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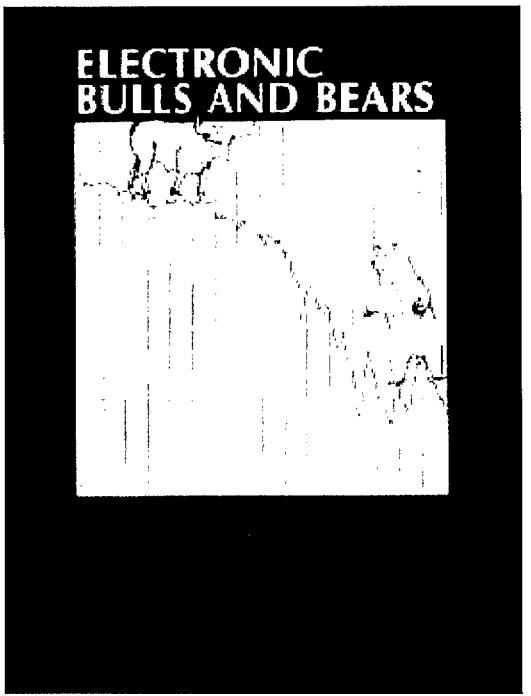
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Electronic Bulls and Bears: U.S. Securities Markets and Information Technology

September 1990

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Foreword

Communication and information technologies—the telegraph, then ticker tape, telephones, and now computers—have historically played important roles in structuring and improving the operation and performance of securities markets. In 1975, Congress-realizing the potential of computer and telecommunications systems for improving competitiveness among U.S. securities markets and dealers-enacted the Securities Exchange Act Amendments. This Act sets forth goals for an electronically integrated 'national market system' that would lead to improved liquidity, higher efficiency, fairness to all domestic investors, and greater attractiveness of U.S. markets to international investors.

This report, *Electronic Bulls and Bears: U.S. Securities Markets and Information Technology,* responds to requests by the House Committee on Energy and Commerce and the House Committee on Government Operations to assess the role that communication and information technologies play in the securities markets. The Committee desired a benchmark for gauging progress made toward the national market system envisioned by the 1975 Act. This report assesses the current use of information technology by U.S. securities exchanges and over-the-counter dealers, by related futures and options markets, and by associated industries and regulatory agencies.

OTA characterizes the present U.S. securities markets as the most liquid, efficient, and fairest in the world, but still there are serious problems besetting or threatening the U.S. markets. Some of these problems result from the reluctance to accept and adapt technologies that may threaten traditional roles and long-standing business relationships. Others are caused by the forces of information technology that now link securities, futures, and options markets into a seamless web of transactions. There is also a mismatch between the capabilities of technology to link these markets and the fragmented jurisdictions of the agencies that are charged with regulating them.

Technology is a double-edged sword that must be used with care and skill. Information technologies will never supplant human function and reason, but when properly and judiciously used they can help achieve the objectives of the 1975 Act.

OTA thanks the Advisory Panel and the many workshop participants, contractors, contributors, and reviewers who contributed to the report. All were unfailingly generous with their knowledge, judgment, and time in helping OTA in this assessment. OTA, of course, bears sole responsibility for the contents of this report.



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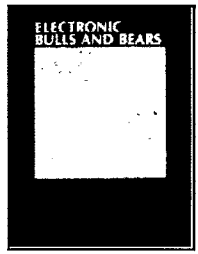
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Chapter 1

Summary: Public Policy and Securities Markets

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Chapter 1

Summary: Public Policy and Securities Markets[1]

U.S. securities markets have been changed by strong social, technological, economic, and political trends over the past two decades. During the 1970s automated systems were put in place, institutions emerged as dominant investors, new kinds of financial instruments began to trade, and Congress passed landmark legislation encouraging greater competition among markets. In the 1980s securities and futures markets became linked through new financial products and computer-assisted trading strategies. The decade of the 1990s will bring still greater challenges for the markets, their regulators, and congressional oversight committees, as foreign competition becomes intense and electronic trading systems mature.

The world is moving toward electronic around-the-clock and around-the-globe securities trading.[2] These challenges will require strong efforts to maintain efficiency and fairness and to meet the needs of domestic and foreign investors. The ability of U.S. markets to compete with foreign counterparts is becoming critical. The U.S. regulatory structure will have to maintain and protect essential domestic policy objectives in an environment buffeted by change. The regulatory structure, designed for yesterday's markets and assets, may not be up to tomorrow's tasks. New or revised legislation may become necessary. The private sector cannot achieve, without government assistance, some of the necessary adjustments to keep American markets strongly competitive and to protect American investors and financial systems.

Securities markets are created by the exchange of information-bids, offers, orders, and prices. The efficiency of the technology used to send and receive information shapes the markets' structure and operation.[3] From the first telegraph in 1846 to electronic order routing systems in 1990, information technology has greatly increased the speed with which orders move from customer to broker to dealer. Increases in speed or in control over the direction of information flow can mean large profits or losses in securities markets. The obvious advantages of better technology have always in the past eventually overcome inertia, tradition, and cost to bring information technology into markets. Eager traders sooner or later seek the benefits of advanced technology for themselves and for their customers, either on established markets or by trading outside of those markets.

Now information technology is moving beyond merely routing and transmitting market data and orders, to acting on that information. It can automatically queue and match bids and orders, execute trades, move them through final settlement, and create an audit trail. The security itself can exist only in electronic form, with no printed certificate. Although some foreign exchanges are putting in place early versions of completely electronic marketplaces, no one is sure of what the costs, benefits, and risks of such systems would be. There is insufficient experience as yet to provide a basis for policymakers to mandate specific technological changes.

Fifteen years ago, Congress instructed the Securities and Exchange Commission (SEC) to guide and assist U.S. securities markets in using technology to create an efficient and fair national market system.[4] The SEC was to promote vigorous, open competition among exchange markets and over-the-counter (OTC) markets, among brokers and dealers, and among customer orders. The intent of Congress has

[1] This chapter is a summary of the report as a whole. For citations and for extended explanation or development of points, readers must go to the other chapters.

[2] See OTA Background Paper, *Trading Around the Clock: Global Securities Markets and Information Technology*, OTA-BP-CIT-65, (Washington, DC: U.S. Government Printing Office, July 1990).

[3] "Securities" usually refers to stocks, bonds, options, and closely related instruments that are either means of capital formation or contractual rights to buy and sell such assets (i.e., options). Equity securities are stocks-shares in the ownership of corporations. Debt securities include corporate, municipal, and U.S. Treasury notes and bonds. Debt securities are sometimes called "fixed-income securities," because in the past most debt has carried a fixed rate of interest; now debt securities includes both fixed- and variable-rate instruments. Options are contracts conferring the right to buy or sell assets (e.g., stocks) at specified prices for a specified length of time. Futures are contracts creating an obligation to deliver or receive assets at specified price at a future time. They are traded not on securities markets but on commodity markets. This assessment discusses futures contracts trading, primarily stock-index futures, but does not otherwise cover commodity markets.

[4] The Securities Act Amendments Of 1975.

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been reaffirmed through legislation, authorizations, hearings, and recent legislative proposals.

Congress wisely did not specify how markets should design technology to meet these goals, leaving that up to market institutions. Decisions about the use of new information technology, by the markets, have however often favored preservation of traditional market structures, trading techniques, and professional skills-at times probably at the expense of the best interests of the U.S. market system as a whole. Insistence on maintaining personal intermediary roles and traditional face-to-face bargaining techniques may have led to inflexibility in dealing with economic and institutional forces for change.

At the same time, advanced information technology has encouraged market professionals and large investors to use computer-assisted trading strategies that can cause short-term price volatility, or spread selling or buying pressure from one market to others. Some people insist that financial markets have become "excessively volatile"; others insist that they are only more efficient (i.e., reflect investors' changing judgments more swiftly). From 1955 to 1982, there were only two occasions when stock market prices fell more than 4 percent in 1 day; from 1982 to mid-1990, there have been 10 such episodes. Many investors conclude that this indicates increased short-term volatility since 1982, when stock-index futures were introduced and computer-assisted intermarket program trading became common.

The changes buffeting U.S. securities markets and derivative products markets[5] do not come solely from technology. There are two other related factors: 1) the evolution of a global economy with multinational corporations seeking capital markets worldwide, and 2) the development of giant institutional investors, with increasing opportunities to satisfy their investment objectives in world markets. These are institutions with large investment portfolios, some worth billions of dollars. They include public and private sector pension funds, insurance companies, mutual funds, labor unions, and banks. Institutional investors differ from individual investors in many ways besides size. For example, they are managed by full-time professionals, they have fiduciary responsibilities (legal obligations to invest prudently to the advantage of their beneficiaries); they usually trade more often and are probably more likely to hedge, and to hedge in more complex ways, than individual investors. Many of them-such as pension funds-are largely tax exempt.

Securities, futures, and options markets are increasingly interdependent because of the opportunities technology provides for interactions between markets, for the purposes of portfolio hedging or short-term profits. Dual regulatory agencies may no longer be appropriate, for what is now one marketplace. The SEC and the Commodity Futures Trading Commission (CFTC) often take radically different positions on issues-e.g., on the tolerable level of price volatility, the causes of market breaks, and the efficacy of measures designed to calm markets under stress. These differences raise doubt about the reliability of their coordination and cooperation during market emergencies. Other problems, especially recurring dispute over authority for new products, also point to the need for improving the regulatory structure.

Reassessment of the regulatory structure is timely because U.S. markets currently have problems that will be *even* more serious in the future. Exchange-listed securities trading may be moving away from the primary exchanges to regional exchanges, OTC markets, off-board trading, and foreign markets. This is less a sign of healthy competition (since institutional barriers and regulations still limit competition) than it is evidence of growing dissatisfaction with the quality and cost of exchange trading.[6] There are problems in handling large block trades and basket trades for institutional investors. (A block trade is a transaction involving at least 10,000 shares of one stock; a basket trade is the synchronized sale or purchase of a large group or portfolio of many different stocks.) Small investors are worried about excessive price volatility and unacceptable levels of market fraud or manipulation in both securities and

[5]Derivative products are those like stock-index futures, stock options, and stock-index options, for which prices are dependent on the prices of cash market items (stocks).

[6]In 1989 only 69 percent of trading in stocks listed on the New York Stock Exchange(NYSE) was done on that exchange, the lowest percentage ever reached. Some of the trading is done on regional exchanges, some on proprietary electronic exchanges, and in some weeks, as much as 17 percent may be done in foreign markets. Usually price is not the detemining factor. See ch. 3.

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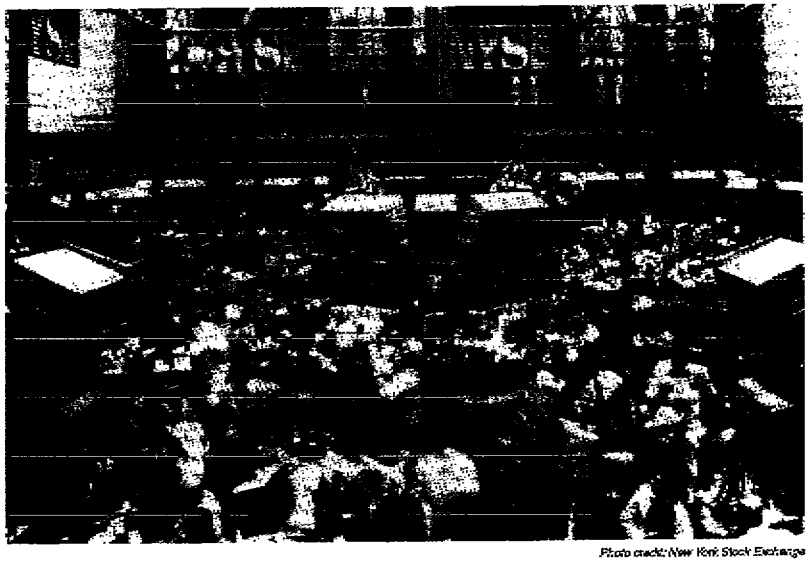


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Trading support systems at the New York Stock Exchange.

derivative product markets. Futures and options markets are criticized for developing products that are suspected of increasing the likelihood of a market crash. These problems call for a reexamination of public policies including changes in the regulatory structure.

Stock exchanges have sophisticated trading support systems on their trading floors, but they have resisted the use of electronic systems for after-hours and remote-site trading. Just-announced plans for after-hours electronic trading are belated, cautious, and tightly limited. The OTC dealers represented by the National Association of Securities Dealers (NASD) are putting some international systems in place now. Futures markets are moving to seize the opportunity for around-the-clock and around-the-globe trading, but have resisted bringing technology into their domestic trading pits. There are signs that these conditions may be ready to change, but further congressional and regulatory encouragement is needed.

THE PUBLIC INTEREST IN SECURITIES MARKETS

[See ch. 2]

Should governments "interfere" with securities markets? Some people believe that securities markets should be regulated only by the forces of the marketplace. Others believe that government regulation is needed because there is a strong public interest in the markets' efficiency, fairness, and competitiveness, and in their role in encouraging investment in economic growth. To understand the public policy issues related to securities markets, one must understand what the role of securities markets is in our economy, and how it is changing in response to technology and to economic and social forces.

The securities markets discussed in this assessment do not directly raise capital They are secon-

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dary markets, for the public resale of securities after their issue and first placement. Secondary markets encourage people to invest their savings in securities by making it possible to resell their investments for cash when necessary, and by establishing the going price for stocks and bonds. Futures and options markets provide ways for people to hedge, or protect the value of their investments by related market transactions.

Securities markets have several vital functions in a democratic-capitalist society:

- Together with primary markets, they enable corporations to raise capital for growth and expansion, and make it possible for local, State, and Federal governments to borrow money.
- They help to direct capital toward its most promising use.
- They provide opportunities for people to increase their savings by investing them in profit-producing enterprises.
- They provide feedback and guidance to corporate management, by revealing the collective judgment of investors about a corporation's potential.
- They generate jobs and contribute to gross national product.

Securities markets have other political or social values as well. By giving citizens a tangible stake in wealth-producing industry, they may encourage citizens to pay attention to a broader range of economic decisions and policies. Because securities markets are sometimes considered barometers of economic health, they may bean important factor in maintaining confidence in our economic system.

But the importance of securities markets in the economy is, nevertheless, often overstated. These secondary markets do not directly generate capital, and most corporate capital is not, in fact, raised by issuing equity securities. Moreover, secondary markets may now be doing a poor job of resource allocation. The economic welfare of most American families is only indirectly affected, if at all, by stock market performance. The vexing problem of low national savings and investment probably cannot be solved by making securities markets either more efficient or less volatile. Finally, these markets directly generate less than 1 percent of national GNP and employment.[7] The many proposals discussed in this assessment for strengthening market structures are aimed at improving the operating efficiency and competitive position of U.S. securities markets, but it should be recognized that they may have little positive effect on American business or on the business cycle. By the same token, efforts to improve some aspects of market performance should not necessarily be ruled out on the grounds of any supposed negative effects on capital formation or GNP.

In spite of these caveats, sound securities markets and their smooth functioning are important. Public officials are rightfully concerned with their performance and their fairness, especially as mutual funds and pension funds investment increase the number of Americans affected by market behavior. Happily, improving the performance and fairness of securities markets is in the interests of both honest market participants and the general public. Most actions toward that end can be taken by market participants and private-sector institutions. The government role may, for the most part, be to remove unnecessary barriers to private-sector action. In some cases, however, the self-interests of market participants create resistance to desirable market improvements or modernization, or otherwise do not match the public interest. In these cases, more direct government actions may be necessary.

The Investors

Institutional investors increasingly dominate U.S. securities markets in terms of total assets and volume of trading (doing about 55 percent of all New York Stock Exchange trades).[8] The largest and most numerous of institutional investors are corporate and government pension funds (with about $2.2 trillion in securities investments), insurance companies (another $1.2 trillion in securities investments) and mutual funds (assets of over $800 billion). The giant institutions trade large blocks of securities and allocate or hedge their portfolios in ways that can move markets, especially when they act in unison.

[7] Approximately 1 million jobs nationwide are related to securities exchanges, OTC dealers, and brokerage firms. Employment in the futures industry is estimated at approximately 100,000.

[8] They d. not yet own most of the stocks, but their proportion of the ownership of NYSE-listed stocks has increased over the last 40 years from 13 percent to nearly 50 percent. Institutions own about 39 percent of OTC stocks. They also dominate trading in privately placed corporate securities, and hold 87 percent of all privately placed securities.

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Their needs strongly influence the types of products offered by exchanges.

Fewer than one in five trades are done for individual investors, but individuals or households still directly own about 50 percent of American equity securities. There is a tiering of equity ownership, with about 45 percent of all individual portfolios holding less than $5,000, another 35 percent of individual investors with between $5,000 and $25,000 invested, and about 10 million individual investors (20 percent) with over $25,000 invested, probably averaging about $90,000.[9]

The United States has the highest level of individual participation in securities markets of any country. The long-term trend, however, is that small investors are leaving the market as direct investors, and are increasingly found under the umbrella of institutional funds. This has broadened the base of participation and given more Americans a stake in the liquidity, efficiency, and fairness of securities markets. But traditional public policies or regulatory procedures, framed around the objective of protecting "the small investor," may not recognize the implications of these changing patterns of market participation. It remains important to ensure investment opportunities and fair treatment for small investors, but even more Americans may be adversely affected if the needs of institutional investors are not also met.

Brokers

The brokerage industry has seen major changes in its operations and structure during the past few decades, driven by the paper-work crisis of the late 1960s, the unfixing of commission rates in the early 1970s, the departure of many retail investors from direct investments in stock, and the increase of institutional investors. Some effects have been increased industry concentration,[10] a decline in brokerage fins' profits from commission revenues, and cyclical swings in the industry's employment and profit levels.

There have been other long-term effects, not all beneficial for small investors. During the 1980s, many firms broadened the scope of their brokerage business to add personalized financial consulting and other services and products, some of which are particularly profitable because they generate underwriting fees and commissions in addition to annual management fees. Brokers have a conflict of interest in selling those products that generate the highest commissions versus helping clients target on those investments best suited to their needs. Institutional investors that generate greater revenues may be treated more favorably by brokerage firms than other investors, paying lower commissions and having better access to research and analysis. This may soon create a three-tiered brokerage system with large institutional investors, medium-size institutional and large retail customers, and small retail customers treated differently.

SECURITIES MARKETS UNDER PRESSURE [See ch. 3]

U.S. securities markets are the largest and probably the world's most liquid, efficient, and fair securities markets. The New York Stock Exchange (NYSE) lists 1,740 securities and does almost 95 percent of trading in exchange-listed stocks. The smaller American Stock Exchange (AMEX) lists 860 stocks. There are also five regional exchanges. About 4,300 securities are traded by OTC dealers. Trading volume in the OTC market, largely because of technology,[11] has grown to almost 80 percent that of the NYSE (in number of shares traded) .12 The problems of U.S. markets today are, in many cases, those of successful, growing markets that are slow to recognize the implications of growth.

[9]These estimates were based in part on survey data collected in 1985, and will have changed some. After the 1987 market crash, small investors decreased their direct investments and decreased their participation in mutual funds; more recently, they may have resumed their net purchases.

[10]In 1973 the top 10 industry firms accounted for 33 percent of the industry's share of capital, but by September 1989, their share had increased to 61 percent.

[11]Until 1971, OTC quotations were published only on daily "Pink Sheets." Since the introduction of an electronic system to display their quotations (NASDAQ), OTC volume has grown rapidly. The automated quotation system (National Association of Securities Dealers Automated Quotation System, or NASDAQ) displays timely dealer quotes on over 4,000 stocks (firm only for 100 share lots, or for those eligible for automated execution, for up to 1,000 share lots); transactions are negotiated by telephone. (Small orders can befilled electronically through the computerized SmallOrder Execution System SOBS.)

[12]It is, however, about 27 percent by dollar volume, because of the lower average price of OTC stocks.

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Securities markets, in the United States, have market-makers-dealers who stand ready, whenever the market is open, to buy or sell securities at firm, publicly displayed prices, or "quotations." Stock exchanges have one designated market-maker, called a specialist, for each stock. The specialists are exchange members, who in return for having the unique and profitable role as dealer for several assigned stocks, have an 'affirmative obligation' to provide liquidity and to moderate and smooth out price changes by buying for and selling from their own inventory if there are no bids (or offers) near the market price. They also have a "negative obligation' not to buy *or sell* for themselves when there are customer orders that can be matched (a buyer with a seller) at a price acceptable to both. The OTC stock market, in contrast, is made up of many market-makers-an average of 10 dealers for an actively traded stock—who do not match customer orders directly, but make markets by buying and selling stocks for and from their inventory. They compete for customers' orders by trying to make the most attractive bid (to buy) or offer (to sell).

The Specialist System

Both exchange floor trading and the specialist system (as well as procedures for OTC dealing) evolved to serve markets that have now radically changed. There are at least four serious strains on the specialist system, which was developed to handle moderate-sized orders, in "round lots" of 100 shares: 1) the greatly increased volume of trading, 2) capital inadequacy, 3) large block trades, and 4) basket trades.

Trading volume has increased in parallel with the growth of large institutional investment funds, from 16 million shares daily in 1973 to 162 million daily in 1989 (and 600 million daily in the midst of a crash). There are sharp peaks in volume associated with factors such as computer-assisted large transactions ("program trading") and the expiration of related futures and options contracts. The limitations on specialists' capital become apparent when many institutional investors begin to sell large blocks and baskets of stock at once. The ability of the specialist to balance these sell orders by buying for his own inventory may be rapidly exceeded.

The average size of a transaction on the NYSE is now over 2,300 shares. In 1961, there were about 9 "large block" trades (10,000 shares bought or sold in one transaction) per day, and they accounted for only 3 percent of share volume. Now there are more than 3,100 large block trades per day, accounting for more than 45 percent of the shares traded. Many of these blocks are of 250,000 shares.

Basket trades-the purchase or sale of many different stocks (a portfolio) simultaneously or as part of a single strategy-are usually the result of inter-market hedging strategies, that is, balancing stock investments with stock-index futures transactions. When many institutional investors are using similar inter-market hedging strategies, the stock exchange may be hit with a tidal wave of basket sales (or purchases), so that the entire market seems suddenly volatile.

These changes placed a heavy burden on the specialist system, and exchanges made efforts to relieve it. For example, the NYSE responded to the challenge of large block trades[13] by allowing large securities firms to act as block positioners. They effectively make markets "upstairs," soliciting and putting together enough buyers (or sellers) to move a block of stocks at a negotiated price. They must still bring the block transactions to a specialist for execution. This "fro" alleviated the problem, but it is not a perfect solution. Liquidity for large blocks is probably decreasing because big firms are less willing to risk their capital as block positioners. Block trades seem to be moving from the NYSE to regional exchanges and the "fourth market' in search of better service.[14]

At the other end of the scale, small-order transactions were also a problem, becoming relatively more expensive and less attractive to execute compared to large blocks, after deregulation of commissions in

[13] These executions can block-completely change the price even if one buyer (or seller) can be found to take (or sell) the entire block order. This would disadvantage other investors whose orders arrive or are on the limit order book while the block is being executed. Alternatively, the block has to be broken up and worked off, which takes time.

[14] The "fourth market" is the unorganized market of large institutions trading directly with one another, often through proprietary trading systems, without going through an organized market.

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the early 1970s.[15] Exchanges have installed automated order routing and execution systems for 1,000 shares or under.[16]

When the NYSE developed a new "basket product," the exchange elected not to use the specialist system but to use competitive basket market-makers, operating upstairs with computer terminals. Like upstairs block positioning, the increased capitalization requirements, and the encouragement for large member firms to take over specialist fins, these actions seem to be tacit recognition of the limitations of the specialist system.

Strains on the specialist system are likely to increase. Barring another crash, the upward trend in trading volume will resume as institutional investors continue to grow both in numbers and in size.[17] Program trading and large block trading are also likely to increase. With growing cross-national investment and international securities trading, foreign money can flush in and out of markets. The risk that a market break will exceed specialists' capitalization has not been removed.

Meanwhile, exchanges struggle to cope with the awkward interface between electronic systems on the one hand, and person-to-person bargaining on the other hand. The threat to the NYSE is that its customers will decide that its services are inadequate or too expensive. But regional exchanges and OTC dealers, unless more fully integrated by an effective electronic order-routing system, may not offer the depth and efficiency that a concentrated market offers.

The Crash of 1987

In spite of the vigor of U.S. markets, the stock market crash in October 1987 revealed three serious problems yet to be fully solved:

- the limits of technological systems when trading volume spikes,
- limits on the ability of market-makers to function when markets are under stress.
- recurring excessive short-term volatility that may promise further crashes.

Technological systems for quote dissemination, order routing, and small order execution, in both exchange and OTC markets, were overwhelmed by the unprecedented volume of orders on October 19 and 20, 1987. Some failures of design had not been apparent until the systems were stressed.[18] Steps have been taken in all of the markets to correct such problems and increase the capacity of electronic systems. But these systems for the most part only deliver orders to a market-maker or otherwise depend on personal intermediation at the transaction stage. During the crash, not just the systems but the market-makers also were overloaded and overwhelmed. The problems that occurred at the human/machine interface are probably the most difficult to correct, because human capacities are less expandable than machine capacity.

There were four major government studies of the 1987 crash, several exchange studies, and innumerable academic studies. No clear consensus emerged about the cause of the crash, nor is there agreement as to the cause of the near crash of October 1989. Frequent sharp short-term price volatility has been evident for about 4 years. Academic researchers disagree about the definition of "volatility," about whether it has increased, and about the break point between how much volatility is desirable and how much is excessive. The traditional objective of fair and orderly markets implies, nevertheless, that at some level volatility is excessive.

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[15] Broker-dealer commissions were regulated until 1975; after that, competition in offering services for large investors drove their rates down while rates charged to small investors remained higher. But the larger volume handled for institutional investors still makes these services more attractive for broker-dealers.

[16] NYSE's SuperDot takes orders up to 2,099 shares. The OTC market, NASDAQ, also has a small order execution system.

[17] Pension funds and insurance funds should continue to grow as the U.S. population grows. Mutual funds may continue to grow as small investors seek an institutional umbrella.

[18] For example, the NASDAQ automated Small Order Execution System (SOES) was designed to stop trading any stock in which locked or crossed orders occurred-i. e., the lowest priced offer to sell was equal to or lower than the highest priced bid to buy—and wait for the dealer to intervene. This occurred during the crash because the dissemination of quotes fell behind rapid price changes.

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Certain kinds of computer-assisted trading, called portfolio insurance, were implicated in the 1987 crash.[19] They had two disastrous characteristics: 1) identical or similar computer programs were used by many institutional investors, so that many large sell orders were triggered almost simultaneously; and 2) portfolio insurance called for selling stock when prices were already dropping, which reinforced the trend.

Portfolio insurance is implemented through program trading, the simultaneous sale (or purchase) of large, diversfied "baskets" of stock, often but not necessarily in conjunction with a balancing purchase (or sale) in futures markets. Program trading (now accounting for about 13 percent of shares traded on the NYSE) is almost prohibitively cumbersome and expensive without computer support.[20] It could involve hundreds of different stocks. When many program traders attempt to buy, or to sell, huge baskets of stock at the same time, the ability of the market to provide liquidity-i. e., to execute these transactions without the price moving sharply in response-may be strained or exceeded. Proposals have been made to curb program trading,[21] but this would not address the needs of institutional investors to trade and hedge large portfolios with the lowest possible transaction costs.[22]

The most serious problem highlighted by the 1987 market crash is the limited capacity of market-makers to respond to extreme price movement and unprecedented high volume. Neither specialists nor OTC dealers can assure liquidity in a period of intense selling pressure caused by aggressive trading by large institutions. Exchange specialists for the most part tried hard to carry out their affirmative obligation to buy when prices are falling, in order to restore balance (to "lean against the market"). Many specialist firms quickly exhausted their buying power, however, and others gave up in the face of overwhelming selling pressure. At the most critical point in the 1987 crash, it was necessary for the Chairman of the Federal Reserve Board of Governors to make a public announcement encouraging banks to extend credit to market participants by promising that the Federal Reserve would back them up.[23]

Capital requirements for specialist firms have been increased since the crash, but the aggregate capitalization of specialists will still probably be inadequate on days when volume peaks and huge order imbalances appear. Even before the crash, the NYSE and AMEX had recognized this problem. They changed their rules to encourage large broker-dealer firms to buy or affiliate with specialist firms. However, there have been only four such acquisitions, and one of those firms has since gone bankrupt.

The performance of OTC market-makers in the NASDAQ system also faltered in October 1987. Some withdrew from the small order execution system, some probably abandoned the market altogether, and some ignored phone calls. Steps have been taken to strengthen discipline and performance in such situations[24] and telephone and computer capacity have been enhanced.

Securities Markets and Competition

The Securities Act Amendments of 1975 directed the SEC to facilitate the establishment of 'a national

[19]A widely accepted scenario (but one disputed by the futures industry and the CFTC) goes like this. When stock prices began to fall, for whatever reasons, portfolio insurance programs were triggered. Widely used algorithms called for selling stock-index futures. As many institutions began to sell these futures contracts at the same time, their price fell, which in turn led index arbitragers to sell stock in order to buy index futures, causing stock prices to fall further. Many investors had limit orders to sell outstanding on the specialists' books. Falling prices jumped over these stop prices and their sell orders were not implemented (the problem of the 'gapping market'). The portfolio insurance strategies were discredited by the crash and have not been used as much since. To compensate, some large brokerage firms reportedly began writing put options to provide a portfolio hedge for their large institutional customers, and on Oct. 13, 1989, when stock market prices began to slide sharply again, these securities firms rushed to adjust their own hedges by selling futures and stocks, again reinforcing the downward price movement.

[20]For a discussion of how this percentage is calculated, see chapter 3, op. cit., footnote 52.

[21]Some brokerage firms stopped doing program trading after the 1987 crash or after the 1989 near crash, either altogether or @ for their own accounts, and usually for only a few months. A New York Stock Exchange "blue ribbon panel, 'established to study program trading after the 1989 break, reported in June 1990. It did not recommend restrictions on program trading but did recommend additional circuit breakers.

[22]Recognizing the problem of the market's inability t. absorb institutional portfolio trading, the SEC and the NYSE reports on the 1987 crash called for a "basket trading product" that could provide a more efficient mechanism than program trading for trading baskets of stocks. Exchange Stock Portfolios (ESPs) were introduced in late 1989. But ESPs cost about $5 million and there has been little trading in them.

[23]This, in a sense, transferred risk t. taxpayers. However, the consequences of a complete market collapse for the economy (and taxpayers) have never been calculated.

[24]For example, participation in SOES is now mandatory; before the crash it was voluntary.

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market system" with fair competition among brokers, dealers, exchanges, and markets. The SEC was instructed to encourage use of modern information technology and to move toward eliminating rules that limit competition.

The automated systems that have been put in use by the Self-Regulatory Organizations (SROs)[25] were designed to facilitate and support, but not replace traditional trading practices. They have probably increased the efficiency, fairness, and liquidity of markets, but they have not fully achieved the policy objectives of full and vigorous competition. An Intermarket Trading System, linking the NYSE and regional exchanges, has improved customer services and helped regional exchanges to maintain or increase volume, but it does not encourage the exchanges to compete with NYSE specialists in making markets by bettering the NYSE prices. Market participants on any exchange floor (but not brokers or public customers) can either route an order to a market with a better price, or execute the order themselves at that price. An alternative could be a direct link between brokers and markets that would automatically switch orders to the market with the best price (''a universal message switch' '). It is possible, however, that a universal message switch might not strengthen regional exchanges as market competitors, but might create an integrated electronic market in which all orders flow to the most liquid market. In that case, regional exchanges could become only service centers.

The SEC has not, since 1975, pushed the exchanges to eliminate some of the rules that limit competition. The NYSE'S Rule 390 prohibits exchange members from competing with exchange specialists by making markets off-exchange for listed stocks-crossing customer orders in-house (internalizing order flow) or acting as dealers.[26] Investors who wish to engage in after-hours trading of listed stock do so through the third market (non-member OTC dealers), the fourth market (direct investor-to-investor trades, often through proprietary' electronic systems), or in foreign markets. Many of these trades are now done in London markets .27

The risks in eliminating Rule 390, as cited by defenders of the rule, are: 1) with several securities fins, as well as the exchange, acting as dealers, fragmented markets would offer less liquidity; and 2) securities firms could internalize orders, not exposing customers' bids and offers to all market participants. It is possible, however, that competing market-makers might increase rather than decrease liquidity.

The costs of not eliminating Rule 390, as cited by critics of the rule, are: 1) spreads (the difference between bid and quote) may be wider than they would be with competing market-makers, and 2) investors will trade many of the NYSE-listed stocks of 1,740 major corporations on foreign exchanges. As for the first point, most NYSE spreads do not exceed the one-eighth point (12.5 cents) minimum now, and eliminating the restriction on dealing in 19c-3 stocks did not lead to narrower spreads on those stocks. However, with exchange rules that permitted less than one-eighth increments (not now permitted), spreads might be one-tenth or even one-sixteenth point.

The end of Rule 390 would probably encourage the development of proprietary electronic trading systems, by large securities firms or by information services vendors to serve those firms. This would encourage competition for NYSE and its specialists, but individual investors-particularly small investors-might not share the benefits of this competition.

The second rule that restrains competition between markets prevents exchange specialists from competing with OTC dealers by making markets in unlisted stocks. After a 15-year delay the SEC has just approved a pilot program allowing the AMEX

[25]The seven securities exchanges and the National Association of Securities Dealers (OTC dealers) are Self-Regulatory Organizations. Under the Securities and Exchange Act of 1934 and subsequent legislation, they have the authority to censure, fine, suspend, or expel members and are responsible for drawing up their own rules, which must however be approved by the SEC. The futures exchanges and industry association are SROS with similar authority under the CFTC.

[26]There is exception for stocks first listed on the exchange after Apr. 26, 1979 (Rule 19c-3). Rule 390 does not forbid me* firms acting as market-maker for other NYSE listed-stocks in foreign OTC markets *after NYSE exchange hours*, or on domestic exchanges or foreign exchanges at any time. But market-maker participation on foreign exchanges or in foreign OTC markets would in fact be determined by the rules of those markets and their regulatory authorities; and on U.S. exchanges there is only one market-maker, the designated specialist.

[27]Some say that they are often done b, U.S. firms here and reported as being done by the London affiliates or branches of those firms.

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and regional exchanges to trade 100 unlisted stocks (the NYSE has chosen not to participate).[28]

Technological Directions for the Future

The 1975 Securities Act Amendments anticipated that telecommunications and computers would ensure investors of the best execution of their transactions through vigorous competition among markets and among dealers. Although securities markets have installed powerful information dissemination and trading support systems, the dominant criteria in design of those systems (in both exchange and OTC markets) have been to maintain or enhance the competitive position of the particular market; to maintain the intermediary role of existing market-makers; and to preserve the traditional modes of trading of that market. These goals may have been consistent with the public interest in the past; they may not be so in the future.

Looking ahead, there are several approaches that American securities markets might take to cope with the challenge of information technology in domestic trading. The long-range goal may be to move carefully toward a fully electronic market, in which a national market system could automatically match customers' bids and offers, execute and record transactions, carry them through clearing and settlement, and provide an audit trail, with dealers making markets only when buyers and sellers are not in dynamic balance. But the most responsible approach to modernizing securities markets is a flexible approach, or several parallel avenues, because it is uncertain what the indirect costs and risks of completely electronic markets may be, and therefore how to avoid or control them. There are examples of securities markets with competing market-makers: the U.S. OTC market and the United Kingdom's International Stock Exchange. There are markets with no market-makers (e.g., Japan). There are markets with automated trading systems (e.g., Instinet, Toronto's Computer Assisted Trading System (CATS), U.S. exchanges' small order execution systems). There is one example of a fully automated market (the Cincinnati Stock Exchange). But there are as yet no adequate models of fully electronic trading in a major national securities market.

Parallel operation of automated and negotiated (dealer) markets would be a wise intermediate step. Securities firms might be allowed to compete in making markets through proprietary trading systems. Or the exchanges could have a "single price auction" daily or several times a day,[29] interspersed with traditional continuous auction trading. Proprietary trading systems might develop rapidly if remaining rules that restrict or discourage competition between exchange specialists, exchange members, and OTC dealers are eliminated.

> If exchanges are too slow to move in this direction they may be preempted by information services vendors. In one way or another aggressively trading investors will seek to take full advantage of modern information technology and its ability to overcome limitations of time, distance, and human skills. The result may be a larger and more liquid fourth market-i. e., many large financial institutions and institutional investors trading with each other over electronic proprietary trading systems, which are not now regulated as exchanges. In the best case, if done with regard for the public interest and guided by balanced public policies, such a highly competitive and efficient electronic market could attract investors from around the world. But if this development were driven entirely by self-interests, the public's interest in fair and open markets could be ignored or given low priority. This could result in fragmented markets, or markets used by institutions but inaccessible to individual investors, and less fair, efficient, and visible than today's markets. Such a two-tier market should be avoided.

U.S. stock exchanges will eventually be pushed by competition from abroad and by the demands of institutional investors to develop electronic systems for trading outside of exchange hours. In late June 1990, as this assessment is being completed, the NYSE announced plans for a five-step process "to prepare for continuous 24-hour trading by the year 2000. " The frost three phases of this plan merely extend trading, at the closing price, for a brief period after the NYSE business day. This is designed to recapture domestic trades now lost to London or Tokyo (estimated by NYSE officials at between 6

[28]The NYSE gets a significant portion of its revenuefrom the fees fOr listing corporate stocks.

[29]In a single price auction, all bids and offers could be collected and arranged by computer in order of price (and then by size and the order in which they were received). The computer would thenfind the single price that would clear, or most nearly clear, the market and execute the trades automatically.

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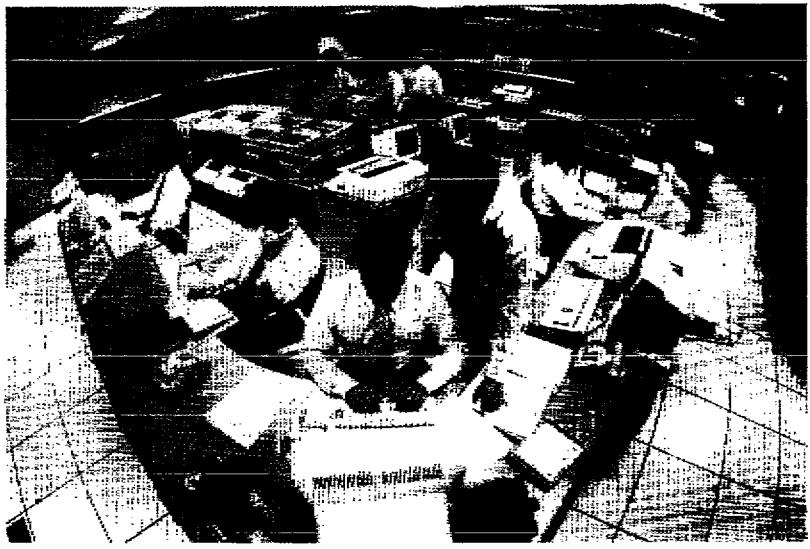


Photo credit: National Association of Securities Dealers

Over-the-counter markets reach over the ocean.

and 20 million trades per day), rather than to facilitate or encourage international trading. The fourth phase envisions several single-price auction sessions during the night. Only the fifth phase, to be implemented about the year 2000, would be designed for around-the-clock, around-the-globe trading.

After the NYSE announcement, three exchanges (the AMEX, the Chicago Board Options Exchange, and the Cincinnati Stock Exchange) announced that they are working with Reuters to develop plans for an electronic after-hours trading system. It is possible that at some later time these exchanges could find their business hostage to one vendor. The NASD, already having links with overseas markets, expects to begin dawn trading hours on September 1, 1990; the OTC dealers will begin to trade electronically at 3:30 a.m. e.s.t. (corresponding to the opening of the London market).

THE OPERATION OF FUTURES MARKETS

[See ch. 4]

Futures contracts are standardized, contractual agreements to buy and sell commodities at a specified price for future delivery, regardless of the cash market price at that time. They developed because of the needs of farmers and commodity merchants to manage the price fluctuations caused by weather and other crop cycle uncertainties. Because of the agricultural origins of futures contracts, they are traded on commodity exchanges. They are regulated by the Commodity Futures Trading Commission.

Futures contracts on financial instruments (e.g., currencies, bonds, interest rates) did not develop until the early 1970s. Financial futures now account for over 60 percent of all futures trading volume. Stock-index futures were not introduced until 1982,

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and account for only 5 percent of all futures trading. They are enormously important, because they are used for inter-market trading strategies that link securities markets with futures markets.[39] Stock-index futures are used by institutional investors for hedging a diversified portfolio of stocks. This allows those who have fiduciary responsibilities to avoid unnecessary risk, to transfer some risk to professionals (speculators) who assume it in the hope of profiting by price movement. Speculators buy and sell stock-index futures as a way of betting on the market as a whole-taking on the risks that institutional investors seek to avoid. Arbitrageurs buy stock-index futures and sell the underlying basket of stock, or vice-versa, to profit by temporary disparities in their prices. This has the effect of bringing their prices back together by the simple operation of supply and demand, and in ordinary circumstances tends to stabilize prices.

It is these trading strategies that link securities and futures markets. Pressure in one market tends to increase pressure in another. Because it is easier, cheaper, and faster to buy a stock-index future contract than to buy the hundreds of shares represented by the stock index, changes in stock-index futures prices tend to lead, or forecast, prices in stock markets. In economists' terms, this is "price discovery." (But it is the average price of the basket that is "discovered.' To the extent that index arbitrage then affects its price and hence the price of individual stocks, the stocks will change price for extraneous reasons.)

All U.S. futures contracts are traded in auction markets, on futures exchanges. There is no OTC market and no electronic trading systems for futures contracts in the United States. Trading is done by "open outcry;" i.e., shouted bids and offers. It takes place on tiered exchange floors *or* "pits." Futures markets are now the focus of two kinds of policy issues: those related to the operations of the markets themselves, and those that focus specifically on stock-index futures.

Issues Related to Futures Market Operations

Open outcry trading, cherished by market participants, has three characteristics that can cause problems: the limitations on volume inherent in face-to-face auctions, the lack of automatic time records or audit trails, and dual trading.

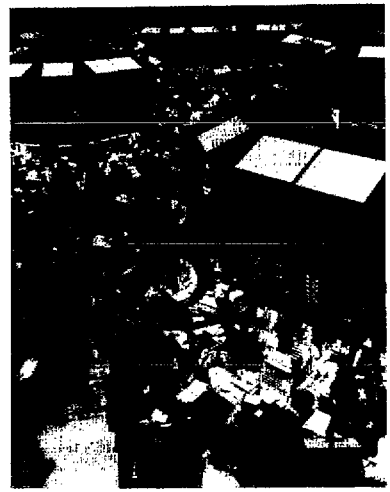


Photo credit: Chicago Mercantile Exchange

Chicago Mercantile Exchange trading floor.

The frantic action of several hundred shouting and gesticulating traders and brokers in financial futures pits makes it difficult to be sure that a customer gets the best price available at any one moment. It is doubtful that such a system can accommodate further growth. The Chicago Mercantile Exchange and the Chicago Board of Trade, in conjunction with Reuters, the British information services firm, are poised to introduce GLOBEX, an electronic trading system that will operate outside of exchange hours. GLOBEX is designed to meet the challenge of international trading. If it is successful, however—i.e., if market professionals make the transition to a different mode of trading and find it advantageous to use-GLOBEX could demonstrate one way to relieve the strain on open outcry trading threatened

[39]Stock-index futures cover the stocks represented in an index, such as the Standard & Poors 500 Stock Index (S&P 500). An index is a statistical indicator of market performance. It is the average price (usually a weighted average) of a diversified basket or portfolio of stocks. Stock-index futures must be settled in cash (the difference between the current index value and that specified in the contract) rather than by delivery of shares. There are no futures contracts on single stocks; this is now prohibited by legislation.

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by further volume growth. GLOBEX could operate 24 hours a day, and become a real competitor for existing futures exchanges.

The lack of an automatically generated, firm audit trail for transactions in futures pits further limits surveillance and monitoring, and makes it difficult to detect and prove fraud and manipulation. This serious problem may be overcome by the introduction of hand-held computers, now being developed, to be used by traders on the floor to record transaction data and transmit it immediately to the central exchange computer.

In futures pits floor brokers may trade both for customers and for themselves, although not in the same transaction. This involves potential conflicts of interest. Dual trading has always been strongly defended by futures markets and their regulatory agency, the CFTC, as necessary for liquidity and beneficial for customers. After a recent study cast doubt on those assumptions, and after revelations and allegations of market fraud coming from FBI investigations in the futures markets pits, the CFTC has proposed a limited prohibition of dual trading of some futures contracts.

Issues Related to Stock-Index Futures

After the 1987 market crash several task force or government agency reports identified the use of inter-market hedging techniques using stock-index futures as a major contributor to the break. A normal dip in stock prices may have set off and then been fed by complex shifting of resources between stock and stock-index futures, on behalf of institutional investors, as already noted. The effects were amplified by the widespread use of computer-assisted trading strategies. Some of the reports said that the effects were further amplified by the greater leverage in futures markets.[31] There were not enough active individual investors, making their own judgments of values, to offset this imbalance. Index arbitrageurs were unable to keep prices linked across the markets. The sudden violent surges of sell orders in stock markets overwhelmed the ability or the willingness of stock exchange specialists to counter and control them.

This is the most credible scenario of the market crash, but it is not universally accepted. It is, for example, vigorously denied by both futures markets and the futures regulatory agency, the CFTC. Statistical analyses of 1987 trading data by academic, industry, and government regulators are, in the aggregate, inconclusive. Their conclusions differ because researchers define volatility differently, use differing time periods, or use different statistical measures. Those on both sides of the debate pick and choose among the empirical studies to bolster their claims, and sometimes overstate the strength of the scholars' conclusions.

Recent studies of the market break of October 1989 by the SEC and the CFTC again offered differing interpretations of the extent to which trading in futures markets contributed to a price decline in stock markets, or merely foreshadowed it.[32] The SEC said:

> When concentrated selling (or buying) strains the liquidity of the futures market, program trading strategies such as index arbitrage, executed by large, well capitalized broker-dealers and institutional money managers, quickly transfer this activity to the stock market.

The CFTC said:

> Neither program trading nor futures sales by those with large positions, explain the observed price movements on these dates.

This again suggests that statistical analysis is inconclusive and cannot resolve the highly charged issue.

[31] Leverage in futures markets is high because of lower initial margin, lower transaction costs, and speedier execution for stock-index futures transactions, compared to the buying or selling of a portfolio of 500 stocks.

[32] On Oct. 13, 1989 (Friday) the Dow Jones Industrial Average fell 191 points (6.9 percent); this was the index's second largest single-day point decline and the 12th largest percentage decline. On October 16 (Monday), the Dow fell an additional 60 points before rallying. Both the CFTC and the SEC studies noted that there was concentrated selling of stock by brokers who were hedging their risks from put options that they had written for institutional clients as a substitute for the portfolio insurance strategies that did not protect them in October 1987. CFTC, Division of Economic Analysis, "Report on Stock Index Futures and Cash Market Activity During October 1989," May 1990; SEC, Division of Market Regulation "Trading Analysis of Oct. 13 and 16, 1989," May 1990.

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A second closely related policy debate focuses on the system of margining[33] used in futures markets and the question of whether the initial margin requirement should be raised. Futures exchanges, futures market participants, and the CFTC hold that the function of margins is to bolster the financial integrity of market participants, and that present levels are-and have proven to be throughout recent market breaks-fully adequate to fulfill that function. Higher margins are unnecessary, they say, because margin accounts are adjusted twice daily or more often to reflect market conditions and changing risks ("marked-to-rnaxket"). Higher margins are undesirable, they also say, because they would reduce liquidity (i.e., tend to depress the volume of trading).

Some critics of futures markets or of stock-index futures call for higher margins to depress the volume of trading in stock-index futures, in the hope of reducing the likelihood of short-term volatility in stock markets. Other critics of futures margins say that higher margins would reduce the leverage that index futures trading exerts on stock prices. These critics, including the SEC and the Secretary of the Treasury, say that futures margin requirements should not be set solely with a view to protecting futures market clearing organizations, but should be set in the broader context of the effect on all financial markets.

This issue too cannot be resolved on the basis of empirical or statistical evidence. Adjustment of margin requirements as a tool of public policy would likely change the way stock-index futures are used for hedging, arbitraging, and speculation. This intervention, if undertaken could be justfied because of the public interest in the efficiency and fairness of securities markets. Whether such intervention would accomplish the desired end-control of stock market volatility-is uncertain. There are, as yet, few relevant studies of the effect of futures market margins on stock market behavior, since the direct linkage began with stock-index futures in 1982. Such studies as have been done (and more general studies of the relationship between stock market margins and price volatility) are again inconclusive and subject to differing interpretations. Proposals to create Federal authority to intervene in determining margin levels are discussed below.

ISSUES RELATED TO OPTIONS TRADING
[See *ch.* 5]

An option contract confers the right to buy or sell an asset or financial instrument at a specified price, during the lifetime of the contract.[34] Options on individual securities and indexes of securities are traded on five stock exchanges or special options exchanges, and are regulated by the SEC. Options on commodities, on futures, and on stock-index futures are traded on commodity exchanges and are regulated by the CFTC. Options on foreign currency are regulated by the CFTC, except those on currencies traded on securities exchanges, which are regulated by the SEC. Methods of trading options vary accordingly; some are traded through open outcry, others through a modified version of the specialist system. A few are written and traded over the counter.

Since 1980, the right to trade a new option on a specific stock or index of stocks has been awarded to only one exchange, chosen by lottery. Anew SEC rule (Rule 19c-5) will allow all listed equity options to be traded on all stock options exchanges ("multiple trading") after January 1991. This rule is aimed at the increased competitiveness goal of the 1975 Securities Act Amendments, but the change was long delayed while the SEC urged the exchanges to develop a market integration system.

The options exchanges resisted market integration systems in the form of order routing or execution systems, both to avoid increased competition and because of the difficulties of keeping their quotations current.[35] The size of the crowd on an

[33] Futures markets define margin as a performance bond put up by futures buyers and sellers to protect futures clearing organizations against default on the obligations embodied in the contract. Typically, it is 3 to 5 percent; margin accounts are adjusted twice daily or more often, and account holders may be called to put up additional margin if prices have moved against them. See ch. 4 (Futures Markets) and ch. 6 (Clearing and Settlement) for a full explanation. In stock markets, "margin" is a downpayment made by a purchaser of stock. It has been set at 50 percent for the past 15 years.

[34] A sell option is a "put.' A buy option is a "call.' Option 'writers" write (i.e., sell)both puts and calls. The options clearinghouse, however, takes the other side of the transaction for both option writers and option purchasers,and settles accounts with both of them.

[35] Each market-maker could be making markets in 500 options series and classes, their prices derivative of the frequently changing prices Of Up to 30 stocks. Market-makers said they could not keep up with these changes well enough to guarantee that their quotes were current and firm.

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options trading floor (sometimes several hundred) also made it difficult to develop a quotations system that could identify the market-maker with the best quote. Technology can solve both of these problems. An "auto-quote" device is available that automatically adjusts options quotes to stock price changes, and hand-held computers are being tested for use by market-makers on the floor.

This could make an electronic market integration system feasible. It could be: 1) an inter-market system to route orders between exchanges, 2) a "neutral switch" to route brokers' orders to the market with the best quote, or 3) a central limit order file to expose all limit orders to all exchanges. The argument about technology continues, even as multiple-trading is about to begin. The SEC has mandated multiple-trading without insisting on a market integration system being in place. However, unless there is a system to force competition from the beginning of multiple-trading, past experience indicates that trading in each option may soon concentrate in one exchange where the most liquidity appears. Should this happen, the benefits sought from competitive market-making-i.e., narrower spreads-will not be achieved. There may still be some benefits from competition in terms of improved services.

The options margin system involves two issues: 1) proposals for cross-margining (under review by both the SEC and CFTC), and 2) proposals for futures-style margining (under review by the CFTC). Cross-margining would adjust margin requirements to reflect the amount of hedging that options buyers enjoy by trading in several markets (e.g., stock, futures, and options). The Options Clearing Corporation (OCC)-the only clearing organization for securities options markets-would be allowed to recognize positions in one market as hedging positions in another market (the options market) that reduce the position holder's total risk. This would reduce the demands for collateral from firms that are trading in more than one market (and therefore presumably increase the amount of money available for market transactions). Cross-margining requires cooperation between two or more clearing organizations serving different markets. There are reservations about the adequacy of cross-margining under all market conditions. There are, nevertheless, two pilot programs underway.

Futures-style margining for options is proposed by advocates of unified clearing systems, in order to reduce the obstacles resulting from having different margin systems for different markets. However, it is currently being considered only by the CFTC for options traded on futures exchanges. It is opposed by the OCC (which clears and settles all securities options), the securities industry, and the SEC because marking-to-market, daily margin calls, and the requirement of margins from options writers would alter the nature of equity-related options and the way they are used for hedging.

Debates about options margining involve inter-market issues and should be examined within the context of linked markets. As with many issues involving equity, options, and futures trading, the issues are complicated by the existence of a bifurcated regulatory structure in which the CFTC and the SEC make conflicting assessments of the effects of margining arrangements and neither position may reflect overall national interests.

CLEARING AND SETTLEMENT

[See ch. 6]

Clearing and settlement is what happens after the trade: matching the records of buyers and sellers and delivery of the asset and payment, or (in the case of derivative products) satisfaction of the terms of the contract. Clearing and settlement is important because the failure of one or more major clearing members could have far-reaching effects on the U.S. financial system, and even on those of other nations.

The 1987 stock market crash put a public spotlight on clearing and settlement and raised questions as to whether the process had broken down under the strain. Several U.S. studies were made that resulted in recommendations designed to strengthen these critical systems. A later study by the Group of Thirty, an international forum of business leaders and financial experts, also developed recommendations, and improvements are underway. Some clearing and settlement problems are domestic in scope and others are international.

Better protections are needed for investors against the risk of default by clearing members. Protections now in place are piecemeal, non-uniform, and

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complicated by differing Federal and State statutes.[36] A second concern involves risks in the payment process, including delayed or inadequate bank credit, uncoordinated timetables for finality of settlement, and disparate netting procedures. Problems may arise with 24-hour trading, if margin calls are made when banks are closed.

More information-sharing between clearing organizations is needed. Better decisions on extending credit can be made by creditors if they have more information about participants' positions and risk exposure. Inter-market trading patterns make information-sharing increasingly critical, as does the trend toward global investing. Some important improvements have recently been put in place but there are still shortcomings in the information-sharing process. A common format for reporting and distributing exposure information would be a major improvement, as would uniform approaches to evaluating risks.

Most of the U.S. clearing and settlement system is technologically advanced, but some areas need improvement. While clearinghouses have done significant upgrading of systems, the benefits of these upgrades can be diluted if all clearing members are not sufficiently advanced technologically to respond to new requirements.

Lack of standardization is another problem. The operating hours for banks and financial markets are not uniform; banks, including the Federal Reserve Bank, may be closed even if financial markets are open.[37] Cross-border trading makes this problem worse, since national holidays are not the same. The settlement period for equities must be shortened to reduce risk of default. This will require immobilization of securities in a depository and a change to same-day funds.[38] The elimination of physical delivery of certificates (which some investors insist on holding) and prompt payment by buyers are critical to further shortening the clearing and settlement process.

Resolving these issues will require continued efforts by the private sector. Some will also require efforts by government regulators, or legislative change. A number of clearing and settlement issues will require international consensus and coordinated efforts as well.

TECHNOLOGY AND SECURITIES TRADING

[See ch. 7]

One hundred and fifty years ago, it took about 1 week for a market quote to travel from New Orleans to New York, and about 3 weeks for market news to reach Europe by clipper ships. Information technology—from the telegraph, stock ticker, and telephone in the 1800s, to the first computers in the 1960s, to today's automated order routing systems—has brought great changes in market operations. The overwhelming advantages of speed and accuracy have ultimately overcome the reluctance to change and the resistance of those who prefer traditional methods of trading based on personal, highly specialized skills.

Computers and telecommunications are now used by securities markets for trading support systems, including quotations display and dissemination, order routing, and transaction execution (for small orders). They are also used for market surveillance and monitoring, and for 'back office' data processing and clearing and settlement of trades. These functions are automated, in both exchanges and the OTC market, in such a way as to preserve the role of market-makers. This can enable investors to get a price 'between the quotes''—i.e., better than displayed bids and offers or dealers' quotations. It may increase liquidity, by attracting skilled professionals whose experience and understanding of floor behavior can make trading highly profitable to them and to their customers. However, the mixing of manual and automated steps in information processing seldom allows the optimum use of either manual skills or

[36] The Securities Investor Protection Corporation for example, provides a uniform level of protection to market users in equities, bonds, and equity-related options markets. The protections afforded to market users by exchanges and clearinghouses in futures markets, however, vary and are extended mainly to clearing members of the exchange's clearinghouse. Further, some failures in securities markets are resolved though bankruptcy proceedings under the Federal Bankruptcy Code, which relies largely on State laws to determine rights to property. These may include State commercial law that often relies on the Uniform Commercial Code (UCC), and since the UCC is accepted on a State-by-State basis and may be amended, investors may be treated non-uniformly. Laws dealing with bank liquidation also need to be updated and made more consistent with other bankruptcy laws. In unregulated markets, such as foreign exchange, there is little investor protection.

[37] This issue, for the United States, was raised at the Feb. 8, 1990 meeting of the Banking and Clearinghouse Roundtable, where members agreed to hold further discussions. The problem is more complicated internationally and far from being resolved.

[38] Same-day funds means that payment is final on the day paid, as it would be with electronic funds transfer rather than with payment by check.

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system capabilities, and may create backlogs and opportunities for error, diversion of information flow, or fraud.

The markets have not moved the country much closer to the integrated, highly competitive national market system envisioned in 1975. Instead, the ad hoc integration brought about by inter-market program trading imposes stress on all markets and on the fragmented market regulatory structure.

The technological link between the markets and their ultimate user, the investor, is the system that disseminates bids, quotes, last-sale prices, etc. Market data flows from organized markets through systems provided by information services vendors and common carriers to brokers and customers located in nearly every U.S. city, town, and hamlet. Advances in information technology have thrown the information services industry into a state of flux. Driven by competition, vendors are developing value-added products and moving into transaction services, creating proprietary trading systems that could become the markets of the future.

International trading has induced foreign vendors such as Reuters to enter the competitive arena for distribution of U.S. stock quotations, and American companies such as Quotron to expand their overseas operations. The financial information business is still growing and continues to attract new competitors. The growing interactions between equities, futures, fixed-income and foreign exchange markets have led vendors, who until recently specialized in one market, to diversify into other markets.

Because vendors can readily obtain data from most stock markets, the market for quotation, price, and volume data has itself become a "commodities market, " in the sense of highly standardized products competing on the basis of price or on value--added features such as software for portfolio analysis. To satisfy the demand for analytical tools, vendors began to offer data in digital form, allowing users to reformat and manipulate data. This raises troublesome questions, e.g., copyright and pricing issues.

Information services providers are also moving to offer transaction services, via automated trading and execution systems. The largest of these, Instinct, now has about 13 percent of the daily volume of the NYSE (but this includes both exchange-listed and OTC stock). If institutional investors become dissatisfied with exchange services and their costs, or with the liquidity available for large block transactions, they may move to proprietary trading systems, perhaps offered by Reuters, Quotron, Telerate, or other vendors. Familiarity with trading private placement issues among themselves on NASD'S new Portal system may also encourage institutions to use other electronic systems.

U.S. exchanges are clearly wary of these developments but are adopting different strategies for dealing with it. The futures exchanges and, more recently, some stock exchanges are working with a dominant vendor (Reuters) to develop their own electronic transaction systems; the NYSE is developing a strategy that would "encourage many vendors to provide access to NYSE after-hours trading. '

The SEC has jurisdiction over companies that collect, process, and deliver market data. So far information vendors have not been subject to much regulation. The SEC has in the past exempted proprietary trading systems from registering and being regulated as exchanges. It may now be appropriate to reconsider both of these exemptions.

It is not clear whether information technology has been a net benefit to small investors or has put them at a disadvantage relative to large investors and institutional investors. Sophisticated portfolio management software is available for home computers, but is used by relatively few individual investors, and even fewer have access to "at-home trading systems" (which send orders to brokers, but do not provide automated execution). Many small investors feel that they are put at risk by volatility that they suspect results from program trading techniques encouraged by information technology. Computerized surveillance techniques have been relatively ineffective against types of market fraud that prey on small investors, such as penny stock scams and collusion in futures trading pits.

Advances in technology to support exchange trading, OTC dealing, proprietary trading systems, brokerage order routing, and customer end use may require accelerated development of standards to ensure interoperability. Improvement is needed in three categories of standards: data, technology, and operational standards. Standards are, however, especially important in developing 24-hour systems for transnational trading.

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MARKET FRAUD
[See *ch.* 8]

Both institutional and individual investors, but especially the latter, are deeply concerned about market fraud and manipulation. Fraud affects both the securities and futures markets, as recent disclosures show. In both, greed and dishonesty on the part of some participants are compounded by difficulties in surveillance and enforcement. Regulatory agents in both the SROs and in government are often thwarted by shortcomings in existing laws, regulatory measures, and surveillance technology. The costs of self-regulation are high-about 23 percent of total costs for the NYSE, for example.

Inter-market trading, and, increasingly, global trading, challenge continuing efforts to protect the public against undisclosed risks and assure all investors of fair practices. Enforcement efforts may be hampered by the divided regulatory structure that looks separately at each side of inter-market transactions, and by the limits of national sovereignty. Some market abusers profit by increased ability to operate from off-shore, often from locations where privacy laws block attempts at international cooperation in enforcement. Inter-market and international abuses are growing while more traditional forms of fraud continue.

Recent congressional hearings, FBI investigations, prosecutions, and news media revelations of abuse have stimulated both securities and futures regulators to look for improved methods of detecting and proving fraud. These measures include increased enforcement, expanded legislative authorities, and greater use of technology. Major foreign trading partners are strengthening mechanisms to control abuses in their markets; this shows promise for improved international cooperation in controlling fraud. These domestic and international efforts are likely to help curtail traditional forms of abuse. But new forms of fraud may occur as after-hours trading systems emerge, and many abuses are beyond the jurisdictictional reach of regulators to detect. The key issue will continue to be: how to balance public policy goals of fairness with other objectives, such as efficiency; the competitiveness of our marketplaces; and cost-effectiveness in enforcement?

THE REGULATORY STRUCTURE FOR MARKETS
[See *ch.* 9]

Securities and equity options are regulated by the Securities and Exchange Commission, established in 1934. Futures contracts, including stock-index futures and options on stock-index futures, are regulated by the Commodity Futures Trading Commission, created in 1974. The organic acts creating the two regulatory agencies were written 40 years apart. Both were written when some of today's most heavily traded derivative products did not exist.

Securities markets and futures markets were originally unrelated, and the regulatory structure reflects this. The markets are now linked. The prices of some products traded in the futures markets are derived from those of products in stock markets. Supply and demand in one market influence supply and demand in the other market. Problems and pressures are transferred from one market to the other. Yet the regulatory structures remain separate.

Since 1982, when stock-index futures contracts were introduced, three problems have become apparent: 1) confusion over jurisdictional responsibility for new trading instruments, sometimes carried to the courts for resolution; 2) differences in leverage caused by different margining systems; and 3) the effects of inter-market trading strategies on market volatility. The CFTC, as well as the futures industry and some academic experts, does not agree that these are problems. (See chs. 4 and 9.) Balanced against these drawbacks to the use of stock-index futures are the great advantages to institutional investors, who manage assets belonging to increasing numbers of Americans, of being able to hedge their portfolios.

As a general rule, the SEC regulates the trading of securities, or assets, which are instruments of capital formation, and the CFTC regulates instruments that are used for hedging and speculation (they are contracts, not assets) .39 Futures exchanges have been highly innovative in developing new products and the CFTC has been flexible and responsive in approving them. The SEC has been more cautious in approving new products for exchange trading. Innovation in securities exchanges maybe more difficult

[39]The major exception to this generalization is equity options, which are contracts and used for hedging, but are regulated by the SEC.

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than innovation in futures markets.[40] Most innovative financial products are derivative of traditional assets (equity securities, debt securities, currencies) and are successful because they are useful for hedging or risk transfer. They almost always, for that reason, have some element of future delivery or settlement. Because of the way that the CFTC legislation is written ("the exclusivity clause"), such products fall under the jurisdiction of CFTC even if they are designed by securities exchanges to meet perceived needs of securities traders.

Stock exchanges have recently attempted to become more innovative. The result has sometimes been dispute over whether the SEC can approve and regulate the trading of such products. Exchanges try to shape new products to fit the authority of their preferred regulatory agency. Exchanges also are likely to challenge (in regulatory agency hearings) approval of innovations by other exchanges that are potential competitors for their own products. Futures exchanges have in a number of cases used litigation or the threat of litigation to discourage competition from securities exchanges.

The two regulatory agencies have strongly different perspectives on inter-market factors in short-term volatility, and on the relationship between futures margin levels and stock market volatility. These different perspectives make it hard to develop an objective and pragmatic approach to identifying and solving problems in either market. Their disagreement over the inter-market effects of futures margin levels results in turning that question into the issue of who should set margins on financial futures and particularly on stock-index futures.

The possible loci of responsibility for futures margin requirements are: the futures exchanges (who now set them), the CFTC (which maintains that margins should be set by the exchanges, and which has consistently defended current margin levels), the SEC (which does not have the authority to set margin levels for stocks), or the Federal Reserve Board (which sets stock market margin requirements but would like to rid itself of this responsibility and does not want responsibility for futures margins). The issue of whether this responsibility should be shifted turns on the question of the purpose of margins: should they be designed only to protect the futures exchanges' clearing organizations (and through them, the other major participants in futures markets) or should they also be designed to achieve desired effects in national markets as a whole? If the former, the current locus is probably appropriate. If the latter, the responsibility should probably not reside in private-sector organizations whose members have a strong self-interest in the determination of margin levels.

The most important question raised by a bifurcated regulatory structure is the reliability of smooth coordination of responses by two agencies in the event of an emergency—a threatened market crash. In the market breaks of 1987 and 1989, the two agencies stayed in constant communication and apparently worked well together. But continuing evidence of strong disagreement on the causes of such market breaks, and the efficacy of existing means of controlling them, raises the question of how much reliance can be placed on effective coordination in all such situations that may arise.

There are now several proposals, some developed in Congress and one presented by the Administration, to shift jurisdiction over stock-index futures from the CFTC to the SEC. There are also proposals before Congress to integrate the two regulatory structures. The several alternative approaches to be considered are outlined below.

Redefinition of Jurisdictions

Another attempt might be made through legislation to define the respective agency jurisdictions so as to minimize confusion over innovative products. This could reduce the need for prolonged negotiation and the opportunity for resorting to litigation. However, it would do nothing to resolve other outstanding or potential problems, such as coordination in stressed market conditions. Shifting authority over stock-index futures trading to the SEC would be a step in the right direction for addressing some of the margin and emergency response issues. However, how that step will affect the willingness of exchanges to offer these instruments, the liquidity that will be available, and the ability of institutional investors to hedge large portfolios are all uncertain.

[40] Some of the most innovative securities—e.g., mortgage-backed securities and other 'asset-backed securities" are managed by banks and are not traded on exchanges.

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An Inter-Market Coordination Panel

The addition of another layer of responsibility over both agencies, to assure broader consideration of inter-market relationships and issues, is another possibility. Such a mechanism already exists, in the form of the President's Working Group on Markets. If the inter-market agency consists, as does the Working Group, of representatives of several government agencies, there is likely to be little gain over the present situation. A panel at the supra-agency level is not an operational working group, and usually is not prepared to intercede immediately, in the midst of an emergency. Inclusion of non-governmental experts may seem to promise a broader perspective, but in practice it would be difficult to find people knowledgeable about problems of markets that do not bring with them a history of affiliation with either futures markets or securities markets or their respective regulatory agencies.[41] With a panel representing the viewpoints of the two industries or the two regulatory agencies, jurisdictional disputes would have to be settled elsewhere.

Integration of the Regulatory Structure

A third approach meriting strong consideration is the creation of one regulatory agency, to replace the SEC and the CFTC, with responsibility over the trading of securities and derivative products, including financial futures and options. Physical commodities and commodities futures trading could be left to another regulatory entity. Critics of this approach argue that the benefit of competition between regulators would be lost. The benefits of regulatory competition, however, carry with them the costs of regulatory arbitrage-i.e., it tempts the regulated industries to play off one agency against the other. It also tempts the regulators to identify closely with the regulated industry. A single agency would facilitate coordination, allow better consideration of inter-market relationships and interdependencies, and encourage a unified approach to ongoing cross-national efforts to strengthen clearing and settlement problems and harmonize regulations and enforcement related to international securities trading.

[41] One reviewer of this assessment commented about other reviewers, "If they are experts they are not neutral; if they are neutral, they aren't experts."

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Chapter 2

What Securities Markets Do—And For Whom

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Chapter 2

What Securities Markets Do—And For Whom

Securities markets have five basic functions in a capitalistic economy:

1. they make it possible for corporations and governmental units to raise capital;
2. they help to allocate capital toward productive uses;
3. they provide an opportunity for people to increase their savings by investing in them;
4. they reveal investors' judgments about the potential earning capacity of corporations, thus giving guidance to corporate managers; and
5. they generate employment and income.

How important are these functions, and how well do securities markets, in 1990, perform them? Who benefits?

DO SECURITIES MARKETS DO A GOOD JOB OF RAISING CAPITAL?[1]

Corporations raise new capital by issuing stock (i.e., selling ownership shares) or by borrowing through bonds, notes, and related debt instruments.[2] State and local governments and the U.S. Government also issue debt securities.

Both stocks and bonds can be sold to investors directly or through underwriters. This is the primary market. It converts household and business savings into investments, to the benefit of both the savers and the corporation.[3] The secondary securities markets, the subject of this report, are for the reselling of stocks and bonds. People would be less likely to invest in securities, even with high dividends or interest, without assurance that they can sell their investments for cash when they wish to.

A decision about which stocks or bonds to buy is supposedly based on information that an investor has about the issuing fro's assets, markets and customer base, future earnings and growth potential, and management skills. Past performance is therefore important in evaluating established firms. Evaluation of new firms is, by comparison, difficult. For startup firms, public stock and bond offerings are often not an effective mechanism for raising capital, and venture capital specialists are more likely to provide it.[4] At some later point, successful growing firms often move to public sale of equities or bonds.

A market, whether physical or electronic, is a meeting place for potential buyers and sellers. A market that attracts many buyers and sellers is said to be "liquid" or to have liquidity. In a liquid market, selling or buying can be done with minimal effect on the prevailing competitively established price. The advantage of a liquid market for customers is "immediacy, ' the ability to sell quickly when the customer needs his assets, or buy quickly when there is a chance for profit, and to clear and settle the trade quickly. Some markets attempt to assure immediacy by designating certain traders as market-makers, with an affimative obligation to buy shares at a price close to the last sale price, or to sell from inventory when there is an eager buyer. Other markets depend on the interaction of bids and offers from customers and market professionals to provide liquidity and immediacy.

Another desirable characteristic of securities markets is "efficiency." This means that changes in investors' collective judgment about the fundamental value of corporations are accurately and swiftly reflected in the prices at which stocks and bonds are bought and sold, with minimum distortion from transaction costs, regulations, or other external factors. Information technology should speed up the process of registering changes in investors' judgment, and both information technology and deregu-

[1]Parts of this chapter draw on an OTA contractor report: James L,. Bulkiewicz (university of Delaware), *The Role of the Stock Market in the U.S. Economy, May 3, 1989;* and on a workshop by the same name held at OTA on Apr. 5, 1989.

[2]The bond is a contract obligating the borrower to repay the debt principal at specified time and also to make interest payments to the bondholder at a specified rate and time.

[3]Alternatively, savings may go into other kinds of investment (e.g., real estate), or into various kinds of bank accounts which banks then use to make loans to individuals, corporations, or governments. Corporations also use retained earnings and depreciation as sources of capital for growth.

[4]The U.S. Small Business Administration is studying the feasibility of special regional stock exchanges to handle issues of small companies. The International Stock Exchange in London set Up such a market for small or startup firms in 1987; it trades stocks of about 50 firms.

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lation should tend to lower transaction costs. Some people believe, however, that as a result of technology and deregulation market prices have recently become too volatile, and that transaction costs should be deliberately raised by taxing, to discourage "in and out" trading.

New equity issues in public markets are not the major source of finding for corporate investments From 1952 through 1981, the proportion of funds raised by American non-financial corporations through stock issues ranged from an occasional high of 7 percent to a low of 0.2 percent in 1980-81. From 1982 through 1988, new stock issues made no net contribution to capital formation. As corporations bought back and withdrew stock, there was in fact a net loss of 14.7 percent. The percent of corporate funds exclusive of bank loans supplied by bonds and notes grew from 10.5 percent in 1980-81 to 19.6 percent during the rest of the 1980s. The proportion of all corporate funds supplied by both equity and debt securities averaged about 16 percent from 1952 to 1982, and has been much less since then.[6]

This has led some people to believe that financial markets "may have deteriorated over time in performing their social functions of spreading risk and efficiently guiding the allocation of capital."[7] John Maynard Keynes said, over 50 years ago, "As the organization of investment markets improves, the risk of the predominance of speculation does increase. Today, some critics perceive that more efficient markets (in part a result of information technology) have encouraged a kind of speculation that drives stock prices away from fundamental values and leads to misallocation of financial resources. Other people argue, however, that securities markets work far better than they have in the past, and without them the growth of today's multinational enterprise would not be possible.

DO STOCK MARKETS DO A GOOD JOB OF RESOURCE ALLOCATION?

In addition to facilitating capital formation, securities markets are assumed to allocate capital to its most productive uses, by allowing stocks (and other securities) to compete for the investor's money. Stock market prices theoretically reveal the relative values placed on ownership in a corporation (' 'price discovery"). Market efficiency in performing this function is essential, according to many main-stream economists. They say that a stock price is the collective best estimate by investors of the present value of future earnings, reflected in prices that are set by people bidding against each other, each using incomplete but overlapping information. The interaction of supply, demand, and price is assumed to be the best signal for allocation of resources.

Taxes and regulations affect market pricing by altering the rewards for risk taking. When that effect is deliberate and desired, tax and regulatory policies are working as intended. When the outcomes are unintentional and undesirable, taxes and regulations may cause capital to be misallocated. Efficient-market theorists tend to see most market regulations and taxes as harmful.

Changes in stock prices are also affected dramatically by mergers, acquisitions, takeovers, and leveraged buyouts that may have unpredictable affects on corporate values and corporate performance for reasons not related to market valuation.

Efficient-market theory emphasizes the importance of information in market behavior. It is therefore not considered possible to "outperform the market" over time, even by studying all available information, because, in an efficient market, all information about stock value is presumably already reflected in market prices. The only "special"

[5]In the first 6 months of 1989, 1,955 new securities issues were offered on American domestic markets, valued at $142 billion; but only 4 percent were initial public offerings of new stock. Junk bonds accounted for 11percent, other bonds for40 percent, convertible debt and preferred stock for 5 percent, and mortgage- and asset-backed securities (which are pools of loans packaged andresold by banks) accounted for the other 40 percent. Kevin Winch, "Growing Risk in Corporate Finance," *CRS Review*, October 1989, pp. 20-21. Data from Investment Dealers' Digest. This does not count the implicit change in net equity from earningsretention, used as a method of shielding dividends from higher income tax rates.

[6]Board of Governors of the Federal Reserve System, *Flow of Funds Accounts*. During this period the percent of corporate funding supplied by retained earnings and depreciation ranged from a low of 62 percent (1970-73) to a high of 81.3 percent (1982-88), with the rest accounted for by loans.

[7]Lawrence H. Summers (Harvard University) and Victoria P. Summers (Hale Dorr), "When Financial Markets Work Too Well: A Cautions Case fora Securities Transactions Tax," presentational the Annenberg Conference on Technology and Financial Markets, Washington, DC, Feb. 28, 1989, p. 2.

[8]John Maynard Keynes, Th*General Theory of Employment, Interest, and Money* (New York, NY: Harcourt Brace, 1936).

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information is knowledge that is available only to "insiders' (i.e., corporate officials, regulators, etc.), in which case its use is illegal. Many large investors, because they believe that one cannot outperform the market except in very brief instances, hold "indexed" portfolios that contain all of the stocks used in computing the Standard and Poor 500 index or another standard market index. (The index is the weighted average price of a basket of selected stocks that are assumed to represent the market as a whole.) The indexed portfolio, by definition, should appreciate or depreciate just as the overall market does. These investors may also use "passive" trading techniques aimed only at reflecting general market trends.

Some people dispute the claims that markets are efficient, that investor behavior is rational, and that the price investors are willing to pay represents any judgment about fundamental values.[9] Economist Joseph Stiglitz said the market is "a gambling casino for the rich,"[10] and John Maynard Keynes likened it to a beauty contest in which:

> ... it is not a case of choosing which [faces] are redly the prettiest, nor even those which average opinion genuinely thinks the prettiest [but] ... we devote our intelligences to anticipating what average opinion expects average opinion to be.[11]

Many empirical studies, especially since the market crash of 1987, have cast doubt on efficient market theory.[12] They ask whether corporate assets really declined in value by one-third between October 13-19, or what new information caused investors to collectively revise their previous judgment so quickly. Alternative explanations of "excessively volatile" stock prices vary from large swings in the discount rate that people use in valuing future earnings streams, to the blind following of perceived trends in general investor behavior, to mass hysteria, or the actions of those who seek to profit by anticipating changes in "market psychology. ' "[13]

Many people have concluded that price jumps caused by large block trades, by new computerized trading strategies, and by professional "speculators" make stock prices excessively volatile. This, they say, endangers financial systems, causes instability in the economy, and imposes unnecessary risks on small investors. Others blame excessive volatility on arbitraging, hedging, and manipulation (although critics sometimes confuse these behaviors in discussing volatility). These arguments are considered in chapters 3,4, and 5, which describe stock, futures, and options markets.

There is, in short, little consensus about whether investor behavior, even in the extreme circumstances that result in a market crash, is rational or irrational. If investors do behave irrationally a significant portion of the time, then prices may not reflect fundamental values, and investment decisions may be based on inappropriate prices. But even if stock markets are efficient and investors behave rationally, the allocation of investment capital is affected by more than securities prices. It is also affected by banking decisions, interest rates, the mortgage market, and the domestic money markets;

[9]See Michael C. Jensen et al., "Some Anomalous Evidence Regarding Market Efficiency," *Journal of Financial Economics 6, 1978;* Robert J. Shiner, "Do Stock Prices Move Too Much To Be Justified by Subsequent Changes in Dividends?" *American Economic Review 71,* June 1981, pp. 421-436; Lawrence Summers, "Does the Stock Market Rationally Reflect Fundamental Values," *Journal of Finance 41,* July 1986, pp. 591-601. There are many articles by economists on 'bubbles,' panics, and crashes in the past, but no consensus is apparent on the extent of investor irrationality. A number of recent papers along this line were presented at a Salomon Brothers Center Conference on *Crashes and Panics in Historical Perspective, New* York University, Oct. 19, 1988.

[10]Joseph Stiglitz, "Comment on Robert Schiller," *Keynes' Economic Legacy: Contemporary Economic Theories,* James L. Butkiewicz et al. (eds.) (New York, NY: Praeger, 1986).

[11]John Maynard Keynes, op. cit., footnote 8.

[12]The most vocal proponents of the irrationality of markets at present are Prof. Robert Schiller of Princeton and Prof. Lawrence Summers of MIT. See op. cit., footnote 9. David M. Cutler, James M. Poterba, and Lawrence H. Summers examined news events on the 20 days over the last 50 years when the largest market moves occurred and concluded that it was not possible to relate the events convincingly to price movement. ("What Moves *Stock Prices," Journal of Portfolio Management, 1989.) Richard* Roll examined the futures market in frozen orange juice in the context of predictions about the weather in Florida and reached similar conclusions. ("Orange Juice and Weather,' *American Economic Review, 1984,* pp. 861-880.) Kenneth French and Richard Roll compared price movements during and between trading sessions and found no evidence that they reflected information bearing on fundamental values. ("Stock Return Variances: The Arrival of Information and the Reaction of Traders, " *Journal of Financial Economics, 1987,* pp. *5-26.)*

[13]A psychologist argues that panics become *almost* inevitable when bull markets continue for a long time. Participation in markets becomes very high and "there are no new believers to be recruited"; "slight tilts in trends will destroy faith that a trend will continue, " causing investors to flee from the market. Donald C. Hood, "Toward Understanding StockMarket Movements: A Marriage of Psychology and Economics, " presented in a Science and Public Policy Seminar held by the Federation of Behavioral, Psychology@ and Cognitive Sciences, Washington, DC, July 1, 1988.

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and increasingly, it is affected by markets, currencies, economic conditions and policies in other countries. At best, increased efficiency of the stock market may not improve, or may only slightly improve, the allocation of corporate capital.

DO SECURITIES MARKETS BENEFIT ORDINARY AMERICANS?

A third function of securities markets is to provide opportunities for people to invest and increase their savings, and thus to encourage overall savings and investment. Public policy has traditionally focused on encouraging small investors by protecting them against market fraud and manipulation. But trading on stock exchanges is increasingly dominated by large investment funds. Only about 18 percent of trades in 1988 were made on behalf of individual investors. 14

Most stock—about 59 percent—is still owned directly by individuals and households.[15] Even more people own stock indirectly through pension funds and mutual funds. The rest is owned by banks, insurance companies, foreign owners, and broker-dealers.

It may be misleading to think of individual investors as "small investors. While about 19 percent of American households own some stock,[16] 43 percent of stock shares and31 percent of mutual fund shares is owned by wealthy families-those with incomes higher than that of 99.5 percent of American households.[17]

The largest group of individual investors-which is, however, shrinking in numbers-are those who have a few thousand dollars invested in securities; this generally does not represent a large proportion of their household assets. Most of these investors probably seldom trade their stocks; some trade them almost as a "dabble", not as a livelihood. A much smaller class of individual investors have securities that average $75,000 to $100,000; these wealthier Americans are probably much more frequent and sophisticated traders.

Small investors have been leaving the stock market for about 20 years, a trend that accelerated in 1987. In early 1989, individual investors were net sellers of stock at the rate of an average 3.5 *million* shares per day, according to the Securities Industry Association. In the last 5 years, individual investors decreased their direct holdings by more than a third.[18] The "small investor" will increasingly be found mostly under the umbrella of large investment funds with professional investment managers, and individual investors still directly in the market are increasingly less likely to be the traditional small investors.

Pension funds now give more Americans, and less wealthy Americans, a stake in the markets.[19] Pension plans cover more than 57 million people. Before the late 1940s, pension plans were rare, and pension reserves did not show up in accounting for household assets. Even in 1950, pension reserves constituted only 2.6 percent of household assets. By 1987 this had risen to 15.1 percent of household net worth.[20] In 1955, pension plans owned only 2 percent of corporate securities, in 1988 they owned

[14]Securities Industry Association, Trends, Mar. 16, 1989. This is an estimate; other estimates vary according to how shareholder are categorized.

[15]According to the Securities Industry Association in its publication *Trends (Mar.* 16, 1989), direct individual ownership of equities fell from 82.2 percent in 1968 to 58.5 percent in 1988. Ownership of securities, both direct and through mutual funds, makes up a decreasing share of household assets; it was 10.6 percent in 1988, compared to over 18 percent in 1958 and 1969. Bonds constituted 6 percent of household assets in 1988, compared to 6.7 percent in 1958 and 6.8 percent in 1969. Edward N. Wolff, "Trends in Aggregate Household Wealth in the United States, 1900- 1983," *The Review of Income and Wealth 35(l),* March 1989:1-29.

[16]Robert B. Avery (Cornell University) and Arthur B. Kennickell (Federal Reserve Board), "Rich Rewards,' *American Demographics,* June 1989, pp. 19-22. Based on 1983 and 1986 Surveys of Consumer Finance conducted by the University of Michigan, Survey Research Center, for the Federal Reserve Board. The median value of stock owned by households was reported as $6,000, and the average value as $81,300. Stocks, on average, constitute about 9 percent of household assets, according to this report.

[17]For comparison, the top half of 1 percent of families b, income distribution own 3 percent of savings accounts, 5 percent of owner-occupied houses, 14 percent of IRA and Keoghs, 28 percent of corporate and Treasury bonds, and69 percent of trust accounts. Robert B. Avery and Gregory E. Elehanger, "Financial Characteristics of High-Income Families," *Federal Reserve Bulletin 72,* March 1986, pp. 164-175. This data is probably from 1985; since small investors have been leaving the markets at a high rate since then, the concentration of ownership in the top 0.5 percent of households is probably understated.

[18]Michael C. Jensen, "Eclipse of the Public Corporation, *Harvard Business* Review, September-October 1989, p. 61.

[19]As first pointed out b, Peter Drucker, Th, *Unseen Revolution: How Pension Fund Socialism Came to America* (New York, NY: Harper & Row, 1976).

[20]Mark J. Warshawsky, "Pension Plans: Funding, Assets, and Regulatory Environment, " *Federal Reserve Bulletin 74,* November 1988, p. 725.

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25 percent. Pension plan investments have become a major force in the securities markets.[21]

Two-thirds of these pension plan investments, however, are held by defined-benefit plans. When the market value rises, this reduces the contribution the corporation has to make to the plan, but does not increase the wealth of the workers, whose retirement benefits are already specified. Such plans cover 72 percent of all covered workers. Only one-third of the securities owned by pension plans (approximately 9 percent of all securities) are owned by defined-contribution pension plans, in which workers directly own the assets and thus benefit directly by market gains. Defined-contribution plans also make those people directly vulnerable to market declines. The proportion of people covered by defined-contribution plans is growing rapidly and thus the number of people potentially directly affected by market losses will grow.

Policymakers and regulators must take these complexities into account. The traditional public policy focus on "the small investor' may not in the future be as realistic or useful as in the past. The interests of securities owners and of securities traders are not always the same. The interests of wealthy speculators and small investors are not always the same. The needs of individual investors and investment fund money managers may be different. Technology for trade support may not meet the needs of these groups equally. Exchange rules and government regulations may not affect them the same way. Understanding the benefits and costs to all parties is important in framing public policy.

DOES PUBLIC OWNERSHIP IMPROVE CORPORATE MANAGEMENT?

A fourth function of securities markets is to control corporate management, or provide it with guidance. First, the prices at which shares trade in the market should indicate to managers the public's judgment about the earnings prospects of the corporation and thus about the quality of their management. Second, shareholders have the rights of owners to exercise control through voting in shareholder meetings and elections. The question is, how effective are these controls now?

Monitoring management performance is difficult and time-consuming. Since each shareholder has one voice among many thousands, there is a vanishingly small amount of leverage, and little incentive for most shareholders to vote. One school of thought says that the separation of ownership and control in publicly held corporations may result in a misallocation of resources and is a serious problem.[23] Among these critics, some see a basic conflict of interest between shareholders and corporate managers. It is assumed to be in the shareowners' interest to maximize company profits and pay them out as dividends; and in the interests of corporate management to enlarge the corporation through developing new products, entering new markets, spawning new divisions, acquiring other companies, investing in research and development, etc. This may defer the paying out of profits to shareholders. Some argue that managers will seek to further the long-term growth of the corporation from a spirit of healthy entrepreneurship, or from a feeling of responsibility to the workforce and the surrounding community; others say that managers will be *motivated* chiefly by the need to justify large salaries or bonuses for themselves. In either case, shareholders are (according to this school of thought) deprived of immediate possession of their profits.

Takeovers are seen as the way to enforce these alleged rights to immediate profits. In a takeover, an individual *or* group acquires enough shares to exert control, install new management, and change corporate policy. After a takeover, "excess" corporate resources-labor, facilities, products, divisions, or subsidiaries-can be sold and the proceeds paid out to shareholders for re-investment.

Critics of takeovers say that the fear of takeovers discourages managers from investing in long-range productivity improvements such as research, development of new products, and ventures into new markets. The threat of a takeover encourages strategies aimed at short-term profits rather than long-

[21] "The Power of the Pension Funds," *Business Week,* Nov. 6,1989, p. 154.

[22] Mark J. Wrightsky, op. cit., footnote 20, pp. 717.?

[23] Adolf A. Berle and Gardiner C. Means were perhaps the first to identify this problem, in *The Modern Corporation and Private Property* (Chicago, IL: Commerce Clearing House, 1932). See also Hal R. Varian et al., "Symposium on Takeovers," *Journal of Economic Perspectives 2,* Winter 1988, pp. 3-82.

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term growth that would strengthen American industry's competitive position in world markets. At their worst, takeovers may destroy jobs, hurt local communities, and often weaken or destroy the corporation. At least 39 States have passed laws to discourage hostile takeovers.[24]

There is disagreement about whether takeovers result in more efficient and profitable firms. There is also little agreement as to whether or when a corporate emphasis on short-term profits, if it exists, is attributable to fear of takeovers.[25] A short-term focus can also result from high real interest rates.[26] Advocates and critics of takeovers often agree, however, that securities markets may not exert strong discipline over very large corporations. This may be due to the proportionate decrease in the influence that can be exerted by even the larger shareholders, as corporations and corporate assets have increased in scale. Another reason maybe that the indexed portfolios and program trading strategies of large investment funds have blurred the relationship between stock prices and public judgments about the fundamental value of corporations. Some people advocate public policy incentives to encourage the long-term holding of large blocks of stock and the active exercise of shareownership rights in corporate governance by large institutions (e.g., pension finds' corporate sponsors), or other mechanisms for stronger shareholder control.

An internal defense against acquisition or takeover is the "buyout," in which a corporation buys back much of its own stock, removing it from the public market. Most buyouts are highly leveraged, that is, they are accomplished by borrowing heavily and committing the corporation to very high interest payments. The acquired corporation will often sell assets, pare down staff and workforce, cut other costs, and pay out the proceeds as interest and as dividends to the remaining (internal) shareholders. Leveraged buyouts are usually funded by issuing "junk bonds"—i.e., debt that is not given an investment-grade rating, but carries a high interest rate. [27]

Michael Jensen claims that "privatization of equity' is becoming the central characteristic of corporate activity today, signaling the "eclipse of the public corporation."[28] This privatization is being carried out by the switch to public and private debt instead of equity, by the concentration of shareownership in large institutional investors, and even more strikingly by the wave of hostile takeovers and leveraged buyouts. If Jensen is right that "privatization of equity" is the wave of the future, then the role of securities markets in the American economy could decline in importance even more. This is a minority viewpoint, but it is likely to be widely debated in the future.

DOES STOCK MARKET IMPROVEMENT ENCOURAGE SAVINGS AND INVESTMENT?

The behavior of the stock market is assumed to influence the level of investment and possibly the

[24]Investor Responsibility Research Center, Washington, DC.

[25]David J. Ravenscraft and F.M. Scherer studied 95 firms before and after takeovers, and found that their profitability did not significant ("Life After Takeover," *Journal of Industrial Economics 36,* December 1987, pp. 147-156.) See also, F.M. Scherer, "Corporate Takeovers: The Efficiency Arguments,*Journal of Economic Perspectives 2,* Winter 1988, pp. 69-82. Frank R. Lichtenberg and Donald Siegel studied manufacturi establishments taken over from 1972 through 1981 and found that their productivity did increase significantly. ("Productivity and Changes in of Manufacturing Plants,*BrookingsPapers on Economic Activity 3,1987,* pp. 643-673.) In subsequent studies they found that industrial employment growth in these acquired firms was less than industry averages, resulting in cost savings; that there was no significant difference in R&D em between acquired firms and industry averages; and that growth in wages and benefits was 12 percent lower in acquired than non-acquired fir Effect of Takeovers on the Employment and Wages of Central-Office and Other Personnel," National Bureau of Economic Research Working Paper No. 2895).

[26]Real interest rates are market rates less the expected rate of inflation. If one assumes that 'expected" inflation rates approximate real inflatio then real interest rates in the 1980s have still been higher than in recent decades. At a 5 percent rate of interest, the present value of a dollar of to be realized 10 years in the future is 61.4 cents. At a 10 percent rate of interest, it is only 38.5 percent. Thus long-term investments that seem rea at periods with relatively low interest rates, may not appear justified at periods such as the present, with higher interest rates.

[27]Junk bonds are sometimes considered "quasi-equity" because unlike conventional bonds, they set on interest rates than on a given company's earning power and . .on its ability to meet interest payments out of cash flow. "Junk Bonds: Last Resorts," *The Economist,* Sept. *2,1989,* p. 75. Companies with large debt and interest burdens are vulnerable to small setbacks as well as to general economic recessions, and m competitive disadvantage relative to other companies. The junk bond market grew very rapidly in the 1980s, to about $200 billion, but begar rapidly in 1988 and 1989. Some companies that used junk bonds for leveraged buyouts were unable to either meet interest payments or refin debt.

[28]Michael C. Jensen, "Eclipse of the Public Corporation," *Harvard Business Review,* September-October 1989, PP. 61-99.

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savings rate.[29] The availability of capital for industry (and thus the cost of capital) is the product of the multiple decisions of individuals to save or to spend.[30] The American rate of saving is considered low compared to that in other developed nations, and personal saving has declined in recent years.[31] Many explanations have been offered for this: people may feel less need to save for retirement because of insurance coverage and pension plans; large purchases can be financed by borrowing rather than saving; the baby boom generation until recently was in the youthful low-savings phase of their lifecycle; and two-income households engenders confidence that reduces the need to save.

It maybe that saving in the United States is neither low or declining.[32] Economists count only private savings, not the purchase of a home, pension contributions, and insurance policies that many Americans think of as their life savings. Pension plans, insurance, and homeownership represent long-term, predictable investment, and public policies that encourage their growth might yield more capital for investment, in the long run, than a cut in the capital gains tax. Some people assume that increasing the income of upper-income households will tend to increase savings more than would income redistribution downward, which would tend to increase consumption. Others argue that the wealthy need not invest most of what they have in order to generate more income than they can consume, and therefore have relatively little incentive to seek productive investments.

The relationship between income, return on investment, and savings is not empirically well-established. The extent to which the saving rate is responsive to rates of return is still doubtful.[33] Continuing debate about the taxation of securities markets transactions or of income derived from securities markets cannot be resolved on these grounds. Nearly all of the possible public policy approaches to encourage saving and investment in productive capital are highly controversial from a social or political standpoint.

HOW MUCH EMPLOYMENT IS GENERATED BY SECURITIES MARKETS?

Gross revenues for the securities industry tripled between 1980 and 1986, reaching a high of $50 billion. Revenue was flat in 1987 and 1988, and probably declined in 1989. Employment for New York securities firms reached a high of 262,000 just before the 1987 crash, and declined to 227,000 by September 1989, a drop of 13 percent. There have been further cuts since then, accelerating with the bankruptcy of the large firm of Drexel Burnham Lambert in early 1990.[34] Total employment nationwide is estimated, on the basis of Labor Department and Census figures, at 641,000.

The National Association of Securities Dealers has 6,148 member firms, with 29,235 branch offices. These firms have altogether 438,701 registered representatives. The number of support staff is unknown, but total employment can be estimated at approximately 530,000. However, there is some double-counting between this and the earlier figure of 641,000. A loose estimate of 1 million jobs related to securities markets sounds realistic.

[29] There are various economic models of investment behavior, including the neoclassical model, James Tobin's 'q theory of investment," the internal cash flow model, etc. The role of securities markets is explained somewhat differently in each model. For an econometric evaluation of these models, see Richard W. Kopcke, "The Determinantts of Investment Spending," *New England Economic Review,* Federal Reserve Bank of Boston..July/August 1985, pp. 19-35.

[30] There are several theoretical explanations ofhow individuals decide when to consume and when to save. The "permanent income" model developed by Milton Friedman says that consumption decisions depend on the level of income expected over long periods of time, so that temporary fluctuations in income—e.g., loss of employment, or the fear of it—have only marginal effects on decisions to save or not save. The lifecycle model developed by Modigliani, Brumberg, and Ando says that people attempt to stabilize consumption over their lifetime, including retirement, so that they tend to be net borrowers in earlyadulthood, net savers during the later working years, and "dissavers' or net consumers during retirement. Other theories emphasize the effects of inflation-adjusted rates of return on savings and changes in government or business-sector savings rates.

[31] Annual average personal savings declined by half from 1981 to 1989. This is about one-third the average for other industrialized nations.

[32] Robert Kuttner, *The Economic Illusion: False Choices Between Prosperity and Social Justice* (Boston, MA: Houghton= 1984).

[33] See for example, Martin Felstein, "Social Security, Induced Retirement and Aggregate Capital Accumulation," *Journal of Political Economy 82,* September/October 1974, pp. 905-926; Lawrence Summers and Chris Carroll, "Why Is U.S. National Saving So Low," *Brookings Papers on Economic Activity, 1987:* pp. 607-635; Gregory V. Jump,"Interest Rates, Inflation Expectations, and Spurious Elements in Measured Real Income and Saving, " *American Economic Review 70,* December 1980, pp. 990-1004.

[34] Data from the Securities Industries Association, by telephone and published in Trends, December 1989.

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There are 362 firms of futures commission merchants. They include (as of Jan. 31, 1990) 37,240 "Associated Persons"; 13,638 principals (who are not themselves registered to sell); and 24,184 "introducing brokers," commodity trading advisers, and commodity pool operators. There are also 7,470 futures floor brokers. This is 82,532 jobs—with support staff, total employment might be estimated as 100,000.

These estimates indicate that employment in securities and futures markets accounts for, at most, one-tenth of one percent of U.S. employment. The majority of these jobs are probably concentrated in New York and Chicago; only in those cities would they have a perceptible effect on the local economy.

THE INVESTORS

Institutional Investors

Institutional investors now are the dominant users of U.S. financial markets in terms of trading on exchanges, ownership of equity ownership, and total assets invested in equities. Their assets grew from $2.1 trillion in 1981 to $5.2 trillion in 1988.[35] (See table 2-1.) This amounts to a 14 percent compound annual growth rate for the period. The New York Stock Exchange (NYSE) says that about 10,000 institutions, representing 150 million Americans, use its services.[36]

Corporate pension funds managed more than $1 trillion in 1988; public (governmental) pension funds held more than $600 billion and were growing faster than corporate plans. The 500 largest corporate pension plans together had over $640.2 billion invested in securities in 1988. The four largest—General Motors, AT&T, General Electric, and IBM—each have assets of more than $26 billion. There are also very large public pension funds, e.g., New York City Employees Retirement Fund has over $30 billion and California's employee fired had over $50 billion invested in 1988.[37]

Table 2-1—institutional Investors

Category	Total assets ($, end 1988)	Percent of assets[a]	% average annual growth (1981-88)
Pension funds	2,240	43.0	14.3
Insurance companies	1,259	24.0	12.3
Investment companies	816	15.5	18.5
Bank trusts	775	15.0	12.7
Foundations & other	133	2.5	13.2
Total	5,223	100.0	

[a]percentage of all institutional investment holdings.

SOURCE: Columbia Institutional Investment Project, Columbia University, Center for Law and Economic Studies.

U.S. insurance companies also manage over $1 trillion in securities investments.[38] Historically, stocks were only a small part of insurance company assets, for reasons rooted both in the industry's investment philosophy and in laws regulating the industry.[39] State laws now commonly allow some investment in stocks, often requiring them to be maintained in a separate account.

In the last few decades, mutual funds became popular. A mutual fund, often setup by a financial management services company to invest in securities, might have growth, income, or other objectives. It might focus on securities that are either all or mostly domestic, foreign, or international. Customers, including many small investors, buy shares of the funds, and share in the funds' profits or losses. Mutual funds' assets grew at a rate of nearly 27 percent per year from 1975 to 1987, when for a time after the market crash of 1987 the industry had net redemptions. Historical ownership patterns suggest that institutional investing has broadened the base of participation in markets. (See table 2-2.) By 1989, the total number of mutual fired accounts, including money market funds, was 36 million. Their total value by April 1990 had grown to $1 trillion ($554 billion of which was in stock, bond, and income mutual funds).[40]

[35]Carolyn Kay Brancato and Patricia. Gaughan, *The Growth of Institutional Investors in U.S. Capital Markets: 1981-1987, The* Institutional Investor Project, Columbia University School of Law, New York City, November 1988, and *The Growth of Institutional Investors. Updated Data: 1981-1988,* Jan. 12, 1990.

[36]NYSE *Annual Report,* 1989, p. 16. These data, however, appear to come from a 1985 NYSE survey of investors.

[37]"1989 Pensions Directory," *Institutional Investor Magazine,* January 1989, p. 131.

[38]Information from the American Council of Life Insurance, courtesy of Paul Reardon.

[39]In the 19th century, common stock was regarded as a speculative investment and avoided by insurance funds. Often this avoidance was written into law. For example, until 1951 life insurance companies operating in New York State were prohibited from investing in common stock.

[40]Data from the Investment Company Institute, June 1990.

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Table 2-2—Volume of Stock Trading on the NYSE*

Year	Institute	Retail	Member firms
1969	42.4%	33.4%	24.2%
1980	47.4	25.7	26.9
1988	54.6	18.2	26.2

*These SIA estimates were revised in 1990 to adjust for NYSE-provided data on the contribution of program trading to the volume of trading by institutions.

SOURCE: Securities Industry Association, *Trends, Mar.* 16, 1989.

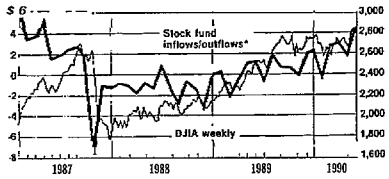
Institutional ownership of NYSE-listed stocks has increased from 13 percent in 1949 to nearly 50 percent. Institutional funds do about 55 percent of all NYSE trades; another 26 percent are done by exchange member firms for their own accounts; and only 18 percent are done for individuals.[41] (See table 2-2.) According to the Securities Industry Association, less than 50 percent of institutional trades are in blocks smaller than 900 shares. Institutions own about 39 percent of the stocks listed on NASDAQ.[42] They also dominate the market for privately placed corporate securities.

Individual Investors

Individual investors now own just over 50 percent of American equity and account for less than one-fifth of all trading. Over half the population owns some type of equity investment, although for most it is through participation in institutional investments, such as mutual, pension, and insurance funds. Direct ownership is concentrated among a relatively small proportion of investors. The United States, nevertheless, has the highest level of individual participation in the securities markets of any country in the world. Less than 25 percent of British citizens hold stock investments.[43]

In 1985, the NYSE conducted its llth survey of Americans who own stock in public corporations.[44] (The NYSE has not published more recent data and uses this data in its annual reports and Fact Books through 1989.) The number of respondents who only owned mutual funds increased from 4.5 million (10.8 percent) in 1983 to 8.0 million (17.1 percent) in 1985.

Figure 2-l—Mutual Funds Net Capital Flows



Investors yanked money out of stock mutual funds after the October 1987 market crash. But with the DJIA hitting record highs before the market drop in mid-1990, money began once again pouring in; monthly, in billions (left scale) v. the DJIA, weekly close (right scale).

*New stock fund sales less redemptions, plus the net effect of switches within the same fund family between stock funds and other mutual funds.

SOURCE: Investment Company Institute.

It is commonly said that individual investors are "leaving the market" because they have been net sellers for 5 years and their holdings are decreasing. The number of Americans owning stock actually increased at least until 1985, growing from 42 million to 47 million in the preceding 5 years.[45] However, nearly all of the increase was in ownership of shares of mutual finds. (See figure 2-l.) The number of Americans directly owning stock has almost certainly decreased since 1985, although the numbers are hard to pin down. In 1969, shares of common stock represented 36 percent of personal financial assets, but by 1979, that figure dropped to 25 percent, and to about 20 percent by 1989. Individual shareholders' median income was $36,800 in 1985, a 5.3 percent annual increase over 1983.46 The median size of their stock portfolios increased from $5,000 to $6,200 in that same period.

Income and investment patterns suggest that individual investors can be grouped into three sets. The frost includes people who have less than $5,100 directly invested in the stock market. This is about 45 percent of all individual investors. Approximately 35 percent of individual investors had portfolios of between $5,000 to $25,000. These are the traditional small investors. Approximately 20

dlh contrast, about 55 to 60 percent of the volume of trading of NASDAQ stock is attributed to individuals, according to NASD officials.

[42]Information provided by the National Association of SecuritiesDealers.

[43]North American Securities Administrators Association, Inc.

[44]New York Stock Exchange, *Shareownership,* 1985.

[45]Ibid.

[46]The U.S. median income, in comparison, increased from $20,200 to $22,400 during the same time, a 5.5 percent annual increase.

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percent of individual investors had portfolios in excess of $25,000. (See table 2-3.)

The 37 million small investors, although probably better off than the "average American," clearly do not depend on securities markets profits for a major part of household income, and probably do little trading. The other 20 percent of individual investors-9 million people whose average portfolio is estimated at $78,000 to $94,000-are wealthier Americans who may trade more frequently .47

Table 2-4 shows the historical pattern of ownership of equity in the population.

Table 2-3-Size of Individual Portfolios, 1985

Percent of individual portfolios	Number of investors (millions)	Portfolio ($ value)
45	21.1	less than 5,000
35	16.5	5,000 to 25,000
20	9.4	over 25,000

SOURCE: Data from New York Stock Exchange, *Share Ownership,* 1985.

BROKERS

The Industry

Major changes have occurred in the operations and structure of the brokerage industry during the past few decades; contributing factors were the paper-work crisis of the late 1960s, the unfixing of commission rates in 1975, the departure of many retail investors from direct investments in common stock, the increasing dominance of institutional investors, and more attractive returns for brokerage firms from "risk-based" businesses. This has resulted in floundering and uncertainty for many brokerage firms. Other changes include cyclical impacts on the industry's employment and profit levels and increased concentration in the industry. The long-term effects on small investors have not all been beneficial.

The "back office" overload of the late 1960s accelerated the introduction of computers into brokerage firms. Since then, computers have increasingly permeated most of their operations, from recordkeeping to order entry, transaction confirmation, client report preparation, client account analysis, and clearing and settlement.

Competition for commission rates led to substantial rate reductions for institutional customers and kept rates on small orders from rising. Between 1970 and 1989, for example, commissions on institutional investors' transactions dropped from 26 cents to between 4 and 7 cents per share.[48] Pension funds, which in mid-1985 paid little attention to transaction costs, now look hard at ways to reduce them.[49] Based on a survey conducted by the *Institutional Investor in 1989, 99* percent of responding pension plan sponsors monitored their commission costs, 50 percent monitored soft-dollar[50] usage, 45 percent monitored market price impact, and almost half reported that they have cost-cutting programs or are planning to start them.[51]

In spite of the growth of stock trading volume, commission revenues in the brokerage industry have declined as a proportion of total revenue.[52] Institutional and retail trading volume both have fallen below record peaks in 1987.[53] The combined effect of this trend (and the rapid growth of other businesses), is that commissions from equities transactions have declined from over 60 percent of all revenues in 1965 to under 17 percent in the first half

[47] The U.S. public equity markets have a capitalization of about $2.5 trillion. Conservatively estimating that one-half of this is owned by 47 million individuals ($1.25 trillion), then the *average* stock portfolio is $27,000. Yet, 45 percent of stock portfolios are $5,000 or less. Assume that these $5,000 accounts collectively amount to between $59 billion and $106 billion of stock owned by individuals. Stock owners with portfolios of $5,000 to $25,000 account for an additional $247 to $411 billion of individual stock ownership. Therefore, the remaining 10 million (one-fifth of 47 million) investors has between $733 billion and $944 billion of the $1,250 billion of equity owned by individuals, or an average portfolio of $78,000 to $94,000.

[48] About 70 percent of pension plan sponsors responding to a survey reported that their commission costs were between 4 and 7 cents per share. "The Drive To Cut Transaction Costs," *Institutional Investor, May* 1989, pp. 125-126.

[49] Ibid. Transaction costs consist of commissions, market impact, portfolio turnover, futures trading costs, and soft-dollar usage.

[50] Soft dollars is a means of paying brokerage firms for their services through commission revenue, rather than through direct payments, or hard dollar fees. For example, a mutual fund may offer to pay for the research of a brokerage firm by executing trades generated by that research through the brokerage firm. The brokerage firm may agree to this arrangement if the fund manager promises to spend at least $100,000 in commissions with the broker that year.

[51] "Institutional Investor," op. cit., footnote 48.

[52] Brokers' large transactions—more than 50 percent were from using risk and index arbitrage—receive few commissions per share relative to smaller transactions.

[53] Trading averaged 189 million shares per day in 1987, a record year for the New York Stock Exchange, and 165 million shares in 1989. *NYSE 1990 Fact Book,* p. 80. Trading averaged 156 million shares per day by mid-June 1990, according to the NYSE.

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Table 2-4-individual Equity Investment

Year	Number of equity owners	Percentage of population	Owned mutual funds only	Percentage of equity owners
1956	8,630,000	5.20	935,000	10.83
1962	17,010,000	9.20	2,165,000	12.73
1970	30,850,000	15.10	3,977,000	12.89
1980	30,200,000	13.50	2,231,000	7.39
1985	47,040,000	20.10	6,219,000	13.22

SOURCE: New York Stock Exchange Shareholder Surveys.

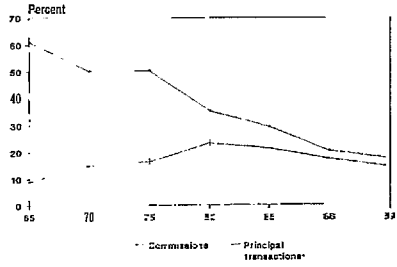
of 1989.[54](See figure 2-2.) The trend also has affected large, full, service brokers. At Merrill Lynch, for example, commissions were about 53 percent of total revenues in 1972, while by 1988 they had fallen to 15 percent.[55]The securities industry also has undergone considerable concentration. In 1973 the top 10 industry firms accounted for 33 percent of the industry's share of capital. By September 1989 their share had increased to 61 percent.

Even though cyclical trends, e.g., large-scale swings of employment and profits, are not uncommon in the industry,[56] capital increased fivefold from 1980 to midyear 1989 from $7 billion to $39 billion.[57]Another key long-term trend is diversification through financing principal transactions, many of which have become large revenue earners. (See figure 2-3.) These include proprietary trading, merchant banking, bridge loans, sole-managed underwriting, and participation in ownership of commercial enterprises. These are areas in which the industry is risking its own capital, in contrast with its historical tendency to provide services for clients' fees. Risk-based revenues in the securities industry accounted for 64 percent of all revenue in 1989 v. 42 percent in 1980.[58]

A Tiered Client Structure

Some brokerage firms have begun to treat all but their largest institutional clients like "retail" customers. One firm found that 150 of its clients were contributing 90 percent of its revenue, while the remaining approximately 700 institutions contributed about 10 percent. Only the 150 largest institutional clients now get lower commissions, access to the firm's research, and direct access to its analysts. Another firm has similar plans; these disadvantage clients whose accounts generate less than $60,000 in commissions per year.[59] Medium-sized institutions and large retail clients, however, still receive better service than do small retail clients. If this trend

Figure 2-2-Share of Domestic Broker-Dealer Revenues



*Principal transactions are revenues from trading and investments.

SOURCE: Securities Industry Association, Trends, *An Analysis of Emerging Trends in the Securities Industry, vol.* XV, No. 4, May 30, 1989, p. 9, updated by SIA, July 1990.

[54]Securities Industry Association, *Trends*, Dec. 29, 1989, vol. XV, No. 7, pp. 7-8.

[55]Data from Merrill Lynch's 1972 and 1988 annual reports.

[56]For example, at least 35,000 jobs in the industry have been cut in the 2 years following the October 1987 stock market crash, although total employment grew by 62 percent from the end of 1980 to the third-quarter of 1989. Securities Industry Association, *Trends*, vol. XV, No. 7, Dec. 29, 1989, p. 3. At least another 10,000 jobs maybe cut in New York during 1990 alone. "Wall Street's Mediocre Managers Again Lurch From Binge to Bust," *Wall Street Journal*, Feb. 1, 1990, p. C1.

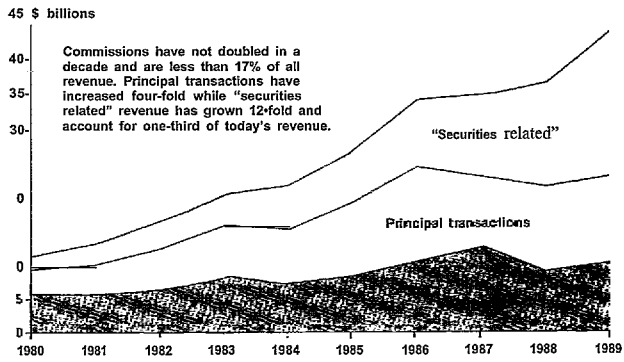
[57]See SIA, *Trends*, op. cit., footnote 56, p. 3.

[58]SIA, *Trends*, Oct. 20, 1989, p. 1.

[59]"PaineWebber Puts Squeeze on Clients That Don't Trade, ' *Wall Street Journal*, Jan. 11, 1990, p. C 1. Shearson, Lehman, Hutton, for example, offers "preferred client" status to customers based on assets in their accounts of at least $200,000 and account activity which generates $1,000 in annual commissions. Shearson, Lehman, Hutton, *The FMA Journal*, Apr. 2, 1990.

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Figure 2-3-Securities industry Main Revenue Sources



SOURCE: Securities Industry Association, *Trends, Oct. 20, 1989, p. 3.*

becomes industry-wide, it will create a three-tiered brokerage system, with institutional investors, medium institutional and large retail customers, and small retail customers each paying different rates and receiving different services by full-service brokers. The emergence of the discount brokerage industry represents still another level of treatment. This could mean higher costs and fewer services for small investors from major brokerage firms.

Stockbrokers in the past were generally paid commissions based on sales volume. They were motivated to encourage clients to buy and sell securities and, later, an expanding array of other products. Coremissions are higher for sales of a fro's proprietary products. Stockbrokers typically had some measure of independence. For example, they might or might not recommend to clients the same stocks or other products that their employers recommended. The key factor that distinguished stockbrokers from most other sales workers was their personal relationship to clients. If a stockbroker became a trusted adviser to clients, those clients often could be lured away when the stockbroker changed employers. These relationships made possible frequent job changes to other brokerage firms. One of the effects of the introduction of brokerage fins' proprietary products-mutual funds, real estate limited partnerships, and cash management accounts-was to strengthen the relationship between the client and firm, while weakening the stockbroker-client relationship.[60]

By the mid- 1980s, computer terminals and workstations had become commonplace for most brokers. They are valuable for keeping track of customer accounts and providing rapid access to securities prices and other market news. Computerization also made it easier for employers to audit stockbrokers' performance and productivity.[61] New software made it possible for brokerage firms to standardize certain customer services. Many firms broadened the scope of their brokerage business to add personalized financial consulting, relating their clients' broader financial interests to financial securities, real estate, annuities, college and retirement planning, mutual funds, and life insurance investments, some of which were proprietary. Some of these products are particularly profitable for the firm, because they generate underwriting fees and commissions in addition to

[60]Garson, Barbara, "TheElectronic Sweatshop" (New York, NY: Simon& Schuster, 1988), Ch. 5, *The Wall Street Broker: Decline of a Salesman, p. 128.*

[61]Ibid.

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annual management fees.[62] There is a conflict of interest between selling those products that generate the highest commissions and helping clients find the investments best suited to their needs.

The terms 'registered representative' and 'stockbroker" were replaced by "Account Executive," which, in turn, was largely replaced with 'Financial Consultant" (FC). FCs increasingly are being encouraged to use their employer's specialized software packages to enter data on clients and to analyze clients' needs for products offered by the brokerage firm. This leads to standardized recommendations to clients and a closer relationship between the firm and the client; proprietary products may be difficult to transfer to another brokerage firm. There is also a trend toward replacing FCs with lower paid employees, sometimes salaried, who are less well-trained and even less independent than brokers.[63]

Many midsize investors who need professional help in managing their assets are unwilling to be dependent solely on FCs. They may manage substantial amounts of funds (typically between $100,000 and $10 million, representing perhaps a family's assets or a small business' pension fund)-yet the amount may not be sufficiently large to qualify for the management services of a large investment house that manages only bigger portfolios. Brokerage firms began to bring these clients together with outside portfolio managers, who make investment decisions for the client for a fee.[64] The brokerage firm executes transactions, arranges depository services and keeps records of transactions, and provides independent reports on the performance of the manager. For this the brokerage firm receives a separate fee. This has become one of the fastest growing parts of the investment business. Competitive commission rates have facilitated the unbundling of investment advice and brokerage.

For large investors, the long-term collective effects of these changes in the brokerage industry are probably positive. They may be less so for midsized investors. The small investor benefits from the larger range of products available, the greater competitiveness of the industry, and the availability of discount brokers.[65] In other ways, however, the small investor may become worse off because some brokerage houses may not give their interests high priority due to the difficulty of profiting from small transactions. Moreover, the competitive economic forces unleashed by the unfixing of commission rates and the unbundling of services mean that services for small investors may be becoming less subsidized by large investors.

Some FCs say[66] that their office managers no longer inquire about how well they are serving the fro's clients, but instead use computer printouts to monitor the commission revenues each FC has generated on a daily basis.

These trends indicate an ongoing restructuring in the brokerage industry with greater concentration, realignment of business focus away from retail sales, continued pressure on floor brokers for lower commissions, and different treatment of investors according to the commissions generated. For small investors the question arises: where may they get good advice and how much will it cost?

---

[62]Some products, such as some closed-end funds of stocks or bonds, are sometimes offered to clients at "no commission%" which is misl the brokerage firm is one of the lead underwriters, the broker may receive between 4 and 5 percent of the amount of these sales.

[63]Garson, op. cit., footnote 60, pp. 145-154.

[64]The annual fee either is a freed ("wrap' fee) or variable percentage of the total value of the client's portfolio, e.g., 2 percent of the frost $3 1.8 percent of the next $20,000, and 1.5 percent of the amount exceeding $50,000. Fees vary among portfolio managers.

[65]The discount brokerage industry also has been undergoing concentration. Some estimates are that the number of independent discounter by as much as 25 percent since 1983 to about 100 by early 1990, and is still shrinking as the industry remains competitive. One comparison of commissions notes that full-service brokers' commissions may be about two to three times or more as much as those of the big three disc even greater than deep-discount brokerages. One discount broker recently announced a three-tier commission structure for traders ranging fr per share to 5 cents per share, depending on their trading volume. "Fewer Firms Are Chasing Small Investors," *The New York Times,* June 17, 1990, sec. 3, p. 10.

[66]OTA interviews,

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Chapter 3

The Operation of Stock Markets

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Chapter 3

The Operation of Stock Markets

A securities market is at core a communication system and a trading mechanism. Its functions are: 1) to communicate orders for securities and the prices bid or offered for them ("quotes"), and 2) to match those orders and transform them into trades. Because of this, communication and computer technology ("information technology") not only can, but inevitably will, change the nature and operations of securities markets. Their performance and efficiency must be evaluated in the light of what could be achieved with advanced information technology.[1]

The stock market crash in 1987 highlighted three problems that could cause future disasters—excessive short-term volatility, technological risk, and strains on the abilities of market-makers to perform their functions under stress. Neither the markets nor their regulators have completely solved those problems in the intervening 3 years.

Stocks are traded in two different kinds of markets-exchanges and over-the-counter (OTC) markets. These markets differ in several important respects. In exchange markets, member firms act for themselves and as agents (brokers) for customers, bringing their orders to a central facility-a "floor"-to be executed. These member firms are large securities companies such as Merrill Lynch or Goldman Sachs. Orders can be executed in two ways: against other orders—i.e., a bid to buy matching an offer to sell; or if there is no such order at an acceptable price, by a sale to or purchase from the "specialist"—a member designated by the exchange to be the sole market-maker for that stock.[2]

The largest U.S. exchange, by far, is the New York Stock Exchange (NYSE). Approximately 1,740 companies' stocks are listed on the NYSE. The smaller American Stock Exchange (AMEX) lists approximately 860 stocks. In general, the stocks of the larger and better-known corporations are traded on the NYSE, which has more stringent listing requirements. The NYSE-listed stocks account for almost 95 percent of the trading volume in all exchange-listed stocks.

There are also five regional exchanges-the Midwest, Pacific, Philadelphia, Boston, and Cincinnati Stock Exchanges-that serve as alternative markets for stocks listed on the NYSE and the AMEX (and a few stocks listed solely on the regional exchanges).[3] Exchange-listed stocks are also traded over the counter. This is the so-called "third market," which accounts for about 3.2 percent of the volume in NYSE-listed stock.

Many stocks do not trade on stock exchanges. They are traded only in the OTC market, operated by the National Association of Securities Dealers (NASD) as a self-regulatory organization. In this market securities firms can act as brokers (agents) or dealers (principals) with respect to any stock.[4] A firm receiving a customer's order to buy stock can either sell the stock to the customer from the firm's own inventory (if it is a dealer in that stock) or act as broker in purchasing the stock from another dealer. In this market, nearly every transaction involves a dealer as one party, whereas in exchanges, customer buy and sell orders can be matched. OTC orders are not routed to a central physical facility but handled by dealers working over the telephone or through a computerized small order execution system. About 4,900 actively traded OTC stocks are listed, and bids and offers for them are displayed, on NASD's

[1]Some of the material in this Chapter draws on an OTA contractor report, Joel Seligman, "Stock Options, and Stock-Index Futures Trading," University of Michigan Law School, August 1989. For further background on the issues discussed in this chapter, see Joel Seligman, "The Future of the National Market System," 10 *Journal of Corporate Law* 79, 1984; Macy and Haddock, "Shirking at the SEC: The Failure of the National Market System," 1985 *University of Illinois Law Review 315;* and Norman Poser, Restructuring the Stock Markets: A Critical Look at the SEC's National Market System," 56 New *York University Law Review 883 (1981). See also* U.S. Congress, *Progress Toward Developing a National M* Report of the Subcommittees on Oversight and Investigations and Consumer Protection, Committee on Interstate and Foreign Commerce, U.S. House of Representatives, No. 96-89, Sept. 24, 1979. Contributions to this chapter were also made by contractors Professor David Ratner, Georgetown University School of Law, and Junius Peake, Peake/Ryerson Consulting Group, Inc.

[2]NYSE rules technically allow for competing specialists, but there have been none since 1967, and exchange procedures (including those procedures for disciplining specialists by reallocating stock assignments) are framed around the assumption that there will be only one specialist per stock.

[3]Share volume in NYSE-listed stocks in 1989 was: Midwest, 5.6 percent; Pacific, 3.1 percent; Philadelphia, 1.8 percent; Boston, 1.6 percent, Cincinnati, 0.5 percent.

[4]New York Stock Exchange member firms are, however, forbidden by NYSE rules to do so (Rule 390, discussed later).

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Automated Quotation system, NASDAQ. Corporate bonds, municipal bonds, American Depository Receipts, and U.S. Treasury bonds and notes are also traded in the OTC market. Figure 3-1 and box 3-A illustrate the mechanics of a stock trade.

OPERATION OF THE EXCHANGE MARKETS

A key function of securities markets is to facilitate capital formation by providing liquidity, i.e., to enable investors to buy and sell securities when they wish to do so. Many (not all) securities markets use intermediaries or professional market-makers to increase liquidity by helping would-be traders find each other or by themselves trading. Stock exchanges in the United States have a specialist, or designated market-maker, for each listed stock.[5]

U.S. stock exchanges are continuous auction markets. Members of the exchange bring their own or customers' orders to the exchange floor and, in face-to-face negotiations, offer to sell a specified number of shares at a specific price ("an offer") or to buy a specified number of shares at a designated price ("a bid").

The customers served by exchange members are increasingly institutional investors (e.g., pension funds, mutual funds, insurance finds). Over 55 percent of NYSE trading is for these institutions; another 26 percent is for securities firms' proprietary accounts, including those of specialists. Only 18 percent of trades are for individual investors.[6]

Stock exchange specialists act as both brokers and dealers. As brokers, specialists buy and sell for the public, by executing limit orders that are brought to them on behalf of customers by floor brokers; they also execute market orders that reach them through the automated order routing system, SuperDOT.[7] (A limit order specifies the price at which an investor is willing to buy or sell. Limit orders are put in the specialist's 'book' until they can be executed at the designated price or a better price.[8] A market order is an order to buy or sell immediately, at the prevailing price.) Specialists are prohibited by law from handling customer orders other than limit orders.[9] The specialist's book was once a looseleaf notebook but now it is, for most NYSE stocks, a computer screen. The specialist is not, with some exceptions, required to show this screen to other traders, exchange members, or the public, although he must disclose aggregate price information.[10]

As dealers, specialists buy and sell for their own account. They have an "affirmative obligation" to do so when it is necessary to provide liquidity. Specialists provide liquidity by buying or selling when there are no other bidders or offerers at or near the market price. The specialist tries to keep prices from making big jumps, by making a bid or offer that acts as a bridge when there is a wide gap between bids and offers. The specialist also has a' 'negative obligation,' not to trade for his own account when there are already customers wanting to trade at or near the market price.[11]

Specialists participate in a substantial proportion of NYSE trades. NYSE figures in 1990 show that specialists' purchases and sales as dealers account for 19 percent of all sales and 9 percent of all transactions (purchases and sales) on the exchange. One study in 1985 concluded that specialists might

[5]The exception is the Cincinnati Stock Exchange, which is completely computerized and uses "designated dealers." In other U.S. exchanges, the specialist is part of a specialist firm, or unit, that is a member of the exchange. Historically, specialist firms tended to be small, well-capitalized firms, distinct from the large broker-dealer firms that are better known to the general public; more recently, a few of the specialist firms are owned by brokerage houses such as Merrill Lynch. At the end of 1989, the NYSE had 52 specialist firms with 434 individual specialists making markets in 1,712 common stocks. [Source: NYSE, February 1990]

[6]Securities Industry Association, *Trends*, Mar. 16, 1989.

[7]Also as brokers, specialists "stop" market orders when they see that the order may be executed at a better price later (e.g., when a block trade is being negotiated). The specialist guarantees that the order will receive at least the price available at the time the order was stopped.

[8]A special kind of limit Order is a stop order, with which a customer specifies that the order should be executed when the stock price drops to a certain price level, or rises to a certain price level.

[9]Securities Exchange Act, sec. 11 (b), 1934.

[10]The NYSE is filing with the SEC a proposal for "A Look at the Book" Pilot Program, whereby limit orders for 50 stocks will be made available to the public through vendors. Information provided by the NYSE, July 16, 1990.

[11]Besides acting as brokers and dealers, specialists have a third function, which is to begin each trading session by overseeing or orchestrating the determination of the opining price.

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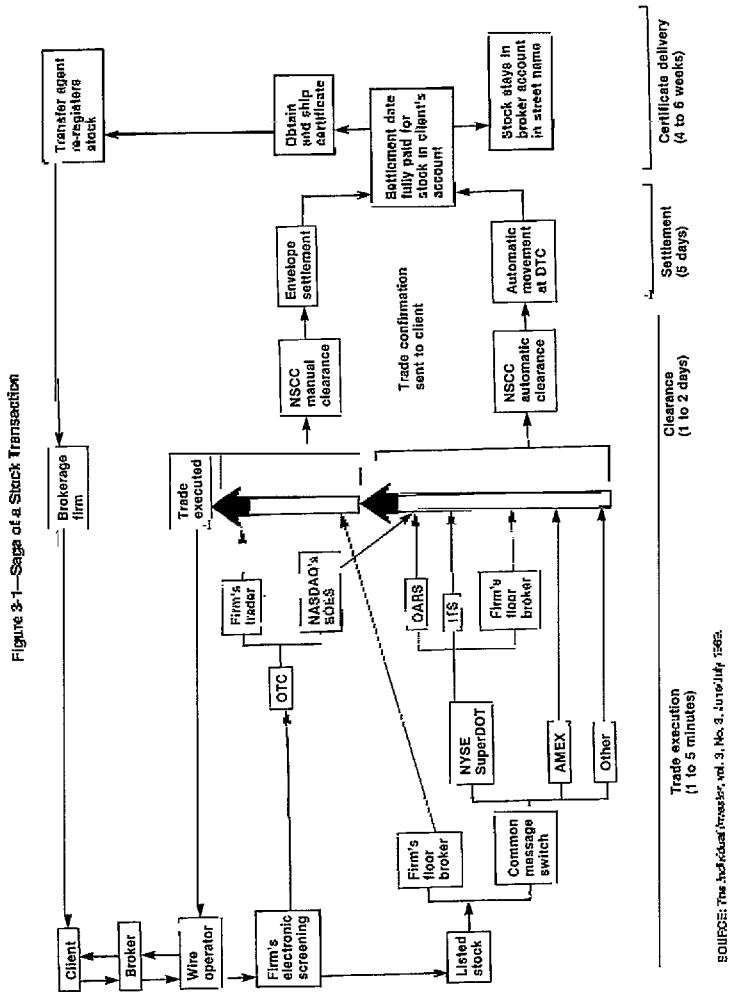


Figure 3-1—Saga of a Stock Transaction

SOURCE: The NASDAQ Investor, vol. 3, No. 3, July/July 1982.

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Box 3-A—The Mechanics of a Stock Transaction

What happens when you visit or call a stock broker to buy or sell stock? The following description traces the chain of events that results in a transaction by a small investor.

A. When you decide to buy or sell stock an Account Executive writes an order ticket, filling in the details-whether to buy or sell, the name of the security, how many shares, whether the order is to be executed at the market price or is a limit order (an order to buy or sell when the price reaches a specified level). The market order is passed to a teletype operator who keyboards the information and sends it immediately to an electronic system linking the broker to the various exchanges and over-the-counter dealers.

B. If the order involves an exchange-listed stock and there are no special instructions routing it to another market center, the order will enter the Common Message Switch, an electronic pathway linking brokerage firms and trading floors. This is the beginning of a journey that could carry the order to several alternative destinations.

C. Most orders in NYSE-listed stocks are routed to the NYSE's SuperDOT 250 system, where orders of fewer than 2,000 shares are executed. These orders can go either to the specialist's post on the floor of the exchange, or to the brokerage firm's floor booth (although with a small order, that is unlikely).

What happens next depends on the timing. On a typical day, between 15 and 20 percent of all orders are executed at the market opening. Through SuperDOT, *market orders* to buy or sell, routed to the specialist post prior to the market opening, are automatically paired with opposing orders. The specialist, after matching buy and sell market orders and checking outstanding *limit orders* and larger opening orders, sets an opening price for the stock. The specialist then executes all paired orders at one price and sends confirmation notices to originating brokers within seconds of the market opening, through the Opening Automated Reporting System (OARS).

Orders that arrive at the specialist's post through SuperDOT after the opening can be filled in several ways. Orders of up to 2,099 shares are usually filled at the best quoted price or better in the Intermarket Trading System (ITS). This system connects NYSE, AMEX, five regional exchanges, and NASD'S Computer Assisted Execution System (CAES). ITS quotes are displayed at the NYSE specialist's post for all floor traders to see. An order sent to ITS will be filled within 1 or 2 minutes at the best price among any of these markets.

For larger orders, or when a wide spread exists between bid and asked prices, the specialist will execute a SuperDOT order in the traditional way (see D). He can also execute the trades from limit orders in his "book." The specialist is obligated to get the best price available at that moment for the client.

D. Some orders are not handled electronically but rather by the broker firm's floor broker. Wire orders reach floor brokers when they are too large for SuperDOT (see C above) or are larger than the broker's chosen parameters for direct routing through SuperDOT

At the broker's floor booth, these orders are translated into floor tickets containing the essential buy/sell information necessary to make the trade. Floor clerks pass the details to floor brokers by hard copy (or through hand signals at the AMEX). The floor broker then presents the order at the specialist's post. There the stock is traded with another brokerage firm, or with the specialist, who may be acting as agent for a client on his books, or who may be acting for his own account. Or the floor broker may execute the trade on another exchange, if there is a better price posted on the ITS screen over the specialist's post. The above applies to exchange-traded stock.

E. If the stock is traded over the counter, and the quantity is more than 1,000 shares, the wire order goes to one of the broker's OTC traders at its main office. There, a computer on the OTC trader's desk displays the identities of all market-makers for that stock and their current bids and asked prices. The trader telephones the market-maker with the best price, and executes the trade.

If the brokerage firm itself makes a market in that stock and the broker's OTC trader is willing to match the best price shown on NASDAQ, the trader can buy or sell it as principal. In either case, at the press of a button on the trader's keyboard, the trade is executed and a confirmation notice is sent to the originating office.

If the OTC order is for 1,000 shares or less, and the stock is listed on NASD'S "National Market System," it will be automatically routed via NASDAQ'S Small Order Executive System (SOES) to the market-maker with the best price at the time of order. (If the stock is not on the National Market System, it must be for 500 shares

[1] Adapted from "The Saga of a Stock Transaction," *The Individual Investor* vol. 3, No. 3, June-July 1988 (American Association of Individual Investors).

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maximum to go through this system.) Trades executed through SOES take less than 90 seconds from order wire to confirmation.

F. What happens next is "after the trade" activities, and the process depends on whether the trade was executed manually or electronically. Generally, the trade confirmation is sent back to the broker through the same pathway by which the order arrived, and the broker calls the customer to confirm the transaction.

Executed trades are also reported immediately to the brokerage firm's purchase and sales department and to the exchange, so that the transaction will go on the Consolidated Ticker Tape. Once on the tape it is visible to the investor community, and to the exchange's and regulatory agency's surveillance analysts.

G. On or before the day following a trade, the brokerage firm sends its customer a written confirmation showing the details of the transaction. The customer has five business days from the trade date to pay for purchases delivery (i.e., to settle). About 95 percent of trades are settled through the National Securities Clearing Corp.

The Depository Trust Company (DTC) stores stock and other certificates and maintains records of ownership for brokerage firms and banks. Under normal circumstances, your stock certificate will be registered in DTC'S nominee name-' 'held in street name'—for you as the beneficial" or real owner. Or you may choose to request physical delivery of the stock to you.

For customers who want physical possession of their stock certificates, these shares are registered in the customer's name by the transfer agent of the issuer. Errors and delays can occur in the paperwork trail from brokerage firm *to NSCC, NSCC* to DTC, DTC to transfer agent, transfer agent back toDTC, DTC to brokerage firm, brokerage firm to customer. For this reason (and other good reasons) there is considerable interest in eliminating paper certificates ("dematerialization' and replacing these with electronic records, as some countries have already done.

be involved, either as dealers or brokers, in more than 70 percent of all NYSE trades at that time.[12]

THE OTC MARKET AND NASDAQ[13]

Until 1939, the OTC market was largely unorganized and unregulated. In that year the Maloney Act Amendments to the Securities Exchange Act allowed the creation of the National Association of Securities Dealers as a self-regulating organization with responsibilities in the OTC market like those of securities exchanges.

Stocks traded in the OTC market are divided into two tiers—the 4,900 NASDAQ stocks, and 40,000 others. NASDAQ includes the more active stocks; for these, the bids and offers of all registered market-makers (dealers) are shown and continuously updated on the automated quotation system, so that the broker or customer can identify the dealer offering the best quote. A NASDAQ market dealer can become a market-maker in a security merely by notifying NASDAQ operations of intent. There were an average of 10.6 market-makers per security in the NASDAQ market at the end of 1989.[14]

For 40,000 less active stocks, until mid-1990 dealers could advertise their prices only by printed quotations (the "Pink Sheets"). On June 1, NASD opened an electronic "Bulletin Board," on which dealers may post and update quotes for these stocks.

[12]Hans *R. Stoll, The Stock Exchange Specialist System: An Economic Analysis. New York* University, Salomon Brothers Center for the Study of Financial Institutions: Monograph Series in Finance and Economics, Monograph 1985-2, p. 15. This was based on analysis of SEC data indicating that limit orders left with the specialist are involved in approximately 24 percent of all purchases and sales. Since the specialist would not be on both sides of a singletransaction, this would mean that limit orders were behind 48 percent of total trades (24 percent of purchases added to 24 percent of sales). These figures will be somewhat different*from year* to year.

[13]Market data in this section supplied by NASD.

[14]National Association of Securities Dealers, Inc., 1989 *Annual Report.*

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The Bulletin Board can be accessed by 2,700 terminals in the trading rooms of member firms.[15]

Until 1971, all OTC stock quotations were reported only in daily Pink Sheets, which listed bid and ask prices of each dealer for each stock for the previous trading day. To getup-to-the-minute quotations and meet commonly accepted "best execution" standards, a stockbroker had to telephone at least three dealers and compare their quotes. The time and effort involved in contending with busy signals and wrong numbers made this an ideal situation for using computer and telecommunications technology.[16] Since the introduction of the NASDAQ system in 1971, the volume of trading in NASDAQ securities has grown rapidly. In 1976 NASDAQ share volume was 31 percent of NYSE share volume. In 1989 it was 76 percent of NYSE share volume.[17] Now the NASDAQ market is the second largest stock market in the country. In the frost half of 1989 daily volume was more than 134 million shares, up from 123 million at the end of 1988.[18] Increasingly the NASDAQ market is used by institutional investors as well as small investors, and block trades now account for 43 percent of total volume. This growth is largely due to technology; as computer systems supplement telephones, dealers can handle larger volumes and provide immediate automated execution for many trades, and customers can receive more competitive prices.

The NASDAQ-listed stocks are further divided. National Market System or "NMS" stocks are the most widely held and actively traded stocks, for which transactions are reported as they occur. Of the 4,500 stocks in the NASDAQ system, approximately 2,800 are NMS securities.

NASD is basically a telephone market supported by a computer screen quotation-display system (and the automatic execution system for small orders). Quotations are collected and disseminated by leased telephone lines from the NASDAQ Central Processing Complex to dealers' desktop terminals. For NMS securities, OTC dealers must provide last sale data within 90 seconds of a trade. For the second-tier stocks dealers need report only the aggregate trading volume at the end of the day.

NASDAQ quotations are indicative rather than firm for lots over 100 shares, except for orders eligible for small order automated execution, for which prices must be firm up to 1,000 shares.[19] In other words, NASDAQ market-makers do not disclose how many shares of stock (over 100 shares) that they are willing to buy or sell at their quotation prices.[20] The OTC dealers continue to display the minimum size (100 shares) required by NASDAQ rules. The price for transactions over that size must be negotiated.

Market-makers are required by now-mandatory SOES participation in the Small Order Execution System (SOES) to execute public small orders up to 1,000 shares in NMS stocks (the number varies by stocks) at market prices, and to maintain minimum SOES exposure limits up to five times that amount. However, SOES trades are less than 2 percent of NASDAQ volume.[21] The Securities Exchange Commission (SEC) has repeatedly encouraged NASD to change its NASDAQ requirements. An NASD proposal, submitted to the SEC on March 20, 1989 and not yet acted on at mid-1990, would require a NASDAQ market-maker's size display to be at least

[15] In the first week of operation, over 100 OTC dealers advertised prices for about 3,000 domestic and foreign securities. NASD says that 7,235 market-making positions were displayed. The Bulletin Board differs from the NASDAQ quotation system in several ways: 1) there are no listing standards; 2) dealer quotations need not befirm quotations, and can even be unpriced indications of interest; 3) the Bulletin Board does not transmit data to press wire services or to information services vendors, as does NASDAQ; 4) it has no equivalent of the NASDAQ's Small Order Execution System.

[16] For history of OTC trading, see Joel Seligman, 1982, op. cit., footnote 1; and Simon and Colby, "TheNational Market System forOver-the-Counter Stocks," 55 *George Washington Law Review 17, 19-34, 1986.*

[17] About 27 percent by dollar volume, because the average price of OTC stock is much lower than the average price of NYSE stock.

[18] Source: NASD, February 1990.

[19] Professional-proprietary (dealer) orders, and customer orders over 1,000 shares, are not eligible for SOES.

[20] NASD points out that in NASDAQ stocks, where dealers are exposed on an identified basis to both automated execution and other real-time quotation-execution processes, the display of size has impacts on dealers that do not exist in othermarkets. InNASDAQ each dealer quotation is displayed and the identity of each market-maker firm is disclosed. Actual execution size is as large, above the displayed minimum, as the quantity all competing dealers are willing to take into inventory at a particular time and price. Size in individual dealer quotations contains inventory-related information and it requires additional resources to update on a continuous basis. In simpler terms, if a dealer is offering the lowest offer, a competing dealer could "pick him off," i.e., buyall of his stock and then resell it at the second dealer's own (higher) price.

[21] A number of proprietary automated systems at dealer firms' also execute such small order trades.

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the SOES required order size in the stock (i.e., up to 1,000 shares).

THE NATIONAL MARKET SYSTEM

In the early 1970s and again in the late 1980s, the operation of American stock markets aroused congressional and regulatory concern. In 1969 to 1970, a series of operational and financial crises caused the collapse of a number of securities firms, and thereby provoked studies of the securities industry and markets by both Houses of Congress and by the SEC. These studies ultimately led to the passage of the Securities Acts Amendments of 1975, which included the most far-reaching revisions of the Securities Exchange Act of 1934 in more than 40 years.

A more recent wave of congressional and regulatory concern followed the October 1987 market crash. A number of reform proposals were made by special commissions, regulatory agencies, and Senators and Representatives. More were proposed after disclosure in 1988 and 1989 of a string of stock market abuses and frauds, and a near crash in October 1989. A few of these reform proposals were implemented by self-regulatory organizations, some are still before Congress or regulatory agencies, and some have been dropped for the time being.

The 1975 Amendments directed the SEC to "facilitate the establishment of a national market system for securities" and to order the elimination of "any . . . rule imposing a burden on competition which does not appear to the Commission to be necessary or appropriate in furtherance of the purposes" of the Act.[23] The basic objective of the 1975 Amendments was the development of a more efficient, fair, and competitive national market system that could provide:

- economically efficient execution of transactions;
- fair competition among brokers, dealers, exchange markets, and other markets;
- availability to brokers, dealers, and investors of information about quotations and sales;
- practicability of brokers executing customers' orders in "the best market, " and
- "an opportunity, consistent with [other] provisions. . . for investors' orders to be executed without the participation of a dealer. "

Congress said that these objectives were to be achieved through "the linking of all markets for qualified securities through communication and data processing facilities. . ..," but it did not specify the exact nature of these systems and facilities.

There is disagreement over whether the objectives of the Amendments, as subsumed in the phrase "a national market system,' have been fully achieved. The nature of the basic objective seemed to call for some necessary steps:

- a consolidated quotation and price dissemination system, so that market-makers could compete with each other to make better bids and offers;
- electronic order routing and execution systems, to speed up transactions, reduce transaction costs, and assure customers that their bids and offers are taken in order by price and time of arrival;
- a way of efficiently directing orders to the market or market-maker with the best quotation at that moment; and
- a national clearing and settlement system, making effective use of information technology.

The SEC's efforts to develop a markets-wide communication system predated the 1975 Amendents. Until 1972, NYSE and AMEX ticker tapes and electronic displays gave a continuous report of transactions on those two exchanges. They did not report transactions in the same securities on regional exchanges or in the OTC market. Under SEC prodding, a consolidated *last-sale* reporting system was established in 1972 by the Securities Industry Automation Corp. (SIAC). SIAC is the central trade price processor and reporter for exchange-listed securities for the NYSE, AMEX, the five regional exchanges, and the NASD.

But a consolidated quotation system that would allow brokers to check all markets for the best price to execute a customer order was still not available for exchange-listed stocks at the time of the 1975 Amendments. In 1978, the SEC proposed requiring

[23] Securities Exchange Act, sec. 11A(a)(1). The Amendments also extended the Act to cover clearing agencies and information processors, and increased the SEC's oversight powers over the Self-Regulatory Organizations (SROs) in the securities industry.

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a universal message switch, a broker-to-market link through which a customer's order would automatically be routed by a broker to the market or dealer showing the best quote. The exchanges objected, and the next year the SEC shelved its proposal.[23] It approved, instead, the development of a market-to-market link-the Intermarket Trading System or ITS-as proposed by the exchanges. The ITS enables specialists and floor brokers on one exchange-not customers or non-member retail brokers—to transmit orders to market-makers on another exchange floor or operating over-the-counter, who have posted a better price on the consolidated quotation system. The market-maker receiving the order must respond within 1 or 2 minutes or the order expires.

The ITS does not require that an order be routed to the market with the best quote. The order can be executed in the market in which it is received, provided the specialist or a floor broker matches the best quote available elsewhere. The regional markets, most of the time, match NYSE quotes; i.e., their prices are derivative of those on the NYSE.

The Securities Acts Amendments of 1975 sought to increase competition by having the SEC review exchange rules "which limit or condition the ability of members to effect transactions in securities otherwise than on such exchanges. The SEC was to report its findings within 90 days and begin a proceeding "to amend any such rule imposing a burden on competition which does not appear to the Commission to be necessary or appropriate in furtherance of the purpose of this title."[24] A "fail-safe" provision authorized the SEC to limit trading in listed securities to exchanges, but only if it were necessary to protect investors and maintain an orderly market, and after public hearings.

The most significant restraint on market-making in exchange-listed securities is NYSE Rule 390 (originally Rule 394), which prohibits members from making markets off-exchange in listed stocks (i.e., they can act as dealer only as a specialist on an exchange). In a proceeding *to* determine whether it should eliminate Rule 390, the Commission found that the "off-board trading rules of exchanges impose burdens on competition" and that the SEC was "not now prepared to conclude that these burdens are necessary or appropriate for the protection of investors. " It proposed repeal of the rule. However, after 4 years of deliberation and hearings, the Commission announced in 1979 that it was withdrawing its proposal. It instead adopted an experimental rule, 19c-3, that allows NYSE members to make OTC markets in stocks first listed on an exchange after April 26, 1979.

A number of major stock exchange members then started making markets in newly listed exchange stocks, about 10 percent of the 100 most actively traded NYSE stocks, including the "Baby Bell" companies spun off in the split-up of AT&T. This market-making proved unattractive or unprofitable, either because of the small number of stocks or because of the competition, or for other unrevealed reasons. By 1983 member firms had largely withdrawn from that activity, although a few have since resumed marking markets.[25]

There are several arguments against abolishing Rule 390. Large member firms might internalize their trading by executing orders upstairs. This would, critics say, fragment the market for those securities, with none of the upstairs or off-exchange markets being liquid or deep enough to keep the spread narrow. However, it could also cause a screen-based market for those securities to develop, with competing market-makers providing good liquidity.

Critics also argue that abolishing Rule 390 could lead firms to execute customer transactions at less favorable prices than could be found on the exchange floor.[26] This is, however, also true for orders

[23] Sec. Ex. Act Rels. 14,416, 14 SEC Dock. 31, 1978; 14,805, 14 SEC Dock. 1228, 1978; 14,885, 15 SEC Dock. 1391978. See also: Norman Poser, "Restructuring the Stock Markets: A Critical Look at the SEC's National Market System," 56 *N.Y. University Law Review 883, 923, (1981);* Joel Seligman, "The Future of the National Market System," 10 *Journal of Corporate Law 79, 136-137, 1984.*

[24] Securities Exchange Act, sec. 11A(c)(4). These provisions were deleted from the Act in 1987, as "obsolete," on the ground that "these requirements were met several years ago. ' Senate Rep. No. 100-105 at pp. 20-21, 1987. The 90-day provision was obsolete but there is not complete agreement that the substantive intent of the requirement had been met.

[25] Merrill Lynch dropped out in April 1983, followed by Paine Webber and Goldman Sachs.

[26] "Trade-through" rules could forbid brokers from executing orders at a price less favorable than that offered on any exchange or NASDAQ; but when trades are made on the floor the price is sometimes better than the published quotation—i.e., the trade is made "between the quotes" as a result of floor negotiation. There have been several proposals of various kinds of order-exposure rules, which would require orders to be exposed for a length of time before transactions; this could add to transaction costs or to dealers' risks.

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sent automatically by many brokers to one exchange (usually the NYSE); they may miss better prices off the exchange. The SEC has been reluctant to force the NYSE to change the rule on the basis that market participants—the members of the exchange-are best able to determine the effects of this NYSE rule.

Competition from overseas markets makes it important that Rule 390 be reexamined. With global securities trading,[27] Rule 390 is becoming increasingly burdensome. Many trades by large investors in 89 of the 100 most actively traded exchange-listed stocks are done after NYSE closing in the London market. (As discussed later, the NYSE is planning limited actions to try to recapture these trades with electronic trading mechanisms. These are likely to be ineffective if large investors want to trade these stocks "around the clock. ' The SEC has been criticized for this hands-off attitude toward Rule 390. Congress may soon find it necessary to direct SEC to reconsider.

Another major barrier to competitive trading among markets has been the rule preventing exchange specialists from competing with OTC market-makers in trading unlisted stocks. The 1975 Amendments directed the SEC to grant unlisted trading privileges where "consistent with the maintenance of fair and orderly markets and the protection of investors.

For 10 years the SEC made only tentative moves to meet the intent of the 1975 amendments. In 1987, the SEC allowed exchanges, as a trial, to trade up to 25 NASDAQ securities. Only the Midwest Stock Exchange took advantage of this, and it captured only about 1 percent of the volume in those shares. On June 1, 1990, the SEC expanded this trial into a pilot program that will (in 9 months) allow up to 100 selected OTC stocks to be traded by the Midwest, Philadelphia, Boston, and American exchanges. Because it relies heavily on listing fees for revenue, the NYSE refused to participate. Companies might be reluctant to list with the NYSE if their stocks could be traded on the exchange without listing.

Some large corporations now traded only over the counter (e.g., Apple and Nike) may benefit by the added exposure, and investors may get better prices because of increased competition. However, these stocks already have competing market-makers on NASDAQ, and it is uncertain how much additional exposure the smaller exchanges will provide.

CHALLENGES TO THE SPECIALIST SYSTEM

Changes in Trading Patterns

The stock exchanges and the NASDAQ system were organized to deal with moderate-sized orders based on a "round lot" of 100 shares. With the growing importance of institutional investors, this system became strained.[28] Institutional trading grew rapidly in the 1960s and thereafter. Institutions increasingly traded in large blocks (10,000 shares or more), that require special techniques because large volumes are difficult to handle in the usual reamer. Between 1975 and 1988, the average size of an NYSE transaction increased from 495 shares to 2,303 shares. Comparable increases occurred in other markets. Brokers' commissions were deregulated in 1975. Small individual orders (less than 1,000 shares) became too expensive to handle in the traditional manner. Techniques had to be developed to funnel these orders to the market-maker in a more efficient reamer. Traditional techniques based on specialists became increasingly unsatisfactory for both small and large orders.

Small Orders

Faced with either losing money on small-order transactions, or charging high commissions and driving away the small investor, the exchanges and NASDAQ developed automated order routing and execution systems for orders over a specified size.

The NYSE'S Designated Order Turnabout System (DOT later called SuperDOT), began in 1976. In 1988 the order routing system handled 128,000 orders a day. Orders are sent to the specialist post, where they are announced to the floor brokers, executed, and reported back. SuperDOT reduces the costs and eliminates most of the errors in executing, transferring, or reporting trades.

The AMEX Post Execution Reporting is much like DOT, allowing members to electronically route

[27] See OTA Background Paper, *Trading Around the Clock: Securities Markets and Information Technology*, OTA-BP-CIT-66 (Washington, DC: U.S. Government Printing Office, July 1990).

[28] In early 1990, institutional investors accounted for 45.3 percent of NYSE trading. The annual average, however, has been 55 percent by share volume.

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orders up to 2,000 shares directly to the specialist. Routing may be done from the member's trading room or from the broker's desk on the floor, with an execution report generated automatically.

Four regional exchanges have developed small-customer-order-execution systems that operate as derivative pricing mechanisms, basing prices on NYSE quotes. (The fifth, The Cincinnati Exchange, is completely automated.) Brokers or trading rooms can electronically route an order to a specialist at a regional exchange. The specialist must accept the order at the best price available in the Consolidated Quotation System, or at abetter price. (The Philadelphia system does not allow the specialist to better the price.) If the specialist does nothing, at the end of 15 seconds these systems execute the order automatically on behalf of the specialist and report it back. These systems have helped the regional exchanges to increase their share of NYSE-listed volume.[29]

On NASDAQ'S small order execution system, SOES, orders of up to 1,000 shares are automatically executed at the best market price.[30] No telephone contact with a dealer is needed. At the end of 1988 only about 9.4 percent of NASDAQ transactions by value (1.4 percent by volume) were being handled through SOES. However, SOES is the standard for a number of proprietary automated execution systems in NASDAQ stocks. About 70 percent of NASDAQ trades are "SOES eligible" (i.e., within SOES size limits), so this allows the automatic execution of a large proportion of NASDAQ trades.

Block Trading

The big problem with trading large blocks is not cost, but liquidity. Big blocks usually have to be broken up, and their execution often sharply changes the prevailing market price. Neither the specialist system on the exchanges nor the NASDAQ system in the OTC market were designed to provide instant liquidity for very large transactions near current market price.

Block trades involve 10,000 or more shares, or have a market value of $200,000 or more.[31] Transactions of this size were rare 25 years ago. They increased rapidly because of the growth of large investment funds with large assets for investment and trading. Block trades made up only 3.1 percent of reported NYSE share volume in 1965, with an average of 9 block trades a day. In 1988, more than 54 percent of reported share volume on the NYSE involve block trades, with an average of 3,141 block trades per day. About 20 percent of these block trades involve over 250,000 shares. Block trades accounted for 43 percent of share volume on NASDAQ in NMS stocks in 1988, and on the AMEX they accounted for 42 percent.

Specialists were increasingly strained to fulfill their affirmative obligations to provide liquidity and smooth out price jumps when these large blocks came to the floor. The NYSE responded by developing procedures for ''upstairs' trading of blocks.

Under these procedures, an institutional investor goes to an exchange member (a large securities firm such as Goldman Sachs or Merrill Lynch) that has registered as a "block positioner."[32] The block positioner usually commits itself to execute the entire block at a specific price, itself taking all of the shares that it cannot sell to others. The positioners primarily work "upstairs" in their trading rooms rather than on the exchange floor. They are, in effect, making markets, although they have no affirmative obligation to do so as does the specialist.

A positioner who receives an order for the purchase or sale of a block is required by NYSE Rule 127 to "explore in depth the market on the floor," and must "unless professional judgment dictates otherwise, ask the specialist whether he is interested in participating in the transaction. Rule 127 also requires the specialist to "maintain the same depth and normal variations between sales as he would had he not learned of the block, " in other words, to act as though he has not been warned.

In advertising the block, the positioner may find additional interest on the same side as well as on the other side—i.e., in the case of a block to be sold, additional sellers as well as potential buyers—and may agree to handle these shares also. Once the positioner has put together as many buyers and

29CTS Activity Report, December 1989. NYSE Strategic Planning and Marketing Research.

30These limits vary according to the security-they may be 200 shares, 500 shares, or 1,000 shares.

31*New* York *Stock Exchange Guide* (CCH) Rule 127.10, sec. 2127.10

32In October 1989 three were 57 firms registered with NYSE as block positioners (source: NYSE) as compared to 66 in 1986, according to the Brady Report, VI-9.

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sellers as it can find, the positioner may buy for its own inventory any shares left over, or the specialist may do so when the block is taken to the floor.

When the order is carried to the floor, the negotiated price may be above the current offer or below the current bid. There are elaborate rules to make sure that customers with limit orders on the book at or near the current price will not be disadvantaged, as they could be if their orders were executed just before the price moved as a result of the block trade. Instead, their orders are supposed to be executed at the 'cross' price (i.e., the block trade price).

Because of strong competition among the block positioners, institutional customers pay very low broker commissions. Possibly for this reason, securities firms now appear increasingly unwilling to risk their capital in block positioning. The block positioners have no affirmative obligation to make markets. SEC officials assert that while these block procedures worked well in addressing the volatility encountered with block trading in the late 1960s, they do not handle progam trading well, and there is evidence that liquidity for the large blocks may now be decreasing.[33]

There is currently a tendency for large institutional trades to be executed on regional exchanges rather than the NYSE. According to the Midwest Stock Exchange, the reasons are to suppress advance information about the impending trade, and to make it less likely that "others will intervene before the institutional trader can play out a particular (positioning) strategy."[34]Brokers like to put together "crosses" (i.e., to match buyers and sellers) without going through the specialist or the floor crowd so that they can collect commissions on both sides. They may go to a regional exchange to avoid the NYSE limit order book, because in New York 'the block probably would have gotten broken up," or a specialist may "try to come in late on a deal that's already established.' "[35]

COMPETITION IN STOCK MARKETS

Assessing competition in the stock markets is difficult because of several structural features. First, stock markets involve many services, including execution of transactions, market-making, and information processing and dissemination. Competitors may provide one or more of these services, and a firm that provides one service may either provide or be a customer for another service. Second, the nature of trading requires that competing firms cooperate with one another by adopting standardized procedures that enable the market to function. Finally, the exchanges and the NASD are membership organizations whose goals and practices reflect the interests of their members. The membership of these organizations overlaps. A firm that is a member of all or most of these organizations may oppose practices in one organization that adversely affect the fro's operations in another.

The three areas of competition which have been most controversial since the 1975 amendments are: 1) competition among market-makers, 2) competition among market facilities, and 3) competition among customer orders.

Competition Among Market-Makers

The SEC has been strongly criticized for not moving toward a national market system by forcing the repeal of NYSE Rule 390. That would permit NYSE member firms to compete in OTC markets in listed stocks. This would in turn encourage the development of proprietary electronic trading systems that could become, in a sense, competing exchanges.

There are reasons to approach such radical change cautiously. There is experience with exchange (specialist) markets and with competing dealer (OTC) markets. There is no real experience with a market where traditional floor-based specialists

[33]"Kentham Says Stock Firms Are Balking at Putting Capital in Block Positions, " 21 Sec. *Reg.&L. Rep. (BNA) 547, 1989.*

[34]Midwest Stock Exchange brochure: *Institutional Traders and Regional Exchanges.*

[35]Ibid.

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compete with multiple dealers or automated execution systems.[36]

The closest approach to competition of this kind is the "third market" (non-members of exchanges dealing in listed stocks over-the-counter) and the "fourth market" (trading between investors on proprietary electronic trading systems). But these do not show how such a market might develop if the dominant large brokers of listed stocks become market-makers. Experience with Rule 19c-3 indicates that most firms will not make markets in a small number of stocks. If they were able to route orders in all stocks to themselves as market-makers (or even to a neutral electronic facility), market-making might be more attractive.

Some people predict that if Rule 390 were rescinded it would have a negligible impact on the market. Others argue that exchanges would be abandoned and all trading shifted to an OTC market modeled on NASDAQ or on the International Stock Exchange in London. There is disagreement about whether investors are best served by an exchange or an OTC market.

While NYSE members cannot compete on the exchange in market-making for NYSE-listed stocks, there is competition between the NYSE and other markets. Trading of NYSE-listed stocks on regional exchanges, NASDAQ, proprietary trading systems such as Instinct, and overseas markets now accounts for 30 percent of all trades in those stocks and more than 15 percent of the share volume. The third market alone-OTC dealers-accounts for 3.2 percent of volume in NYSE-listed stock. Some dealers now pay brokers for directing order flow to them rather than to exchanges (where the broker would pay a transaction cost).

The NYSE also must compete with the NASD for listings. It has successfully retained almost all of its listed companies (it is nearly impossible for a corporation to "delist" from the NYSE),[37] and has even lured some large companies from NASDAQ. NASD, on the other hand, has been successful in holding many large companies that qualify for NYSE listing. One measure of NASDAQ's success is that on many days there are almost as many stocks that trade more than 1 million shares on NASDAQ as on the NYSE.[38]

There were once competing specialists within the NYSE, but the last disappeared in 1967.[39] Now NYSE procedures, customs, and technology are geared to a single market-maker. Another way to get internal competition would be for member firms to compete for the privilege of being the specialist in a particular stock, but the turnover in specialist assignments is very low.

Competition Among Market Facilities

The SEC has also been criticized for not insisting on more competition among market facilities. It approved the ITS instead of pressing for a universal message switch (UMS) that would automatically route brokers' orders to the market where the best price was being displayed. The critics' assumption is that a UMS would encourage the regional exchange specialists to more effectively compete by offering better prices than offered by the NYSE or AMEX specialist. The regional systems compete with the NYSE and AMEX through speed and transaction costs under the ITS, but there is no inducement to compete by bettering NYSE prices. They need only match the NYSE price.

The regional exchanges warmly defend ITS.[40] In 1989 the Midwest received more than 10 percent of its trades (15 percent of its share volume) from ITS. The number of stocks listed on ITS has grown from 300 in 1978 to 2,082 (of which all but 300 are NYSE-listed). The number of shares traded on ITS

[36] The American Stock Exchange and the Philadelphia Stock Exchange have a specialist and competing dealers (On the floor) in certain of the options which it trades. However, because of the complexity of options (puts and calls, different prices, and different expiration dates), this may be more an example of sub-markets than a model which would work in the single market for the single class of stock.

[37] To delist its stock voluntarily, a corporation must have two-thirds of the shares voted to delist and no more than 10 percent of the shareholders opposed to delisting.

[38] NYSE and NASDAQ volume figures are not completel, comparable, since all NASDAQ trades involve a purchase or sale by a dealer while some NYSE trades involve a direct transaction between two investors. Customer to dealer to customer is two sales; customer to customer is one sale.

[39] In 1933, there were 466 NYSE stocks with competing specialists, in 1963 there were 37.

[40] For example, a vice president of the Midwest Stock Exchange says that ITS "is vital to the continued competitive viability of all market centers that compete with NYSE.... Without ITS there would be insufficient liquidity on markets other than on NYSE to adequately service most investor needs." Allan Bretzer, Oral Statement before the OTA Advisory Panel on Securities Markets and Information Technology, Jan. 22, 1990. Text provided by Mr. Bretzer.

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annually has grown from 42,000 in 1978, its first year, to 2.3 billion in 1989.

ITS is not sophisticated; it is simply a communication system. After the 1987 market crash, the SEC concluded that "the present configuration of ITS is not designed to perform efficiently in high volume periods."[41] ITS has been modernized and expanded since the crash; some of its critics have moderated their criticism. Other critics say that one of the objectives of a national market system is not being fully met—that of inter-market competition.[42] It is still much simpler for brokers to route orders routinely to the NYSE than to spread them among exchanges, especially if the price differences are small or nonexistent. Only with automatic routing of customers' orders to the market with the best price will regional and OTC market-makers have a full incentive to provide competing quotations. This is a chicken-or-the-egg situation.

Is real market-making competition among exchanges *(as they are* currently organized) either a realistic or desirable expectation? The benefits of a central market, with a physical floor and specialists to whom all orders are routed, are touted by those who think an electronic market would be fragmented and less liquid. There is some inconsistency in extending this defense to five or six competing floors with specialists, each receiving a portion of the order flow. The regional exchanges have chosen to compete: 1) by offering less expensive service to brokers for the automatic execution of small trades, and 2) enabling block positioners to complete crossed transactions without exposing orders to the NYSE specialist or customer orders on the NYSE floor. Less expensive services may pressure the major exchanges to reduce the costs of executing small transactions,[43] but their services to block positioners may result in denying to customers whose orders have been routed to the NYSE floor an opportunity to participate in the crossed transaction.

The advantages of the regional exchanges for small orders or for block trades might or might not ensure their competitive survival if a UMS routed orders to the market with the best price. A UMS might not strengthen the regional exchanges as competitors with the NYSE but might instead create an integrated electronic market in which all of the exchanges would become only service centers for brokers and issuing companies, and perhaps regional regulatory organs.[44]

Competition Among Customers' Orders

The most far-reaching criticism of the failure of the SEC to 'facilitate the establishment of a national market system" is that it has not pushed for the establishment of a single system in which:

1. all customer orders would have an opportunity to meet,
2. customers' orders could be executed against one another without the participation of a dealer, and
3. any dealer would be permitted to make markets.

Such a system would differ from today's stock exchange system (which does not meet the frost and third criteria), and from today's OTC market (which does not meet the first or second). Some experts argue that this would require the SEC to replace the exchanges and NASDAQ with a computerized system in which all orders and quotes would be inserted and all transactions would be executed. Such a system is technically feasible and it would hold the promise of cost reductions in trading securities. The basic questions are: Would it work? Would it be an improvement over the current system? What are the risks? Other possibilities are discussed later in this chapter.

41 SEC Division of Market Regulation, *The October 1987 Market Break, 1988;* Report of the Presidential Task Force on Market Mechanisms, 1988 [the Brady Commission Report]. The NYSE acknowledged that extremely high trading volumes generated backlogs of orders. According to the Brady Report, SEC suggested that ITS might adopt default procedures ensuring that if a commitment to trade was not accepted or rejected during the specified time period, execution would automatically occur.

42 Seligman, contractor report to OTA, op. cit., footnote 1.

43 The success of the regional exchanges in this competition can be gauged by the fact that they currently account for more than 30 percent of the *trades* (not volume) in NYSE-listed stocks, most of their activity being in small trades.

44 France plans to integrate its regional bourses with an electronic network, and officials anticipate an outcome such as sketched here. See OTA background paper, op. cit. footnote 27.

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THE 1987 MARKET BREAK AND THE PROBLEM OF VOLATILITY

The stock market crash in 1987 focused attention on three important problems—volatility, technological risk, and market-maker performance. Several times in 1986 and 1987 there was extraordinary short-term volatility in the stock market.[45] The break came in October 1987. From the close of trading on October 13, to close of trading on October 19, the Dow fell 769 points, or 31 percent. In the frost hour of trading on October 19, the Dow fell 220 points, or over 11 percent. In all, the drop on that day was 508 points, nearly 23 percent, with a record volume of 604 million shares. On the next day, October 20, there was great volatility, with the market rising nearly 200 points in the frost hour, declining more than 200 points in the next 2 hours, and rising again by 170 points just before closing, with a new volume record of 608 million shares. On the third day the market rose 10.1 percent, the largest one-day rise in history; but there was another one-day fall of 8 percent the following week. These losses were paralleled by similar declines in the U.S. regional exchanges and OTC markets, and in stock exchanges around the world.

Several special studies by task forces, regulatory agencies, and exchanges reached different conclusions about the cause of the 1987 crash.[46] In the following 2 years no general consensus has emerged. Blame has been placed on rising interest rates, trade and budget deficits, decline in value of the dollar, new financial instruments such as stock-index futures, program trading for portfolio insurance, too much and too little inter-market linkage, discussions in Congress about changing tax laws, investor irrationality, over-reliance on computer systems, and under-use of computer systems.

It is also possible that increasing volatility is nearly inevitable given the increased volume of trading, coupled with computerized trading. The average daily volume has increased from about 30 million shares in the mid-1970s to 165 million in 1990. Peaks in volume can go much higher; on October 19, 1987, 604 million shares were traded. The NYSE said at that time that it was preparing—technologically-for a billion share day. The rate of turnover (number of shares traded as a percentage of total number of shares listed) has also been increasing. Between 1951 and 1966, the turnover rate never exceeded 20 percent. Between 1967 and 1979, turnover ranged between 20 and 30 percent; it then began to increase rapidly. Since 1983, turnover has exceeded 50 percent every year, reaching a peak of 73 percent in 1987. This is one of the forces that raises doubts about the continued capability of traditional trading mechanisms to cope with increased pressure.

The Debate About Volatility

Whatever the cause of the 1987 market break, a more persistent concern is the appearance of excessive short-term volatility in the stock market before and since the crash. By *some* estimates the 1987 volatility was roughly twice the level of volatility over the preceding 4 years.[47] On at least four occasions in April, 1988, there were abrupt rises and falls; for example, on April 21,1988, the Dow fell 36 points in 30 minutes. On October 13, 1989, the market dropped about 190 points, or 7 percent, most of it in the last hour of trading.

Many experts nevertheless deny that there is excess volatility. There is disagreement over how much is "excessive' or how volatility should be measured (e.g., changes in price from day to day,

[45] On Sept. 11 and 12, 1986, the Dow declined 6.5 percent with daily volume of 238 and 240 million shares. On Jan.23, 1987, it fell 5.4 percent in 1 hour.

[46] Brady Report, VI-47; SEC Market Break Report, 7-48; T-J. S. Congress, General Accounting *Office, Preliminary Observations on the October 1987 Crash, 1988; N.* Katzenbach, An *Overview of Program Trading and Its Impact on Current Market Practices,* Dec. 21, 1987 [the Katzenbach Report]; Commodity Futures Trading Commission, Divisions of Economic Analysis and Trading and Markets, *Final Report on Stock Index Futures and Cash MarketActivity During October 1987, 1988.*

[47] Report of the Presidential Task Force *on* Market Mechanisms, *1988,* pp. 2-4. This did not, however, approach the volatility of 1933, when on 10 percent of all trading days there were moves of over 5 percent.

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during the day, during half-hour periods, etc.) fig If stock prices actually reflect "fundamental values," how much up-and-down movement is inevitable as the market homes in on a consensus about value? Professor G. William Schwert of the University of Rochester concludes that the volatility of rates of return to broad market portfolios of NYSE-listed common stocks has not been unusually high in the 1980s, except for brief periods such as October 1987.[49] Volatility has seemed high to the public, Schwert says, because the level of stock prices has risen over the last 20 years, and a drop of many points is actually a relatively small percentage drop.

Some theorists contend that any attempt to curb volatility makes markets less efficient and is undesirable. But the historical objective of "fair and orderly markets" implies that at some level volatility becomes excessive. Fast rising markets raise fears of "bubbles," and sudden unexplained drops cause many investors to withdraw from the market.

The Debate Over Program Trading

Many people who are concerned about excessive short-term volatility place the blame on portfolio trading, program trading, portfolio insurance, or index arbitrage. These terms are often loosely used by the media, with considerable overlap. This gives rise to much public confusion. Generally, portfolio trading means the buying or selling in a single order or transaction of a large mixed group (portfolio) of stocks. Some trades involve hundreds of different stocks. "Program trading" means the same thing. It is defined by the NYSE, Rule 80A, as either: a) the buying or selling of 15 or more stocks at one time or as part of a single maneuver, when such trades involve at least $1 million; orb) index arbitrage. The term usually also means that a computer program is used to guide trading decisions and to route the orders.

Portfolio insurance is a kind of program trading designed for hedging (protecting one's investment by an offsetting investment or transaction). Portfolio insurance calls for balancing transactions in several markets (e.g., the stock and futures markets) in order to reduce risk. (When the average price of a basket of stock changes adversely, an investor holding a stock-index futures contract covering that basket has locked in the more advantageous price. See ch. 4.) With "passive hedging," there is relatively little turnover of stock. "Dynamic hedging" portfolio insurance can lead to many large institutional investors deciding to sell baskets of stock (and large blocks of each stock) at the same time, when the stock prices are already declining. This can make the decline even more precipitous.

Several forces caused program trading and associated trading strategies to increase in the mid- 1980s: 1) the growth of investment funds with very large portfolios and a legal obligation to make prudent profitable investments; 2) computers and telecommunications for making complex, multi-asset transactions simultaneously; 3) the development of computer algorithms for managing dynamic trading strategies; and 4) the invention of stock-index futures.

Institutional investors often hold an "index" of stocks, i.e., a portfolio matched to the stocks used in an indicator index such as the Standard and Poors 500 (S&P 500). In this way, fund managers can be sure that their investment fund does at least as well as the market average (and usually no better). About 20 percent of all stock owned by pension funds, for example, is in indexed funds.[50] These institutional investors often use hedging techniques involving stock-index futures (as described in ch. 4) to protect the value of their portfolios. Some of these strategies require rapid switching of assets among stocks, stock-index futures or options, cash, or other markets. They may turn over every share in the portfolio

[48] See, for example: Merton H. Miller, *Financial Innovation and Market Volatility,* Mid America Institute for public Policy Research, 1988; Theodore Day and Craig M.Lewis, "The Behavior of the Volatility Implicit in the Prices of Stock Index Options," Owen Graduate School of Management Vanderbilt University, June 1988; Steven P. Feinstein, "Stock Market Volatility,' Federal Reserve Bank of Atlanta, *Economic Review,* December 1987; James F. Gamrill Jr., and Terry Marsh, "Trading Activity and Price Behavior in the Stock and Stock Index Futures Markets in October *1987, "Journal of Economic Perspectives, vol. 2, No. 3,* Summer 1988, pp. 25-44; G. William Schwert, ' 'Why Does Stock Market Volatility Change Over Time,' 1989, and other papers on volatility, University of Rochester Bradley Policy Research Center; Robert J. Shiner, "Causes of Changing Financial Market Volatility," presentation at Federal Reserve Bank of Kansas City Symposium on Financial Market Volatility, Aug. 17-19, 1988; Adrian R. Pagan and G. William Schwert, "Alternative Models for Conditional Stock Volatility," University of Rochester Bradley Policy Research Center, BC-89-02.

[49] Schwert, "Stock Market Volatility," New York Stock Exchange Working Paper No. 89-02, December1989.

[50] The largest pension fund indexed investors are now TIAA-CREF ($26 billion), New York State and Local ($15.9 billion), New YorkState Teachers Fund ($13.7 billion), California Public Employees ($13 billion), and California State Teachers Fund ($12.7 billion). One hundred Percent of these portfolios are indexed (1989). *Pensions & Investment Age Magazine,* Jan. *22,* 1990, p. *38.*

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several times in a year. The effect of program trading on stock price volatility is related to the strategy used to direct the switching of assets. If the strategy calls for selling stock when the price is declining and buying when the price is rising, this "positive feedback" will accelerate price movements and increase volatility. This is particularly so if very large blocks of shares are traded and if many investment funds are using similar trading strategies.

Program trading of all kinds accounts for about 21 million shares a day on the NYSE,[51] about 13 or 14 percent of NYSE trading.[52] About half of the program trading on the exchange is in the form of index arbitrage (trading in order to profit by temporary discrepancies or misprizing between stock and stock-index futures prices). Much of the rest is various hedging behaviors for the purpose of risk management rather than profit on trading volume, but they sometimes lead to behavior similar to profit strategies-rapid shifting of assets.

Just before the 1987 market break, the use of portfolio insurance was increasing rapidly. It is likely that when stock prices fell rapidly on October 19, this triggered selling of stock-index futures, causing their price to fall. This in turn led arbitragers to sell stock in order to buy futures, causing stock prices to fall more rapidly. (As discussed in ch. 4, this thesis is still a subject of controversy, and is challenged by the futures industry and its regulators.) The SEC reported that at least 39 million shares were sold by institutions on that day because of portfolio insurance strategies that called for stock sales either in lieu of futures transactions or as a supplement to them.[53]

On October 19, 1987, portfolio insurance sales accounted for only 15 percent of total sales. The effect may have been magnified for two reasons.[54] First, about half of reported sales are accounted for by direct and indirect market-making (specialist activities, block positioners, arbitrageurs, etc.), so that the portfolio insurer sales were about 30 percent of 'true sales. The volume of such attempted sales was perhaps twice the volume that insurers were able to complete, again doubling the perceived demand for liquidity. Secondly, market participants could not know how persistent these sales would be, or how far they might go. Specialists saw that their fins' capital could quickly be exhausted.

Many market participants say that "portfolio insurance" of the kind that provides strong positive feedback loops has been largely abandoned and is unlikely to become popular again, since it failed to protect portfolios. Other observers are skeptical of this conclusion. The more one believes that others have given up portfolio insurance, the more strongly one may be tempted to try to beat the market by using it.[55] Many firms said they were giving up program trading, or some forms of program trading, after the 1987 break, but gradually resumed it. After sharp declines on the afternoon of Friday, October 13,1989, there were renewed demands for 'abolishing" or "controlling' program trading, with little attempt to distinguish among the kinds of program

[51] See monthly NYSE Program Trading Releases. In September 1989 program trading amounted to 13.8 percent of NYSE trading; this is about the level of early October 1987, prior to the crash. In 1988, program trading was down somewhat, to about 8 to 13 percent depending on the month. There is large variation from week to week, however.

[52] There is much argument over how program trading volume should be calculated. The NYSE calculates it as the sum of shares bought, sold, and sold short in program trading, divided by total reported volume. Some experts think this is double-counting (the same shines are bought and sold), and would prefer to calculate program purchases as percentage of total purchases, or program sales as percentage of total sales, or program purchases and sales as percentage of twice total volume. However, many transactions do not involve program trading on both sides of the trade; and program trading may have one leg in stock markets and one in futures markets; therefore the NYSE believes that its method is a more reliable indicator of the contribution of program trading to volume.

[53] Securities Exchange Commission, *The October 1987 Market Break*, p. 1.

[54] According t. R. Steven Wunsch, then Vice President of Kidder Peabody, in discussions with OTA project staff and in "Phoenix Rising From the Gas@" *Institutional Investor*, December 1988, p. 25. Wunsch also notes that most specialists stayed at their post". . . and many probably deserve medals for doing so, particularly stock specialists who in many cases suffered severe financial and personal strain living up to their affirmative obligations to make markets. . .."

[55] A substitute for portfolio insurance developed in the form of brokers writing put options for institutional investors to "insure" their stock portfolios. When stock prices declined on Oct. 13, 1989, these brokers attempted to hedge, or adjust their hedges, by selling stock. This was identified as a contributor to the rapid price decline. CFTC, Division of Economic Analysis, *Report on Stock Index Futures and Cash Market Activity During October 1989*, May 1990, p. 3; SEC, Division of Market Regulation *Trading Analysis of Oct. 13 and 16,1989, May* 1990, p. 5.

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trading or determine exactly how it could be controlled.[56]

To the extent that "program trading" means the trading of diversified portfolios or "baskets" of stock simultaneously (with or without the assistance of computers), it is probably an essential procedure for institutional investors trying to manage very large portfolios. A "blue ribbon panel,' established by the NYSE to consider the problem after the 1989 market break, did not recommend restraints on program trading.[57] Significant restraints on the practice would certainly run the risk of driving institutional funds into off-exchange or foreign markets where much program trading is already done. According to the NYSE, in a recent week, 78 percent of program trading (in equities) took place on that exchange, 5.2 percent in other domestic markets, and 16.8 percent in foreign markets.[58] *Some* of this program trading was done in the "fourth market' "[59] on two electronic, off-exchange, trading systems: Instinct's "Crossing Network" (owned by the British company, Reuters), and "Posit," a system operated by a Los Angeles brokerage firm.[60] Currently only about 400 institutions trade over these systems. Many of the large program trades cannot be executed on these systems because of limited liquidity. However, if program trading were to be forbidden on the exchange, these systems could become a preferred alternative.

Whether it is possible or wise to reduce program trading by abolishing stock-index futures, by adjusting their margin requirements, or by changing the way in which they are regulated, is another question, which is considered further in chapter 4. The question here is whether or how markets can be helped to cope with the problems that arise when many large investors make instantaneous sales (or purchases) of large baskets of stock. One approach is the increased use of "circuit breakers"—techniques for halting trading when prices move rapidly.

The Debate About Circuit Breakers

The perception of excessive short-term volatility raises the issue of circuit breakers, which were first widely advocated after the 1987 crash, especially by the Brady Report. Circuit breakers are procedural or operational ways of halting trading when there is an abrupt or sustained decline in market prices and a volume of trading that threatens to overload the markets' capacity. Circuit breakers may be designed to be triggered by price limits, volume limits, order imbalances, or trading halts in a related market.

Critics, including free-market advocates, claim that circuit breakers unfairly prevent some investors from leaving the market when they are frightened. This, they say, makes panic worse, and sell orders pile up until the dam breaks. Circuit breakers also inhibit use of some hedging and arbitrage strategies.

Proponents say that circuit breakers allow time for people to consider fundamental values, for traders to determine who is solvent, for credit to be arranged, and for imbalances to be advertised so that bargain hunters can be located and get into the market. Circuit breakers could counter the "illusion of endless liquidity' that tempts institutional investors to try to sell huge amounts of stock quickly.

Market breaks produce ad hoc circuit breakers, in any case. Technological systems overload and break down; some market-makers abandon their posts; communications become chaotic. But to be effective, circuit breakers must be mandatory, be in place

[56] Shearson Lehman Hutton announced in October 1987 that it would not do program trading for itself, and announced in October 1989 that it would do no program trading for customers. Many other securities firms took similar actions. Several stock-issuing companies were reported to be putting pressure on securities firms to end program trading; the chairman of Contel Co. said program trading was turning the NYSE into " 'a gambling casino." William Power, "Big Board Faces Fight on Trading," *Wall Street Journal, Nov. 30, 1989. See also, Sarah* Bartless, "Wall St.'s 2 Camps," *New York Times,* Oct. 23, 1989, Dl; Alan C. Greenberg, Chairman of Bear, Stearns, & Co., "How To Reduce Stock Market Injury Potential," letter to the editor, New York *Times, Nov. 14, 1989. In May 1990* Kidder Peabody resumed program trading.

[57] The panel was made Up of 19 corporate executives and business leaders chaired by Roger B. Smith, chairman of General Motors Corp. It reported to the exchange on June 12, 1990.

[58] In the preceding weeks, the comparable percentage figures were 78, 8.7, and 13.3. NYSE Weekly Program Trading Data, Mar. 201 1990; data was for the week of Feb. 20-23.

[59] "Fourth market" refers t. off-exchange (i e directly between institutions) trading of stock that is listed on an exchange. Exchanges are the first market and OTC dealers make up the secondmarket; OTC trading of listed stock is the third market.

[60] About 13 million shares are sold daily on Instinet, according to Reuters; the number sold on posit is not known. Most of the "fourthmarket" program trading does not involve stock-index futures, but is for the purpose of liquidating orbalancing a portfolio after exchange closing. All of Instinet's Crossing Network trades and 10 percent of Posit trades are executed after NYSE's close-of-business, at closing prices.

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ahead of time and hence predictable, and be coordinated across stock, futures, and options markets.

Some circuit breakers were put into effect by exchanges following the crash, and others have been proposed. Under specified conditions, the stock exchanges and futures exchanges execute coordinated halts for 1 or 2 hours. This formalizes ad hoc procedures used during the crash (when, for example, the Chicago Mercantile Exchange (CME) suspended trading of stock-index futures in reaction to halts of trading of individual stocks on the NYSE). Some circuit breakers are designed to interrupt program trading rather than halting all trading. The NYSE has adopted a circuit breaker that is activated if the Dow declines or advances 50 points or more in 1 day. It prohibits members from entering program trading orders into the, SuperDOT system. When it was frost applied on a voluntary basis, 13 of 14 exchange members then engaged in index arbitrage continued program trading manually instead of by computer. More arbitrage selling was done for customer accounts during this voluntary restraint than before it was imposed.[61] Under an NYSE rule that replaced the voluntary collar, when the stock-index future traded on CME (S&P 500) falls a certain amount, program trading orders will be automatically routed by SuperDOT into a separate file (a "sidecar") for delayed matching and execution.

An NYSE panel, created after the October 1989 market break to consider the problems of program trading and excessive volatility, has recommended new and stronger circuit breakers to halt equity trading in all domestic markets when the market is under pressure.[62] A movement in the Dow Industrial Average of 100 points (up or down) from the previous day's close would call for a l-hour halt; 200 points would call for 90 minutes, and a 300 point movement would call for a 2-hour pause.

The proposed Stock Market Reform Act (H.R. 3657) would give the SEC authority to suspend trading in stocks and options for up to 24 hours during a' 'major market disturbance. ' '[63] With Presidential approval, the SEC could extend this for two additional days. (Congress is considering whether the SEC should be given regulatory authority over stock-index futures. Such authority would enable the SEC to coordinate trading halts across markets.) The Market Reform Act would also give the SEC authority to require large-trader reporting, that would improve the Commission's ability to monitor inter-market trading and effectively analyze the results of program trading.

In the meantime, the SEC is being urged to reconsider the oldest form of circuit breaker, the "short sale" rule. Rule 10a-1, adopted in 1938, prohibits traders from selling stocks short[64] when the price is falling. If prices fall and traders believe that the price will continue to fall, they can profit by selling short. This would accelerate a price decline. Efficient-market theorists and many practitioners argue that Rule 10a-1 keeps market professionals from immediately expressing new information, thereby distorting the market function of price discovery. They say, moreover, that the rule is ineffective against panic selling and can be circumvented by trading stock in London. Defenders of the rule point out that negative expectations are not 'new information,' and that selling short on down-tick merely manipulates the price to the practitioner's advantage. The SEC last reviewed the rule in 1976 but declined to abolish it, and is not expected to do so in the immediate future.

THE 1987 MARKET BREAK AND THE PERFORMANCE OF MARKET-MAKERS

The 1987 market break also exposed problems with the ability of market-makers to respond to the challenges of rapid downward price movement and unprecedented high volume. The performance of exchange specialists and OTC market-makers was criticized. One lesson that may be drawn from the market break, however, is that neither the specialist system nor a system of competing market-makers

[61] Memorandum to SEC Chairman Ruder from Richard G. Ketchum, Director of SEC Division of Market Regulation July 6,1988. The event described was on Apr. 14, 1988.

[62] See footnote 57 for the makeup of the panel.

[63] The Commodity Futures Trading Commission, which regulates futures markets, already has this power. The SEC can now suspend trading for 24 hours but only with prior Presidential approval.

[64] Selling short is the practice of selling borrowed stock, or stock that one does not yet own. It is done in the belief that one can, before settlement, buy the stock to be delivered at a lower price than one has sold it for, thus making an instant profit.

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can assure liquidity in a period of intense selling pressure caused by aggressive trading institutions.

NYSE Specialists

NYSE specialists were net buyers of 9.7 million shares between October 14 and 16, 1987, and made net purchases of 21.2 million shares on October 19, in a futile effort to stem the tide. They were "often the primary, and sometimes the only, buyers" during the crash.[65] By the end of trading on October 19, however, 13 of the 55 specialist units had no buying power left. On the next day, October 20, specialists were net sellers of 9.1 million shares.[66] By contrast, "upstairs firms' (non-specialist members) sold a net 7.6 million shares from their own inventory from October 14-16, and were net sellers of 4.5 million shares on October 19 and 9.6 million shares on October 20.

The President's Task Force on Market Mechanisms (the Brady Task Force) evaluated the NYSE specialists' performance during the crash. It reported that as the market collapsed, most specialists "were willing to lean against the downward trend in the market at a significant cost to themselves. "67 But there were exceptions. Of 50 specialists, 30 percent were net sellers on October 19. Of 31 stocks on October 20, specialists contributed to, rather than countered, the market's fall in 39 percent. The Brady Report acknowledged that some of the poor performance by specialists may have been caused by "exhaustion of their purchasing power following attempts to stabilize markets. " For others, however, it seemed hopeless to attempt ' 'to stem overwhelming waves of selling pressure. '

Studies after the 1987 market break confined that the performance of specialists is highly variable. Some specialists fulfill their obligations to "lean against the market' more aggressively than others. The SEC criticized the NYSE for not using its power to punish specialists for poor performance during the preceding 10 years by reallocating their stock to other specialists.[68] After the crash, however, the NYSE reallocated 11 stocks from 7 specialist units, and in 1989 reallocated stock from another specialist unit.@ The SEC, in its report on the market break, suggested that the NYSE develop regular comparative evaluations with a view to reassigning stocks from less effective to more effective specialists. The NYSE rejected this suggestion at the time. However, in 1990, the exchange began an experiment with a specialist performance questionnaire system, scored entirely on the basis of relative ranking of specialist units' performance. After further experience, the exchange intends to develop formal performance standards .70

In June 1988 capital requirements for specialist firms were substantially increased over those that prevailed during the 1987 crash. Each specialist unit or firm must be able to buy or sell 15,000 shares of each common stock in which it is the registered specialist. Each must have additional net liquid assets equal to 25 percent of those position requirements or $1 million.[71] Some market professionals conclude that the capitalization of specialist firms—in the context of growth in market volume and market capitalization-is inadequate and will become more inadequate. Stanley Shopkorn, Vice Chairman of Salomon Brothers, Inc., says:

> New York Stock Exchange specialists in the aggregate have slightly over a billion dollars of capital. . . . [T]his capital cannot make a meaningful contribution to stability on days when $15-25 billion in stock changes hands on the exchange.[72]

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[65]SEC Division of Market Regulation *The October 1987 Market Break,* February 1988, Pp. 4-24 to 4-26.

[66]Data in this paragraph on specialists' and upstairs firms' performance was supplied to OTA by the NYSE, Apr. 17, 1990.

[67]Report of the Presidential Task Force on Market Mechanisms, Op. Cit., footnote 41, PP. 49-50.

@SEC, *The October 1987 Market Break,* op. cit., footnote 41, p. 4-29. When in 1972 the SEC assembled evidence of poor performance by 14 specific specialists, the Exchange committee on Floor Affairs (of whose 11 members 7 were specialist) refused to take disciplinary action, citing as extenuating circumstances "unusual market conditions" or "thinness of the book. " This is summarized in U.S. Congress, Senate Committee on Banking, Subcommittee on Securities, 4 *Securities Industry Study Hearings,* 92d Cong. 2d sess., 1972, pp. 34-46.

[68]Between 1984 and 1989, the NYSE censured, suspended, and/or freed 28 specialists, and barred 4 specialists either permanently or conditionally from membership, employment, or association with any member firm. Source: New York Stock Exchange.

[70]Correspondence from the NYSE, July 1990.

[71]Note that upstairs fires on Oct. 19, 1987, were net sellers of 4.6 million shares; if the average price at sale were $30, it would require $138 million to offset these one-day sales, averaging $3 million per specialist firm. On Oct. 20, upstairs firms sold yet another 9.6 million shares.

[72]From a letter signed by Mr. Shopkorn and sent to clients of Salomon Brothers, Inc., and reprinted with permission in *Commodities Law Letter,* November-December 1989.

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In 1986, before the crash, the NYSE and AMEX had implicitly acknowledged strains on the specialist system by requesting and getting SEC approval for rule changes to encourage large broker-dealer members to become (buy or affiliate with) specialist firms.[73] The Commission hoped that:

> The financial backing of well-capitalized upstairs firms would serve . . . to strengthen the financial resources available to specialists to withstand periods of market volatility.

However, no broker-dealer acquired a specialist firm until the crash, when Merrill Lynch acquired the financially troubled A.B. Tompane, Inc. Acquisitions were later approved for Bear Stearns & Co. (already a specialist fro), for Drexel Burnham Lambert, Inc. (now bankrupt), and for Smith New Court, Carl Marks, Inc., only four approvals since the rule change.

Both SEC and NYSE reports on the 1987 crash noted the problem of the market's ability to absorb institutional portfolio trading. The reports recommended developing a "basket-trading product' that could restore program trades to more traditional trading techniques. Such a product could provide better information "by identifying program trade executions and overhanging program orders in individual stocks, and provide an efficient mechanism for trading, clearing, and settling baskets [of stock] in a cost-efficient way. ' ',[74]

A basket product was approved for trading in late 1989. "Exchange Stock Portfolios" or ESPs are standardized baskets of stocks traded at an aggregate price in a single execution on the exchange's stock trading floor. The initial contract contains the 500 stocks represented in the Standard and Poor 500 Index, and is designed to sell for about $5 million. It is subject to normal margin requirements.[75]

The NYSE elected not to use the traditional specialist system to trade ESPs. Instead, it developed a special adaptation that makes use of advanced information technology. The ESPs, or basket contracts, are assigned to "competitive basket market-makers' (CBMMs) who are not required to be on the floor, as are specialists. They operate upstairs, using special terminals. They do have affirmative obligations as do specialists.[76] However, there has been almost no trading in ESPs since their introduction.

Block trading procedures, the 1986 rule change and the increased specialist capitalization requirements, and the competitive market-maker arrangements for ESPs, are all intended to reduce the strains on the specialist system, as markets try to adapt to increasing pressures.

OTC Market-Makers

The competitive OTC market-makers also performed poorly during the market break. Volume on NASDAQ jumped to 223 million shares on October 19, and reached record levels of 284 million and 288 million on October 20 and 21. (However, NASDAQ share volume on October 19 increased only 49 percent over its average daily volume of the preceding 9 months.)77 This points to differences in the functioning of the exchange and OTC markets. The NYSE had to halt trading in many stocks for long periods on October 19 and 20. On the other hand, the Brady Task Force found that there were trades reported in 36 of the 50 leading NASDAQ stocks during each quarter-hour on those 2 days and for the remainder of those 50 stocks, trades were not reported in only one or two 15-minute periods. However, the volume of trading that customers were able to do in the OTC market was far less than the volume on the exchanges, as many market-makers either withdrew, ignored telephone calls, or only traded the 100-share minimum they are required to accept.

Prior to the break, 46 of the 50 top NASDAQ market-makers participated in the Small Order Execution System (SOES), in which they are obli-

[73] This had not been prohibited before, but was discouraged by prohibitions or restrictions on member firms trading securities that were assigned to specialist firms affiliated with them. See SEC Release No. 34-23765, Nov. 3, 1986.

[74] SEC Rel. 34-27382, Proposed Rule Changes Related to Basket Trading, approved Oct. 26, 1989.

[75] That is, users must put up 50 percent initial margin and maintain 25 percent maintenance margins, as with other stock transactions.

[76] CBMMs may make proprietary bids and offers only in a manner consistent with maintaining a fair and orderly market, must help alleviate temporary disparities between supply and demand, and must maintain a continuous two-sided quotation in the basket product subject to a specified bid-ask parameter. CBMMs must meet a $10 million capital requirement over and above other capital requirements. They are treated as specialists for margin purposes.

[77] NASDAQ Shine volume, which was equal to more than 80 percent of NYSE volume in the weeks prior to the market break, was equal to only 37 percent of NYSE trading on Oct. 19,47 percent *on* Oct. 20, and 64 percent on Oct. 21. Brady Report at VI-50.

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gated to buy or sell up to 1,000 shares. (Participation in SOES was then voluntary.) At times during the break, up to one-third of these firms completely withdrew from SOES (thus reducing their exposure to the 100 shares mandated by NASDAQ for non-SOES transactions) and others reduced the number of securities in which they were SOES participants. [78]

Non-SOES trading also became difficult, because market-makers' telephone lines were overloaded and some market-makers simply stopped trading. Market-makers withdrew from 5,257 market-making positions (over 11 percent), according to the SEC. [79] NASD maintains that these may have been inactive positions that were abandoned to allow market-makers to concentrate on more important active positions. The average spread of NASDAQ quotations expanded by over 36 percent.

THE 1987 MARKET BREAK AND THE LIMITATIONS OF TECHNOLOGY

Experience during the market break indicates that information technology, if not developed and utilized wisely, can worsen imbalance and volatility instead of correcting them. All markets had pile-ups of sell orders that could not immediately be executed and therefore overhung the markets for long periods. The NYSE'S SuperDOT system, designed to make trading by small investors more economical, was overwhelmed by institutions executing their program trades. However, the order pile-ups could have been worse without the technology. Almost certainly clearing and settlement mechanisms would have failed.

The NASDAQ Small Order Executive System (SOES) was disabled by "locked" or "crossed" quotations (i.e., bid quotes equal to or higher than asked quotes). SOES was programmed to require human intervention when that occurred.

The consolidated tape system became overloaded and there were several computer breakdowns at SIAC. These were mostly isolated incidents that were quickly remedied. [80] But prices of derivative products such as stock-index futures depend on last transaction prices for stocks. Even short delays in reporting those prices can lead to spurious discounts of index futures prices to stock prices. This could cause volume surges on one or the other markets, generated by computer-trading strategies.

After October 1987, the exchanges and the NASD increased the capacity of their systems and took steps to prevent repetition of the practices which made it impossible for public customers to get their orders executed. The NYSE increased the capacity of its SuperDOT system and the number of electronic display books, increased the capacity of the Intermarket Trading System, and constructed a second SIAC data processing facility. The NYSE says it could now handle 800 million trades in 1 day. It now gives small orders of individual investors priority in routing to the specialist when markets are stressed. The NASD made SOES participation mandatory for all market-makers in National Market System securities. The system was modified so that it will continue to execute orders even when quotations are locked or crossed. An order confirmation and transaction service (OTC) was put in place so that dealers can negotiate trades and confirm executions through NASDAQ when they cannot do so by telephone. Other forms of automation have also been put in place, including an Automated Conflation Transaction service that allows telephone-negotiated trades to be "locked in" through automatic reporting, comparison, and routing to clearing organizations.

AUTOMATION AND STOCK MARKETS: THE FUTURE

The fundamental problems with technology during the crash may have resulted from the fact that the automated systems currently in use in the securities markets were designed for the purpose of facilitating, not replacing, preexisting trading practices. The Brady Report stated in assessing the performance of the NASD'S automated system, but in language that is equally applicable to the automated systems on the exchanges:

> Many of the problems emanated from weaknesses in the trading procedures and rules which were programmed into the automated execution sys-

[78] Brady Report, op. cit., footnote 41, VI-53.

[79] SEC, October 1987 Report, op. cit., footnote 41, pp.9-19.

[80] *The* October *1987* Market *Break,* op. Cit., footnote 41, pp. 7-3 t" 7-7.

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