been

99. George Bernard Shaw, *quoted in* OXFORD DICTIONARY OF QUOTATIONS 498 (3d ed. 1979).

100. Development of National Market System, Exchange Act Release No. 14,416, [1978 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 81,502 (Jan. 26, 1978). Request for Comment on Development of Order Routing and Market Linkage Systems, Exchange Act Release No. 14,885, [1978 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 81,625 (June 23, 1978); *see also* Seligman, *supra* note 39, at 133-37.

101. *See* Securities; Brokerage and Research Services, Exchange Act Release No. 23,170, 51 Fed. Reg. 16,004, at 16,011 (1986); Kidder, Peabody & Co., Exchange Act Release No. 8,426, [1967-1969 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 77,618, at 83,323 (Oct. 16, 1968); *see generally* Request for Comment on U.S. Equity Market Structure Study, Exchange Act Release No. 30,920, [1992 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 85,012 (July 14, 1992).

102. *See* Morris Mendelson et al., *Toward a Modern Exchange: The Peake-Mendelson-Williams Proposal for an Electronically Assisted Auction Market, in* IMPENDING CHANGES FOR SECURITIES MARKETS: WHAT ROLE FOR THE EXCHANGE? 53, 55-60 (Ernest Bloch & Robert A. Schwartz eds., 1979).

executed on another exchange. The CLOB would eliminate this potential by displaying the limit order to specialists on every exchange. Thus, the order is guaranteed execution if *any* exchange reaches the set price.¹⁰³

These proposals do not go far enough, however. Each maintains a central role for the physical exchanges, and thus merely makes the existing system moderately more efficient, forgoing the opportunity to create what potentially could be a radically more efficient system. One can envision both concepts incorporated naturally as part of an integrated system. The UMS and the CLOB would only be two functions of a more comprehensive unified system. The challenge is how best to encourage the development of such a system.

Alternatives to the current system exist today. Each has its flaws, but with certain modifications, easily could replace the current system. And each proves that the physical exchange itself is not necessary. If the current system is proven not to be indispensable, then we have paved the way for a system which lessens some of the shortcomings of the physical exchange.

A. The NASDAQ

The National Association of Securities Dealers Automated Quotation (NASDAQ)¹⁰⁴ system operates on a paradigm completely different from the physical exchanges. Rather than centralize trading on a trading floor, the NASDAQ system connects brokers over an automated network, which allows them to negotiate directly with each other and bypasses the floor broker and the specialist entirely. Orders are entered in the NASDAQ system and literally must be negotiated with a dealer holding an offsetting order to be executed. Thus, the NASDAQ system does not eliminate the human touch; it merely eliminates the middle man, the floor broker.¹⁰⁵

103. See William R. Harman, *The Evolution of the National Market System—An Overview*, 33 BUS. LAW. 2275, 2286, 2295–96 (1978); see also Cohen, *supra* note 3, at 772–75; Poser, *supra* note 89, at 927–31.

104. Securities listed on the NASDAQ must be registered with the SEC under § 12(g) of the Securities Exchange Act of 1934. 15 U.S.C. § 78l(g)(1) (1988). The NASD itself is registered as a self-regulatory organization under § 15A of the Act. 15 U.S.C. § 78o (1988).

105. For a thorough description of the NASDAQ system, see Michael J. Simon & Robert L.D. Colby, *The National Market System for Over-The-Counter Stocks*, 55 GEO. WASH. L. REV. 17 (1986).

The key role in the NASDAQ system is played by the "market maker." Market makers are, in some respects, the analog of the specialist on the NYSE, in that they hold themselves out as willing and able to buy or to sell a security at any time, regardless of whether they have an offsetting order.¹⁰⁶ There are at least two differences between the market maker and the specialist, however. First, the market maker does not have a monopoly.¹⁰⁷ For any given security, there may be any number of market makers.¹⁰⁸ These market makers are in competition with one another for the lucrative business of trading in that security. That competition, at least in theory, should result in more favorable prices to the investor. Second, the NASDAQ market maker is not subject to the affirmative trading obligations of the NYSE specialist.¹⁰⁹ The market maker may withdraw from the market at will, although, under current rules, the penalty for an unexcused withdrawal is a suspension from the market for twenty days.¹¹⁰ This rule was adopted in the wake of the 1987 market break, where the withdrawal of market makers was deemed to have contributed to the failure of the over-the-counter market.¹¹¹

In addition to the full NASDAQ system, there is a subsystem, that does not require dealer negotiation. The Small Order Execution System (SOES) allows brokers to enter orders for up to 200, 500, or 1000 shares, which then are executed automatically at the best market price. The SOES currently

106. See NASD Bylaws, Schedule D, Part VI, § 2, Nat'l Ass'n Sec. Dealers Man. (CCH) ¶ 1819 (July 1992).

107. Compare the discussion of the monopoly granted to NYSE specialists, *supra* notes 86-89 and accompanying text.

108. In fact, in 1982, the 3664 securities traded over the NASDAQ system averaged 7.6 market makers each. NAT'L ASS'N OF SECURITIES DEALERS, ANALYSIS OF THE IMPACT OF LAST SALE REPORTING ON MARKET CHARACTERISTICS OF TIER 2 NASDAQ SECURITIES 3 (1983); Seligman, *supra* note 39, at 95.

109. For a discussion of the specialists' affirmative trading obligation, see *supra* notes 82-89 and accompanying text.

110. SEC, DIVISION OF MARKET REGULATION, THE OCTOBER 1987 MARKET BREAK 9-25 n.86 (1988). "[P]ending news, a sudden influx of orders or price changes, [and effecting] transactions with competitors shall not constitute acceptable reasons for granting excused withdrawal status." NASD Bylaws, Schedule D, Part VI, § 8(b), Nat'l Ass'n Sec. Dealers Man. (CCH) ¶ 1824 (July 1992).

111. MARKET MECHANISMS REPORT, *supra* note 47, at VI-49 (explaining that the withdrawal of market makers from the market, among other things, prevented buyers and sellers of NASD-listed securities from executing desired transactions promptly).

handles 1.3% of the total NASDAQ volume.¹¹² The SOES has been praised for increasing the efficiency of the market,¹¹³ but it also has its flaws. In addition to the potential for market makers to withdraw, the SOES suffers from periodic "locked," or "crossed," markets. These occur when the normal relationship between "bid" or purchase prices and "ask" or sale prices is upset. Typically, the market maker will "bid" a lower price than they "ask."

Buy low, sell high. Due to quirks in the SOES, however, the "bid" price can, at times, equal or exceed the "ask" price. When this happens, the market cannot function, as market makers will not buy securities for more than they can sell them. The SOES, therefore, is limited to small, non-professional trades.¹¹⁴

The NASDAQ system is particularly interesting as an example for eliminating the exchange floor because it has been used as a model for exactly that. The London Stock Exchange uses a quote driven, competing dealer market called the Stock Exchange Automated Quotations (SEAQ) system.¹¹⁵ As Sir Andrew Hugh-Smith, Chairman of the International Stock Exchange, has explained:

NASDAQ, the computer system that forms the basis of America's national over-the-counter trading operation, was the model the London Exchange used to set up its own computerized trading system. One result was a big growth in trading volume. But there was also another effect.

Although [they] made provision for trading to continue on the floor, within two weeks, virtually every firm had decided to pull out of the floor and rely entirely on the screen-based systems.¹¹⁶

112. Self-Regulatory Organizations; NASD; Order Approving Proposed Rule Change to Define Professional Trader for Purposes of the Small Order Execution System, Exchange Act Release No. 26,361, 53 Fed. Reg. 51,605, at 51,606 (1988); 5 LOSS & SELIGMAN, *supra* note 13, at 2588.

113. MARKET MECHANISMS REPORT, *supra* note 47, at VI-53.

114. See Self-Regulatory Organizations; NASD; Order Approving Proposed Rule Change to Define Professional Trader for Purposes of the Small Order Execution System, Exchange Act Release No. 26,361, 53 Fed. Reg. 51,605, at 51,605-06; 5 LOSS & SELIGMAN, *supra* note 13, at 2591. The NASD has suspended firms for violating this rule by breaking large orders up into 1000 share blocks. See *Suspension by NASD*, N.Y. TIMES, Aug. 13, 1992, at D8.

115. Karmel, *supra* note 12, at 3.

116. *Business World*, *supra* note 40.

B. The Cincinnati Stock Exchange

The Cincinnati Stock Exchange has instituted a "black-box" trading system known as the National Securities Trading System (NSTS).¹¹⁷ The exchange completely eliminates human communication in a way that exceeds even the NASDAQ's elimination of the trading floor. Brokers deal with the NSTS exclusively through the computer—no human communication takes place. The NSTS accepts orders from brokers and executes them against matching orders.¹¹⁸ Orders are prioritized according to price (high for purchases, low for sales); time of entry determines priority for orders at the same price.¹¹⁹ Traders can try to negotiate a better price by entering prices into their terminal slightly above or slightly below the quoted price. This is the definitive feature of the NSTS—matching the physical exchanges' ability to allow traders to deal "between the quotes."¹²⁰

The NSTS, however, is not flawless. Its primary flaw appears to be the human costs of monitoring the system.¹²¹ It appears impossible, given the structure of the NSTS, to insert trades automatically.¹²² Each must be inserted into the system individually. This feature eliminates the potential for program trading, an important recent development in major exchange trading.¹²³ Also, as in the main NASDAQ system, trades are not executed automatically. Traders must decide individually

117. 5 LOSS & SELIGMAN, *supra* note 13, at 2562.

118. *Id.* at 2562-63.

119. *Id.* at 2562. An exception to the general rule that time of entry determines the priority of orders at the same price is that public orders get priority over specialist or dealer orders. *Id.*

120. Seligman, *supra* note 39, at 113.

121. SEC, A REPORT ON THE OPERATION OF THE CINCINNATI STOCK EXCHANGE NATIONAL SECURITIES TRADING SYSTEM 1978-1982, at 18 (1982); 5 LOSS & SELIGMAN, *supra* note 13, at 2562-63.

122. 5 LOSS & SELIGMAN, *supra* note 13, at 2563.

123. "Program trading," as the term has become widely used, refers to buying and selling stocks and their derivative instruments simultaneously in order to gain market advantage. Its advantages include the potential for arbitrage (buying a security in one market for a lower price than can be obtained by selling it or an equivalent derivative instrument in another market), portfolio insurance (buying or selling a security in the equity market while simultaneously taking an offsetting position in the futures market to insure against wild market swings), and asset allocation and hedging (insuring a well-diversified portfolio against market risk by taking an offsetting position in the index futures market, rather than taking offsetting positions on single securities). See Solomon & Dicker, *supra* note 20, at 205-15.

whether to execute a trade or attempt to negotiate for a better price. Thus, the NSTS replaces a group of human brokers on the floor of an exchange with a group of human brokers sitting in front of their computer screens. This feature eliminates the most important benefit to be gained from an automated system—efficiency. In order to be a model for a national automated securities exchange system, trades must be able to be ordered *and executed* by computers, without a human touch. This requirement, however, may be met in the near future by virtue of a new system being developed by Morgan Stanley. Morgan Stanley's MatchPlus system will allow users to enter orders, with a variety of limiting parameters, for automatic execution.¹²⁴ The system, while not part of the NSTS, is likely to be linked to the NSTS in order to satisfy NYSE Rule 390,¹²⁵ which prohibits member firms from trading outside of a recognized exchange during regular business hours.¹²⁶

124. *Morgan Stanley Deploys Black Box Trading System*, TRADING SYSTEMS TECH., May 20, 1991, available in LEXIS, Nexis Library, Omni File.

Morgan Stanley & Co. is offering its clients a new flavor of execution service in the form of a black box equity trading system. The system—called MatchPlus Patient Trading System—is designed to handle crosses of equity portfolios at low cost and without market impact. The service will be available through several quote vendors' terminal networks.

All New York Stock Exchange-listed and NASDAQ National Market System stocks are eligible for crossing on MatchPlus, which will match orders continuously during the NYSE trading day. Trade confirmation will be instantaneous; users can constantly monitor the progress of their orders. But no information—no order book—will be available to any participants.

Id.

125. NYSE Rule 390, N.Y.S.E. Guide (CCH) ¶ 2390 (Mar. 1978).

126. *Id.*; *Morgan Stanley Deploys Black Box Trading System*, *supra* note 124.

A black box matching system is a bit of a departure for an NYSE member firm like Morgan Stanley. Member firms are bound by rule 390, which requires daytime trades to occur on an exchange floor. Morgan Stanley's MatchPlus will satisfy this requirement by executing and reporting its trades through a regional stock exchange

The Cincinnati Stock Exchange is considered a likely suspect [to support the system] because its comparatively thin order book makes crossing of matched orders easier. Morgan Stanley has a computer-to-computer link with the Cincinnati Stock Exchange.

Id.

C. The Wunsch System

There is a new player in the electronic stock exchange game: Steven Wunsch. With significant local support,¹²⁷ he has formed the "Arizona Stock Exchange," more commonly known as the Wunsch system. The SEC classified the Wunsch system as an exempt exchange under section five of the Securities Exchange Act of 1934.¹²⁸ The Wunsch system uses a single-price auction system,¹²⁹ which runs after the NYSE closes each day.

Using special software, buyers and sellers enter on their computers the amount of stock and the price range at which they're willing to deal. At the end of each day, the orders are matched at the price that will execute most of the trades. . . . [P]rices are set at the intersection of two curves, one representing supply, the other demand.¹³⁰

The Wunsch system "has low commission prices (1¢ per share or less), no bid and ask spreads, no floor and no specialists."¹³¹ The system allows investors to enter their bids in an "open book," where other investors can see the order, or in a "reserve book," where other investors will not see the order until the trade has been executed after the auction is over.¹³² Trades not executed return to the investor.¹³³ Wunsch is attempting to build automatic bridges to other systems in order to execute

127. *Exchanges and Regulators: Former Wunsch Auctions Systems, AZX Opens Up In Arizona*, TRADING SYSTEMS TECH., Apr. 6, 1992 [hereinafter *AZX Opens Up*], available in LEXIS, Nexis Library, Omni File. "Arizona has committed \$700,000 to support the exchange, with a further \$2 million on the way. AZX [the Arizona Stock Exchange] is receiving the money in \$50,000 monthly increments that will run through 1994." *Id.*

128. See Self-Regulatory Organizations; Wunsch Auction Systems, Inc., Exchange Act Release No. 28,899, 56 Fed. Reg. 8377 (1991); Wunsch Auction Systems, Inc., SEC No-Action Letter, [1991 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 79,662 (Feb. 28, 1991).

129. The Treasury Department recently used a single price auction system, without the automation, for the first time in its crucial Treasury bill auction. Marlene G. Star, *U.S. To Try Single-Price Treasury Auction*, PENSIONS & INVESTMENTS, June 22, 1992, at 1.

130. Eric Reguly, *Cracks Appearing in NYSE's Armor*, FIN. POST, May 15, 1992, at 15.

131. *Id.*

132. *AZX Opens Up*, *supra* note 127.

133. *Id.*

investors' trades which are not executed in his "one-shot" per day auction.¹³⁴

The Wunsch system, however, is not without its problems. These stem primarily from its specialized design and function. By design, it is a low volume, instantaneous one-price auction system. While the system does arrive at its prices independently from the NYSE, an investor's trade either executes, or it does not. If it does not, it is up to the investor to find an alternate market for the trade.¹³⁵ In that sense, it is as dependent on the NYSE for liquidity as proprietary systems are dependent on the NYSE for price determination, as investors typically would look to the NYSE to execute trades which went unexecuted on the Wunsch system.¹³⁶ Moreover, the exchange operates once a day, at 5:00 p.m., after the NYSE closes. Investors who prefer to trade during the day must look elsewhere.¹³⁷ It should be noted that while the NYSE vigorously opposed the approval of the Wunsch system,¹³⁸ it since has sought and received temporary approval for its own after-hours trading system, created to compete with the Wunsch system.¹³⁹

134. *Id.*

135. *Id.*

136. See Request for Comment on U.S. Equity Market Structure Study, Exchange Act Release No. 30,920, [1992 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 85,012 (July 14, 1992).

137. *Id.* Steven Wunsch, predictably, takes the contrary position.

Wunsch argues that his system will actually improve liquidity because prices will not change until a big volume of orders has piled up on both sides. Wunsch says that most intra-day trading is just so much noise. Continuous trading gives dealers and brokers the opportunity to clip off commissions and fractions on trades. It also means order imbalances are frequent, since you can't expect all potential buyers and sellers to appear at the same exact moment. That's why stock prices—General Motors, for instance—may vary by \$1 during a day even if there's no news. Does it make sense that General Motors as a company could be worth \$1 billion more in the morning than in the afternoon?

Richard L. Stern, *A Dwindling Monopoly*, FORBES, May 13, 1991, at 66.

138. The NYSE vigorously opposes any competitive threats. See Oesterle et al., *supra* note 58, at 228; see also William Bower, *Bicentennial Battle: Big Board at Age 2000, Scrambles to Protect Grip on Stock Market*, WALL ST. J., May 13, 1991, at A1.

139. Self-Regulatory Organizations; New York Stock Exchange, Inc.; Order Granting Temporary Approval to Proposed Rule Changes Relating to NYSE's Off-Hours Trading Facility, Exchange Act Release No. 29,237, 56 Fed. Reg. 24,853 (1991) (temporarily approved on May 31, 1991); see generally SEC to Issue Decision on Fate of Big Board's Off-Hours Trading System, SEC. WK., May 20, 1991, at 12 (describing NYSE's proposed off-hours trading system).

C. Globex

The closest thing to a truly global electronic market in existence does not trade traditional equity securities. It trades options and futures, including derivative equity instruments. Formed by an alliance between the Chicago Mercantile Exchange, Reuters, and the Chicago Board of Trade (CBOT), Globex is heading rapidly toward including many of the world's existing and emerging commodities and futures exchanges within its electronic portals.¹⁴⁰ For example, Globex recently signed an agreement with the Marche a Terme International de France (MATIF) (a French options exchange) to allow members of each exchange to trade contracts on either exchange through the Globex system.¹⁴¹

Globex, like the NSTS, is designed to operate as a "black box," the computer system itself matches buyers with sellers. Unlike the NSTS, however, Globex will execute trades

140. *Futures Exchanges, OTC Marts Booming Globally*, WALL STREET LETTER, June 29, 1992, at S1.

New exchanges continue to open in Europe—Belfox in Brussels and Austria's Otab are among the most recent. An Italian futures exchange, which will initially just trade Italian bond futures, is also expected to be launched soon. Its opening will bring the total number of exchanges worldwide to close to 75. The total number of futures and options contracts traded on worldwide exchanges reached over 58 million lots in May 1992.

Id.

141. *CME, MATIF, U.S. Regulators Announce Start of Cross-Exchange Access System*, 24 Sec. Reg. & L. Rep. (BNA) 1682 (Oct. 30, 1992) [hereinafter *Cross-Exchange Access System*].

Patrick Simonnet, executive vice president, MATIF, said cross-exchange access "means that MATIF members, as well as CME members on the reverse side, will have the opportunity to trade products of other exchanges—members of the GLOBEX system—around the clock, wherever the terminals for the sessions are located."

Simonnet added that member-operators will be required to comply with the rules of the exchange from which they are trading, as well as the rules of the exchange listing the products on the Globex system.

Id. Globex also expects to enter into agreements with futures exchanges in Sydney, Tokyo, and Hong Kong in the very near future. *Globex Near-Term Expansion Plans Included Hong Kong, Japan and Sydney*, SEC. WK., Oct. 26, 1992, at 9.

automatically.¹⁴² But Globex does not replace the auction floor. Globex is designed to complement floor trading, rather than replace it. It operates only during hours the CBOT and CME are closed, and does not have the physical capacity to handle the peak loads which occur during the main trading hours.¹⁴³ It remains to be seen whether the floor can remain cost competitive with the automated trading possible over Globex, as the managers of Globex claim.¹⁴⁴ As yet, however, no commodities futures exchange in the world has opted for a totally automated system.¹⁴⁵

Globex both solves and creates many regulatory problems. For example, while the nature of electronic trading lends itself to the creation of an audit trail, Globex will be regulators' first attempt at regulating a twenty-four hour trading environment.¹⁴⁶ Also, while traders on the network theoretically will be bound by both the rules of their home exchange and the exchange on which they are trading,¹⁴⁷ many choice of law and jurisdictional issues will arise once violations occur in practice.¹⁴⁸ To address this issue, the International Council of Securities Associations established a working group to discuss regulation of cross border electronic trading.¹⁴⁹ More issues are sure to arise in this area as Globex becomes more ubiquitous in the commodities futures market.

142. Stephen Davis, *Globex: Chicago's Black Box Debuts*, INSTITUTIONAL INVESTOR, May, 1992, at 21.

143. *Globex Does Not Threaten Pit Trading in the Short Term*, FIN. REG. REP., Apr. 1992, available in LEXIS, Nexis Library, FRR File.

144. *Id.*

145. Ginger Szala, *Futuristic Automation Now at Traders' Fingertips*, FUTURES, Jan. 1992, at 50.

146. Roger Fillion, *Globex to Test Regulators on Twenty-four Hour, Global Trading*, REUTERS NEWS REP., June 22, 1992, available in LEXIS, Nexis Library, Reuter File.

147. *Cross-Exchange Access System*, *supra* note 141.

148. See, e.g., Leslie B. Samuels & Patricia A. Brown, *Observations on the Taxation of Global Securities Trading*, 45 TAX. L. REV. 527 (1990).

149. *Emerging Electronic Trading Exchanges Pose Increasing Headaches For Regulators*, THOMSON'S FIN. COMPLIANCE WATCH, Apr. 6, 1992, at 4; see also Commodity Futures Trading Commission, Policy Statement Concerning the Oversight of Screen-Based Trading Systems, 55 Fed. Reg. 48,670 (1990).

III. REFORM

*Progress is impossible without change; and those who cannot change their minds cannot change anything.*¹⁵⁰

A. The Role of the SEC

In 1975, Congress amended the Securities Exchange Act of 1934 "to facilitate the establishment of a national market system for securities."¹⁵¹ Relatively little has been done by the SEC in furtherance of this goal.¹⁵² The SEC's ideological preference for deregulation and noninterference during the Reagan and Bush administrations tends to explain this inaction. This ideological stance is firmly rooted in economic theory and, in general, is supported by free market thinkers such as the "Chicago" school of economics.¹⁵³ It remains to be seen how the Clinton SEC will deal with these issues. The SEC, however, has a role under any administration in influencing the means by which securities are exchanged in the United States. Moreover, the form which the world's largest market takes should be determined by market forces. Thus, the examination of the SEC's role prompts a broader look at competition in the capital markets themselves.¹⁵⁴

There are essentially four levels of competition in the equity capital markets: competition between investors for the "best deals;" competition between brokers for the investor's business; competition between exchanges for the broker's business; and

150. George Bernard Shaw, *quoted in THE CONCISE COLUMBIA DICTIONARY OF QUOTATIONS* 37 (Robert Andrews ed., 1987).

151. Act of 1975, Pub. L. No. 94-29, 89 Stat. 110, (codified at 15 U.S.C. § 78k-1(a)(2) (1988)).

152. Jonathan R. Macey & David D. Haddock, *Shirking at the SEC: The Failure of the National Market System*, 1985 U. ILL. L. REV. 315.

153. This ideological stance, not surprisingly, is also ubiquitous on the floors of the exchanges. For example, on the floor of the CME, it is not uncommon to see brokers sporting buttons carrying the motto "Free markets for free men." Interview with John F. O'Donovan, *supra* note 58.

154. See generally *Big Board v. Small Screen*, ECONOMIST, Apr. 6, 1991, at 12 (noting the tension between competition, which reduces cost-raising inefficiency, and regulation, which prevents some customers from being able to find the best price when shares are trading at different prices in different places).

competition between countries for investment dollars. Of these, the first is the competition upon which the capital market thrives. This is the competition which the SEC attempts to regulate most vigorously and which reflects the underlying realities of the capital marketplace.¹⁵⁵ The last, competition between countries for investment dollars, occurs on a variety of levels. It is influenced by (and influencing) currency exchange rates, the methodology of exchange, the depth and stability of the capital market, and the underlying structure of the nation's economy itself.¹⁵⁶

The second and third forms of competition, competition among brokers and competition among exchanges, are good only to the extent that they facilitate the smooth and efficient exchange of stock between investors. In other words, they are good only to the extent that they facilitate competition between investors. The assumption that it is necessary to maintain or increase competition between these entities¹⁵⁷ itself assumes that brokers and exchanges are necessary. Brokers probably are necessary. They serve as the interface between the investor uninitiated in the procedures and the language of the exchange of stock.¹⁵⁸ This function adds to the liquidity of the market by making the market accessible to these investors. This Note calls into question, however, the assumption that exchanges in their current form are necessary at all. This is a question best left to the market to determine. It is incumbent upon the SEC, via section 11A, to structure the regulatory system to ensure that there are no unnecessary impediments to competition determining the structure of the market.¹⁵⁹

155. See SEC, POLICY STATEMENT ON THE STRUCTURE OF A CENTRAL MARKET SYSTEM 8 (1973); SEC, STATEMENT ON THE FUTURE STRUCTURE OF THE SECURITIES MARKETS 1-9 (1972).

156. See generally Charles C. Cox & Douglas C. Michael, *The Market for Markets: Development of International Securities and Commodities Trading*, 36 CATH. U. L. REV. 833 (1987).

157. SEC, POLICY STATEMENT ON THE STRUCTURE OF A NATIONAL MARKET SYSTEM 8-10 (1973).

158. Of course, this analysis does not apply to the sophisticated individual investor. Query why it should be necessary for such an investor to pay brokerage fees when they are more than capable of executing their own transactions. Eliminating these fees is the intent of proprietary trading systems such as AUTEX and Instinet. See Seligman, *supra* note 39, at 115-16.

159. Congress made this clear, explaining that:

[t]he bill approaches the problem of encouraging the development and

A legitimate consideration is who should be responsible for taking the lead in this effort. Should it be the government? Particularly when it comes to "pure" economic issues, U.S. policymakers have shown a preference for market-based solutions, and for good reason: government is notoriously inefficient. The financial community rightly should cringe at the idea of a stock exchange run with the efficiency of the post office.¹⁶⁰ Policymakers made no exception with regard to the national market system. "It [was] the intent of the conferees that the national market system evolve through the interplay of competitive forces as unnecessary regulatory restrictions [were] removed."¹⁶¹

B. Specific Reform

This Note does not argue for a government-mandated solution. Rather, it proposes that the government pave the way for a market-based solution. The SEC can either protect the near-monopoly position of the NYSE by enforcing the current regulatory regime, or allow competitive forces to overcome inertia by instituting an alternative regime.¹⁶² This Note calls for the development of alternative stock exchange mechanisms through the implementation of a rule exempting exchanges

implementation of a national market system from the point of view of preserving the competing markets for securities that have developed, breaking down all barriers to competition that do not serve a valid regulatory purpose, and encouraging maximum reliance on communication and data processing equipment consistent with justifiable costs.

S. REP. NO. 75, 94th Cong., 1st Sess. 8 (1975); *see also* Seligman, *supra* note 39, at 131-32.

160. Or the DOD, or the SEC for that matter. Professor Poser claims that one of the reasons for the SEC's failure to effect the changes envisioned by § 11A is its lack of institutional competence as a "development agency," i.e., that the SEC is much better at regulating the existing regime than it would be at creating a new one. Poser, *supra* note 89, at 946-51.

161. H.R. REP. NO. 229, 94th Cong., 1st Sess. 92 (1975).

162. This dilemma was described by the Advisory Committee on a Central Market System (the Walbert Committee) in its 1972 and 1973 reports. 173 Sec. Reg. & L. Rep. (BNA) I-1 to -7 (1972); 192 Sec. Reg. & L. Rep. (BNA) I-1 to -7 (1973). "That Committee developed two positions known as Approach I and Approach II. Approach I urged a gradual evolutionary approach Approach II . . . concluded that the present market structure was simply incapable of evolving into . . . a more integrated central market system Approach II was substantially embraced by the SEC" Harman, *supra* note 103, at 2281.

which operate below a certain volume from the onerous burdens of exchange regulation. The Securities Exchange Act defines an exchange as

.... any organization, association, or group of persons, whether incorporated or unincorporated, which constitutes, maintains, or provides a market place or facilities for bringing together purchasers and sellers of securities or for otherwise performing with respect to securities the functions commonly performed by a stock exchange as that term is generally understood.¹⁶³

Classification as an exchange subjects the classified entity to a variety of regulatory burdens. For example, securities exchanges must file copies of proposed rules and proposed rule changes for SEC approval or disapproval,¹⁶⁴ must undertake a long list of other duties and responsibilities,¹⁶⁵ and must comply with certain limitations on their activities.¹⁶⁶ These regulatory burdens create a barrier for potential entrants into the stock exchange market. As the SEC noted in its exemption of the Wunsch System from exchange regulation under section five of the Securities Exchange Act, these regulatory burdens:

do not decrease in a purely linear fashion as volume decreases. Thus, there are minimum fixed costs of compliance that these obligations entail even for small exchanges. . . . On the other hand, the revenues of an exchange are more directly related to volume and are not in any sense fixed. For a proprietary exchange with . . . limited volume and thus limited revenues . . . the costs of compliance with the obligations and limitations of registration would represent prohibitive business, administrative, and financial burdens.¹⁶⁷

163. 15 U.S.C. § 78c(a)(1) (1988); *see also* Board of Trade v. SEC, 923 F.2d 1270 (7th Cir. 1991) (holding that a computerized system for trading options was not an "exchange" that was required to be registered with the SEC).

164. 15 U.S.C. § 78s(b)(1) (1988).

165. 15 U.S.C. § 78f(b)(1)-(8) (1988).

166. *See, e.g.*, 15 U.S.C. § 78k(a) (1988) (prohibiting members of exchanges from trading for their own account); § 78f(c)(1) (1988) (providing that exchanges generally may admit only broker-dealers and their associates as "members").

167. Self-Regulatory Organizations; Wunsch Auction Systems, Inc., Exchange Act Release No. 28,899, 56 Fed. Reg. 8377, 8381 (1991) (footnotes omitted).

The Wunsch System was given a unique limited volume exception to exchange regulation under section 5 of the Securities Exchange Act.¹⁶⁸ The SEC did not determine exactly what volume the Wunsch System must stay under in order to maintain its exception. However, it did strongly suggest that the benchmark would be the volume on the Cincinnati Stock Exchange.¹⁶⁹ The SEC also required the Wunsch System to forward certain reporting data to the SEC, regardless of Wunsch's exemption from direct exchange regulation.¹⁷⁰

The SEC should codify the exemption given the Wunsch System, so that entrepreneurs with innovative ideas for the exchange of stock can implement their ideas with confidence of approval and with minimal regulatory burden. The maximum volume should be large enough to ensure an adequate profit to the system operator, and the exempt exchange should be given explicit authority to trade securities that are listed on any registered securities exchange or with any self-regulatory organization. Once such a rule is in place, there should arise a number of exempt stock exchanges which can operate profitably under the specified volume.¹⁷¹ Given the economies

168. *Id.* at 8380, 8383; see also Wunsch Auction Systems, Inc., SEC No-Action Letter, [1991 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 79,662 (Feb. 28, 1991). Section five of the Securities Exchange Act authorizes the SEC to grant an exemption from registration if "by reason of the limited volume of transactions effected on [the] exchange, it is not practicable and not necessary or appropriate in the public interest or for the protection of investors to require such registration." 15 U.S.C. § 78e (1988).

169. Self-Regulatory Organizations; Wunsch Auction Systems, Inc., Exchange Act Release No. 28,899, 56 Fed. Reg. 8377, 8380, 8383 (1991).

The statute provides no absolute guidelines as to what level of volume does not justify a continuing exemption. The Commission agrees generally with the NYSE, however, that the present volume levels of fully regulated national securities exchanges provide a useful benchmark. The Commission would be concerned over the competitive implications of the Wunsch System operating pursuant to an exemption if its volume exceeded that of any of the fully regulated national securities exchanges. The Cincinnati Stock Exchange ("CSE") is the smallest of the currently registered fully regulated national securities exchanges in terms of shares and transactions.

Id. at 8380. "For calendar year 1990, CSE's average daily volume, expressed in reported trades was 717; its average daily volume, expressed in shares traded was 1,238,241." *Id.* at 8380 n.40.

170. *Id.* at 8382-83.

171. Such a rule is to be distinguished from SEC proposed rule 15c2-10. Reg. § 240.15(2-10), Fed. Sec. L. Rep. (CCH) ¶ 25,115 (proposed Apr. 11, 1989). Rule 15c2-10 "is designed to provide for SEC review of proprietary trading systems that are not operated as facilities of a registered national securities exchange or association and are not subject to SEC regulation as national securities exchanges or associations pursuant

of scale surrounding the exchange of stock,¹⁷² it is likely that certain of these exchanges will prevail in the competitive marketplace. As these stock exchanges become more successful, they will come under the SEC's regulatory framework. Eventually, we may even end up with one dominant stock exchange, similar to what we have currently.¹⁷³ The difference is that it would be a stock exchange whose structure is the most efficient of a large group of contenders, rather than the heir to the legacy of an idea that is over two centuries old.

The process as described should be molded by the SEC to meet the goals of section 11A. For example, the SEC should only exempt those stock exchanges which operate over an automated network, as opposed to exchange floors. It is unlikely that anyone would build a new exchange floor, but such a limitation would serve a useful signalling purpose. The SEC should also exempt only those stock exchanges which engage in independent price discovery.¹⁷⁴ No system which relies on the NYSE for its prices can ever replace the NYSE itself. A word of caution: the SEC could select any number of desirable attributes of an automated stock exchange and limit exemptions to those exchanges possessing such attributes. This approach, however, would be contrary to the general goal of allowing the market to determine the most efficient design of a stock exchange. Any limitations of this sort should be based on sound fundamental regulatory requirements and be balanced wisely against their restraint on innovation.

This Note proposes that the following rule should be promulgated by the SEC:

17 C.F.R. 240.5a Exemptions from Registration.

- (a) Applications for exemption made pursuant to rule 240.6a-1 shall be approved if the following conditions are met:

to Sections 6 or 15A of the "Securities Exchange Act of 1934. Proprietary Trading Systems, Exchange Act Release No. 26,708, [1989 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 84,406, at 80,053 (Apr. 11, 1989). The difference between this Note's proposed rule 5a and proposed rule 15c2-10 is fundamental. This Note argues for *exempting* entities from regulation, which under current law would be regulated. Rule 15c2-10 proposes *regulating* entities which are not currently subject to regulation as exchanges.

172. See Oesterle et al., *supra* note 58, at 295-300.

173. *Cf. id.* at 296-97 (discussing the NYSE and its specialists as having occupied, in the past, a near natural monopoly position in the market).

174. See Request for Comment on U.S. Equity Market Structure Study, Exchange Act Release No. 30,920, [1992 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 85,012, at 82,914-15 nn.36-38 (July 14, 1992).

- (1) The entity seeking exemption is registered with the SEC as a broker/dealer under 15 U.S.C. 78o(a)(1);
 - (2) The entity seeking exemption uses an automated network as its principal vehicle for the exchange of securities. No exemption shall be granted under this rule for entities intending to operate a centralized trading floor;
 - (3) The entity seeking exemption uses an autonomous mechanism for discovering prices. No exemption shall be granted under this rule for entities intending to trade securities at prices discovered on a registered securities exchange, a registered self-regulatory organization, or any foreign exchange;¹⁷⁵ and
 - (4) The entity seeking exemption files an affidavit of intent to operate at an annual volume of less than 450 million shares or at an annual dollar value of less than \$150 billion as adjusted for inflation from the date of promulgation of this rule.¹⁷⁶
- (b) Entities granted exemptions under paragraph (a) of this rule shall file annually with the SEC data showing that the limitations contained in subparagraphs (1)–(4) were met during the previous year.
- (c) Entities granted exemption under paragraph (a) of this rule shall have the authority to trade any securities registered with the SEC and listed on any national securities exchange or self-regulatory organization.

The SEC should also solicit proposals for conducting a major study to design a system. The SEC should fund this study and

175. Of course, securities *will* trade on any new exchange at the same prices available on the existing exchanges. If prices were different, arbitrage would occur, forcing prices back into parity. For a discussion of arbitrage, see *supra* notes 42–45 and accompanying text. The intent of this requirement is to ensure that potential competitors to the NYSE have the ability to compete over the long term. Thus, there must be an endogenous price discovery mechanism, as exists on the Wunsch system. For a discussion of the Wunsch price discovery mechanism, see *supra* note 130 and accompanying text.

176. These figures represent approximately 9% of the 1992 volume on the NYSE. FACT BOOK 1992, *supra* note 2, at 11.

then make its conclusions available to the public.¹⁷⁷ Currently, a market participant would face a great deal of risk in designing such a system. A funded study would take some of the risk out of the system design process for any future market entrants.

The unfortunate dilemma the SEC faces in encouraging the development of a national market system is that while a purely market based solution is optimal, the current structure of the market makes the independent, undirected adoption of such a system unlikely. The SEC's Equity Market 2000 study will examine these issues and hopefully come to some definite conclusions about the scope of the SEC's role in shaping the markets of the future:

There have been widespread differences of opinion over the role the Commission has played over the past 17 years in oversight of the equity market structure. One viewpoint would have the Commission exercising more initiative in the process, while a different viewpoint would lead to less governmental action to alter, shape, or direct market forces. Whatever the merits of either view, all those interested in the development of healthy equity markets—investors, issuers, the SROs, market professionals, and Congress—have frequently looked to the Commission to resolve or mediate the seemingly intractable market issues that continually arise. Accordingly, the Division [of Market Regulation] is interested in exploring the proper degree of Commission oversight of the functioning of U.S. equity markets.¹⁷⁸

C. Room for Caution

The SEC has been criticized for its handling of Congress' section 11A mandate.¹⁷⁹ Why has it failed to act? One answer is that the exchange floor community and other political

177. This is similar to a proposal made by Cohen, *supra* note 3, at 78–81. Cohen argues for the creation of a committee to provide design and financing plans and rules for the national market system to the SEC. This committee would also sponsor studies concerning the future development of the national market system. *Id.*

178. Request for Comment on U.S. Equity Market Structure Study, Exchange Act Release No. 30,920, [1992 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 85,012, at 82,909 (July 14, 1992).

179. See, e.g., Macey & Haddock, *supra* note 152, at 322–24.

constituencies which have a vested interest in the status quo are simply too powerful. While in the final analysis, this is probably *the* reason why wholesale reform has failed,¹⁸⁰ even interests as powerful as these must advance legitimate reasons to maintain the status quo other than to maintain their power base.

A shibboleth which the NYSE has invoked repeatedly in opposing various market reforms is market "fragmentation."¹⁸¹ Fragmentation, so the argument goes, would reduce the "depth" of the market, and lead to disorderliness and discontinuity of pricing.¹⁸² Admittedly, there are benefits inherent in centralizing trading.¹⁸³ Critics of this argument, however, claim that fragmentation is merely a dirty word for competition.¹⁸⁴ It is ironic indeed that the NYSE, the last bastion of unabashed capitalism, should claim relief from "ruinous competition." The answer to their claim is simple: if fragmentation were injurious to investors, it would not happen. Investors are risk averse. They will not leave the safe portals of the NYSE unless there is truly something better available. But, investors are leaving¹⁸⁵ and despite the efforts of the NYSE, U.S. securities

180. Former NYSE Chairman John Phelan, Jr. perhaps put it best: "Technology and communication bring efficiency. Money is made in inefficiency." Hansell, *supra* note 17, at 172.

181. See, e.g., NYSE, COMMENTS ON THE NEED FOR AN ORDER EXPOSURE RULE (1982).

182. See generally WILLIAM M. MARTIN, JR., THE SECURITIES MARKETS: A REPORT, WITH RECOMMENDATIONS 3 (1971) [hereinafter MARTIN REPORT].

183. Professor Seligman describes these benefits thusly:

With a regular volume of orders flowing to a single place of execution, a central market should be "orderly," without wide or abrupt price swings; "continuous," with minimum price variations between successive transactions; "liquid," with the ability to process orders immediately and have "depth" or the capacity to handle temporary imbalances in supply and demand caused by substantial volume without becoming disorderly.

Seligman, *supra* note 39, at 84; see also MARTIN REPORT, *supra* note 182, at 2.

184. Interview with Joel Seligman, Professor of Law, University of Michigan Law School, in Ann Arbor, Mich. (Oct. 14, 1992). "Banning proprietary exchanges which directly serve customers would have that effect [granting the NYSE a monopoly], which is of course exactly the intent of the intensive lobbying which claims that fragmentation (read 'competition') is bad for markets (read 'members')." Steven Wunsch, *Market Fragmentation: Threat to U.S. Competitiveness or the Cartel's Clever Ruse*, WALL STREET LETTER, June 29, 1992, at S2.

185. The persistence of "third market" trading in the period since brokerage commission rates were deregulated refutes the view offered by Professor Poser in 1981 that such deregulation would enable the NYSE to regain institutional trading volume, and thus remain the de facto national market system. See Poser, *supra* note 89, at 903.

markets are becoming increasingly fragmented.¹⁸⁶

There is at least one concern about changing the market environment, however, (other than the purely political) which is legitimate.¹⁸⁷ In this case, as in many, a legitimate rationale for proceeding cautiously is risk.¹⁸⁸ SEC Chairman Williams persuasively expressed his view before Congress in 1980, stating, "I am not about to be the person to come back to Congress and say I am sorry I implemented your program and it blew [up]. [T]he capital markets of this country are too important."¹⁸⁹ The fact is that we have a system that works, and the conventional wisdom in such a situation is that "if it ain't broke, don't fix it."¹⁹⁰ Such an attitude, while prudent, may be somewhat short-sighted. The system "ain't broke" only so long as there is no better system available. One may have said there was nothing "broke" with the U.S. auto industry—until the Japanese began overwhelming it in international competition.¹⁹¹ In high technology, the balancing

186. "In 1981, the NYSE had more than 86 percent of the volume on the Consolidated Tape in NYSE listed stocks; in 1991, it had approximately 67 percent." Karmel, *supra* note 12, at 4.

187. Although perhaps this assumes that political issues are inherently "illegitimate."

188. See generally David M. Schizer, Note, *Benign Restraint: The SEC's Regulation of Execution Systems*, 101 YALE L.J. 1551 (1992) (arguing that the SEC is correct in adopting a restrained regulatory strategy). One of the most significant risks involved with automating the markets is that the speed at which transactions are completed may cause unforeseen problems, including increased volatility. Interview with John F. O'Donovan, *supra* note 58. Indeed, the Paris Bourse has encountered exactly that sort of volatility on their automated network, although they ascribe it to a lack of liquidity due to investors' reluctance to place large orders on the system. Hansell, *supra* note 17, at 183; see also MARKETING MECHANISMS REPORT, *supra* note 47, at VI-52 (noting that trading procedures aimed at easing NASD members' apprehension about automation exacerbated the 1987 October market break).

189. STAFF OF THE HOUSE COMM. ON INTERSTATE AND FOREIGN COMMERCE, 96TH CONG., 2D SESS., NATIONAL MARKET SYSTEM: 5 YEAR STATUS REPORT 2 (Comm. Print 1980) [hereinafter STATUS REPORT].

190. This phrase is originally attributed to Bert Lance, Chairman of the Office of Management and Budget under President Carter. William Safire, *Wedges and Bounces*, N.Y. TIMES, Sept. 20, 1992, § 6 (Magazine), at 24.

191. Indeed, if market share in the futures trading market is any indication of things to come for the equity trading market, time is even more clearly of the essence:

[I]n striking contrast to the years prior to 1982, market share is moving away from U.S. shores, toward Europe and the Pacific Basin. As recently as 1986, U.S. exchanges commanded 99 percent of market share in stock-index futures, with the Standard & Poor's 500 index (CME), at 19.5 million contracts traded, accounting for approximately three fourths of the total. Just three years later, at the close of 1989, U.S. market share had slipped to 57 percent. The S&P 500 did finish 1989 as the industry's pacesetter, but volume, at 10.5 million, was down some 46 percent from 1986.

act is to stay on the "leading edge" where you can compete effectively, and stay off the "bleeding edge" where you take on too much risk. Is there too much risk in automating the securities markets? That depends on how clever you think the competition is. It may be a mistake to underestimate the financial communities in London and Tokyo—or even Toronto.¹⁹²

The transition from the physical stock exchanges to an automated network entails a great deal of risk. Such is the nature of transition. Those who manage change effectively can benefit from it. Those who resist change are likely to be left behind. Given the increasing globalization of the securities markets, the NYSE, like U.S. Steel,¹⁹³ is no longer guaranteed a monopoly over the market. The question for the 1990s and beyond will not be who had the first major stock exchange, or even who had the best stock exchange. The question will be

William J. Brodsky, *The Future Is Now*, INSTITUTIONAL INVESTOR, Jan. 1991, at Supp. 7.

192. For example, the London Stock Exchange's SEAQ system may present future challenges to U.S. dominance of stock exchanges. See *supra* text accompanying note 115. For an explanation of the market structure debates ongoing in Europe, see Roberta S. Karmel, *The Stalled Investment Services Directive*, N.Y. L.J., June 18, 1992, at 3. A group in London is also planning to start an electronic trading system which would offer institutional investors low-cost secondary trading. *Let's Do Wunsch; Electronic European Exchange in the Works*, WALL STREET LETTER, July 13, 1992, at 1. The Toronto Stock Exchange is preparing to close its trading floor by the end of 1993, saving \$30 million over six years. Farnsworth, *supra* note 70, at 15. "Could the NYSE floor become a museum devoted to vintage technology while Vancouver licenses its trading system to emerging markets in Latin America, and Toronto sells Computer-Assisted Trading System (CATS) to the Europeans? At home, the Big Board is losing market share to fledgling crossing networks and to institutional investors like Fidelity that cross orders internally." Ivy Schmerken, *Wall Street's Quiet Revolution*, WALL ST. & TECH., June 1992, at 26. There is clearly no dearth of pretenders to the NYSE's throne.

193. See generally ROBERT W. CRANDALL, *THE U.S. STEEL INDUSTRY IN RECURRENT CRISIS* (1981) (arguing that global diffusion of steelmaking technology helped contribute to the U.S. steel industry's decline). The Commerce Department explains that:

The declining competitiveness of domestic steel may be attributed to a number of interrelated factors. One central factor is that the domestic steel industry has been slower in adopting cost saving technologies

[A]nother factor . . . is the relatively high cost of labor in the U.S. market

The domestic steel industry's future will depend on its flexibility . . . and on its adaptability to the changing world market.

U.S. DEPT OF COMMERCE, *THE U.S. PRIMARY IRON AND STEEL INDUSTRY SINCE 1958*, at 27 (1985).

who *has* the best stock exchange system.¹⁹⁴ It is the role of the SEC to regulate and promote the exchange of securities within the United States. The U.S. financial markets are considered to be a "national asset."¹⁹⁵ Now is not too soon for the SEC to take action to ensure the continuation of the United States as a world financial center.

CONCLUSION

*Progress, therefore, is not an accident,
but a necessity It is a part of nature.*¹⁹⁶

The establishment of a national automated securities exchange system, unlike most technological advances, is not inevitable.¹⁹⁷ The entrenched interests in control of the current system are unlikely to support the elimination of their privileged position.¹⁹⁸ It is in the nature of free markets that market power can become concentrated, and thus inhibit the further development of the market itself.¹⁹⁹ When that happens, government authority becomes necessary to correct the "market failure." This is the theory behind government regulation of natural monopolies, government intervention in the form of antitrust regulation, and indeed, government regulation in the securities markets at all.

The question facing the SEC on this issue is simply this: what market is it to protect? If the SEC views its role as

194. "At stake from the New York Stock Exchange's point of view is its preeminent position as the principal market for securities of major corporations (indeed, the world's largest capital market)." Farrar, *supra* note 10, at 109. See generally STATUS REPORT, *supra* note 189 (discussing the status of the national market system five years after its inception).

195. 15 U.S.C. § 78k-1(a)(1)(A) (1988).

196. Herbert Spencer, *quoted in* OXFORD DICTIONARY OF QUOTATIONS 514 (3d ed. 1979).

197. *Demise of Trading Pits Not Inevitable—Officials*, REUTERS NEWS REP., Jan. 30, 1990, available in LEXIS, Nexis Library, Reuter File.

198. See generally Farrar, *supra* note 10 (noting how vested interests can resist structural reforms on Wall Street).

199. This clearly has happened in the case of the NYSE. "Had Rip Van Winkle, a stockbroker, fallen asleep at the corner of Wall and Broad streets in 1870 and awakened a century later, he would have found both the structure and technology of the marketplace with which he had been familiar essentially intact." Farrar, *supra* note 10, at 117.

correcting market failure in the current system, without analyzing the system itself, then the prescription should be business as usual. If the proper role of the SEC, however, is to develop and encourage the exchange of securities, as opposed to the securities exchanges, encouraging the development of a national automated securities exchange system deserves a hard look. True, the establishment of such a system is not inevitable.²⁰⁰ But given international competition, the United States' continued preeminence as a financial center is not inevitable either.²⁰¹

200. William C. Freund, chief economist emeritus of NYSE and professor and chairman of the economics department at Pace University's Graduate School of Business, takes a contrary view. He claims that a global automated trading network is both inevitable and desirable. William Freund, *Trading Equities*, INSTITUTIONAL INVESTOR, Jan. 1991, at Supp. 21-22.

201. See generally Macey & Kanda, *supra* note 98 (arguing that the regulatory structure of the Tokyo Stock Exchange is better suited to modern trading practices and investor needs than the structure of the NYSE); Solomon & Dicker, *supra* note 20, at 249-51 (noting that the globalization of financial markets has increased the pressure on U.S. markets to compete for capital). The British appear to have learned this lesson already. "We have no God-given right to be a central market in equities." Steven Prokesch, *Market Place: London is Trying to Keep Its Lead*, N.Y. TIMES, Apr. 10, 1990, at D6 (quoting Nigel Elwes, Warburg Securities executive).