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

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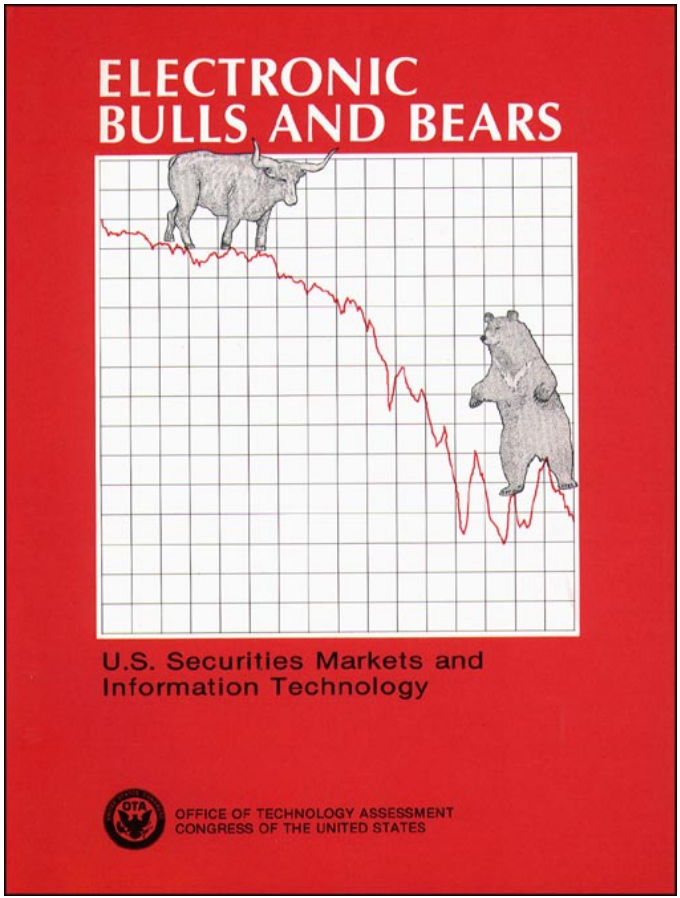

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Foreword

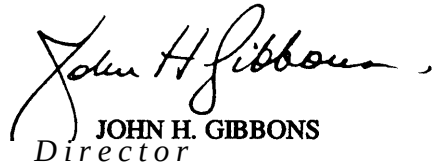
Communication and information technologies—the telegraph, then ticker tape, telephones, and now computers—have historically played important roles in structuring and improving the operation and performance of securities markets. In 1975, Congress-realizing the potential of computer and telecommunications 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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Contents

Page

Chapter l. Summary: Publicand Securities Markets ..... ”” ”” ”” ”” ”” ”” ”” ””s. ”””””””.”””””” 3

Chapter 2. What Securities Markets Do-And For Whom . .....””.”-”””-”””””””””””” “““”””””””””. 25

Chapter 3. The Operation of Stock Markets .. .. ”” ”” ”” ”” ”” ”””””””.”” “““” ”” ”” ” ” ”” ”” ”” ”” 41

Chapter 4. The Operation of Futures Markets....”.-... . . . .”..... 6$_9$

Chapter 5. The Operation of Options Markets . . . .” ..o. 93

Chapter 6. Domestic Clearing and Settlement: What Happens After Trade 107

Chapter 7. How Technology Is Transforming Securities Markets 129

Chapter 8. Market Fraud and Its Victims.. 149

Chapter 9. The Bifurcated Regulatory Structure 167

Appendix. Clearing and Settlement in the United States..... 181

Acronyms and Glossary . . . . . .“...”.....”..... 194

Index . . . . ,....., ... 203

Chapter 1

Summary: Public Policy and Securities Markets

CONTENTS

	Page
THE PUBLIC INTEREST IN SECURITIES MARKETS	5
The Investors	6
Brokers	7
SECURITIES MARKETS UNDER PRESSURE	7
The Specialist System	8
The Crash of 1987	9
Securities Markets and Competition	10
Technological Directions for the Future	12
THE OPERATION OF FUTURES MARKETS	13
Issues Related to Futures Market Operations	14
Issues Related to Stock-Index Futures	15
ISSUES RELATED TO OPTIONS TRADING	16
CLEARING AND SETTLEMENT	17
TECHNOLOGY AND SECURITIES TRADING	18
MARKET FRAUD	20
THE REGULATORY STRUCTURE FOR MARKETS	20
Redefinition of Jurisdictions	21
An Inter-Market Coordination Panel	22
Integration of the Regulatory Structure	22

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-66, (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) atspecified prices for aspecified 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.

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 determining factor. See ch. 3.



Photo credit: New York Stock Exchange

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-

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 privatelyplaced corporate securities, and hold 87 percent of all privately placed securities.

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 be filled electronically through the computerized Small Order Execution System SOES.)

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

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] Their execution as one block can sharply 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.

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.

[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.

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]

CapitaI 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 O@ 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 s$_{sin}$e, 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.

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, free, 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 otherNYSE 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 foreignOTC 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.

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 then find the single price that would clear, or most nearly clear, the market and execute the trades automatically.



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,

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.[30] 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.

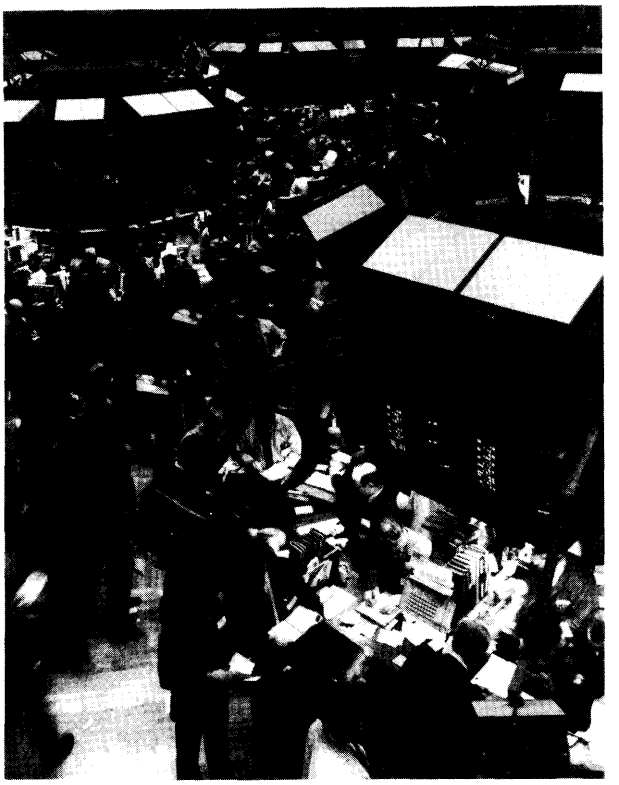

Photo credit: Chicago Mercantile Exchange

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

[30] 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.

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.

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[31] Leverage in futures markets is hi@ because of lower initial ~@, 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.

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.

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

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 nonregulated 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.

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.

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.

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.

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."

Chapter 2

What Securities Markets Do—And For Whom

CONTENTS

Page

DO SECURITIES MARKETS DO A GOOD JOB OF RAISING CAPITAL? 25
DO STOCK MARKETS DO A GOOD JOB OF RESOURCE ALLOCATION? 26
Do SECURITIES MARKETS BENEFIT ORDINARY AMERICANS? 28
DOES PUBLIC OWNERSHIP IMPROVE CORPORATE MANAGEMENT? 29
DOES STOCK MARKET IMPROVEMENT ENCOURAGE SAVINGS AND INVESTMENT? 30
HOW MUCH EMPLOYMENT IS GENERATED BY SECURITIES MARKETS? 31
THE INVESTORS 32
Institutional Investors 32
Individual Investors 33
BROKERS 34
The Industry 34
A Tiered Client Structure 35

Figures

Figure ***Page***

2-1. Mutual Funds Net Capital F1ows 33
2-2. Share of Domestic Broker-Dealer Revenues 35
2-3. Securities Industry Main Revenue Sources 36

Tables

Table *Page*

2-1. Institutional Investors 32
2-2. Volume of Stock Trading on the NYSE 33
2-3. Size of Individual Portfolios, 1985 34
2-4. Individual Equity Investment 35

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 I.,. Butkiewicz (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 obligatingthe borrower to repay the debt principal at aspecified time and also tomake 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.

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 11 percent, other bonds for 40 percent, convertible debt and preferred stock for 5 percent, and mortgage- and asset-backed securities (which are pools of loans packaged and resold 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 earnings retention, 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 for a 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).

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;

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[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 economic historians 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. Butkiewica 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 Stock Market 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.

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 Elliehausen, "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.

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. Warshawsky, 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.

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

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

[25] David J. Raverschraft and F.M. Scherer studied 95 firms before and after takeovers, and found that their profitability did not significantl ("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. Lictenberg 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," *Brookings Papers on Economic Activity 3,1987,* pp. 643-673.) In subsequent studies they found that 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 "The 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 are "less dependent 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 began rapidly in 1988 and 1989. Some companies that used junk bonds for leveraged buyouts were unable to either meet interest payments or refina debt.

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

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.

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[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.

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-l.) 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 .- 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 Inves 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.

Table 2-2—Volume of Stock Trading on the NYSE[a]

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

[a]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.

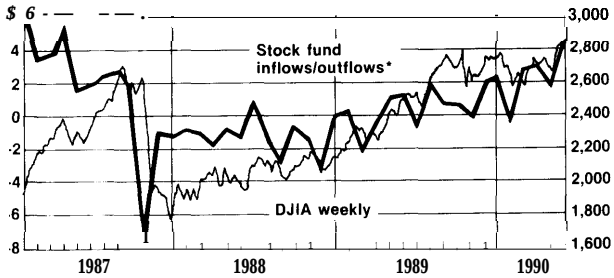
Institutional ownership of NYSE-listed stocks has increased from 13 percent in 1949 to nearly 50 percent. Institutional funds do about 55 percent of all NYSE trades; another 26 percent are done by exchange member firms for their own accounts; and only 18 percent are done for individuals.[41] (See table 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.

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 fins. 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 rents 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 f,,s 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 commis sions 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.

Table 2-4-individual Equity Investment

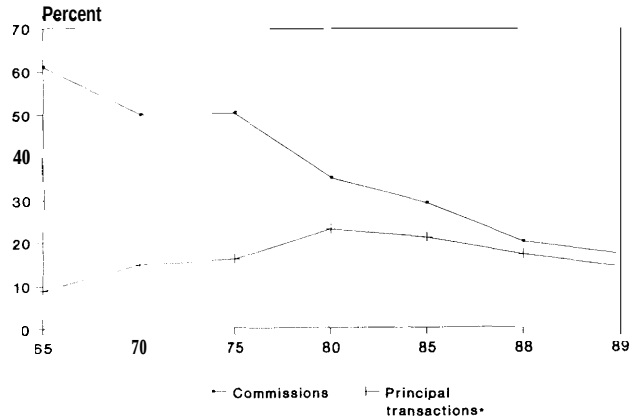
Year	Number of equity owners	Percentage of population	Owned mutual funds only	Percentage of equity owners
1956	**8,630,000**	**5.20**	935,000	10.83
1962	17,010,000	9.20	2,165,000	12.73
1970	30,850,000	15.10	3,977,000	12.89
1980	30,200,000	13.50	2,231,000	7.39
1985	47,040,000	20.10	6,219,000	13.22

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.[15] 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]

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.

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

[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.

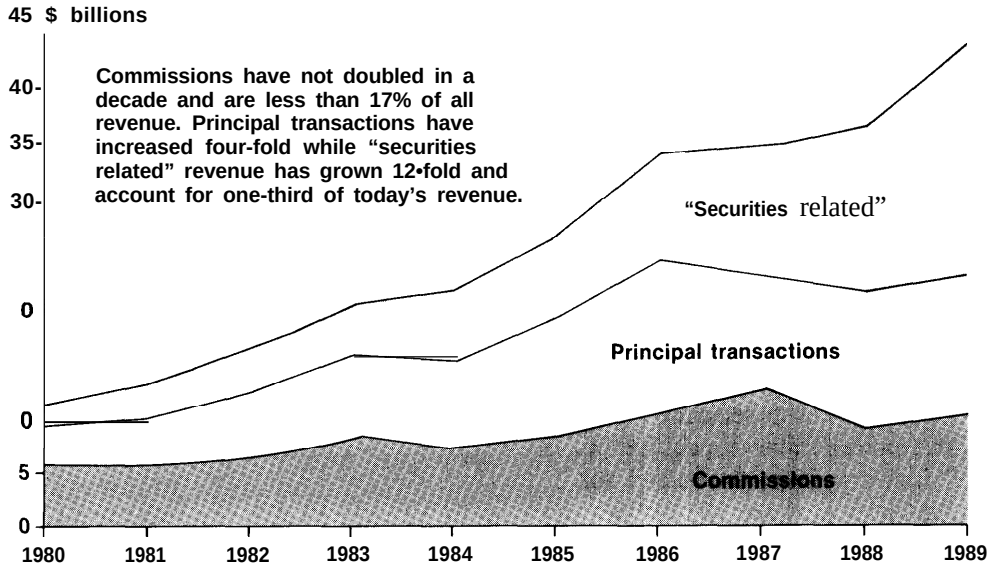
[56] For example, at least 35,000 jobs in the industry have been cut in the 2 years following the October 1987 stock market crash, although total employment grew by 62 percent from the end of 1980 to the third-quarter of 1989. Securities Industry Association, *Trends,* vol. XV, No. 7, Dee. 29, 1989, 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. Cl.

[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.

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.

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 'stock-broker" 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 tban 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. "New Fewer Firms Are Chasing Small Investors," *The New York Times,* June 17, 1990, sec. 3, p. 10.

[66]OTA interviews,

Chapter 3

The Operation of Stock Markets

CONTENTS

Page

OPERATION OF THE EXCHANGE MARKETS 42
THE OTC MARKET AND NASDAQ 45
THE NATIONAL MARKET SYSTEM. 47
CHALLENGES TO THE SPECIALIST SYSTEM 49
Changes in Trading patterns 49
Small Orders 49
Block Trading 50
COMPETITION IN STOCK MARKETS 51
Competition Among Market-Makers 51
Competition Among Market Facilities 52
Competition Among Customers' Orders 53
THE 1987 MARKET BREAK AND THE PROBLEM OF VOLATILITY 54
The Debate About Volatity 54
The Debate Over Program Trading 55
The Debate About Circuit Breakers 57
THE 1987 MARKET BREAK AND THE PERFORMANCE OF MARKET-MAKERS 58
NYSE Specialists 59
OTC Market-Makers 60
THE 1987 MARKET BREAK AND THE LIMITATIONS OF TECHNOLOGY 61
AUTOMATION AND STOCK MARKETS: THE FUTURE. 61
Domestic Exchanges of Tomorrow 62
Around-the-Clock, Around-the-Globe Trading 64

Box

Box ***Page***

3-A. The Mechanics of a Stock Transaction 44

Figure

Figure *Page*

3-1. Saga of a Stock Transaction 43

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 Michgan 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 Normon 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 1%7, and exchange procedures (including those procedures for disciplining specialists by reallocating stock assignments) are framed around the assumption tbat 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).

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.

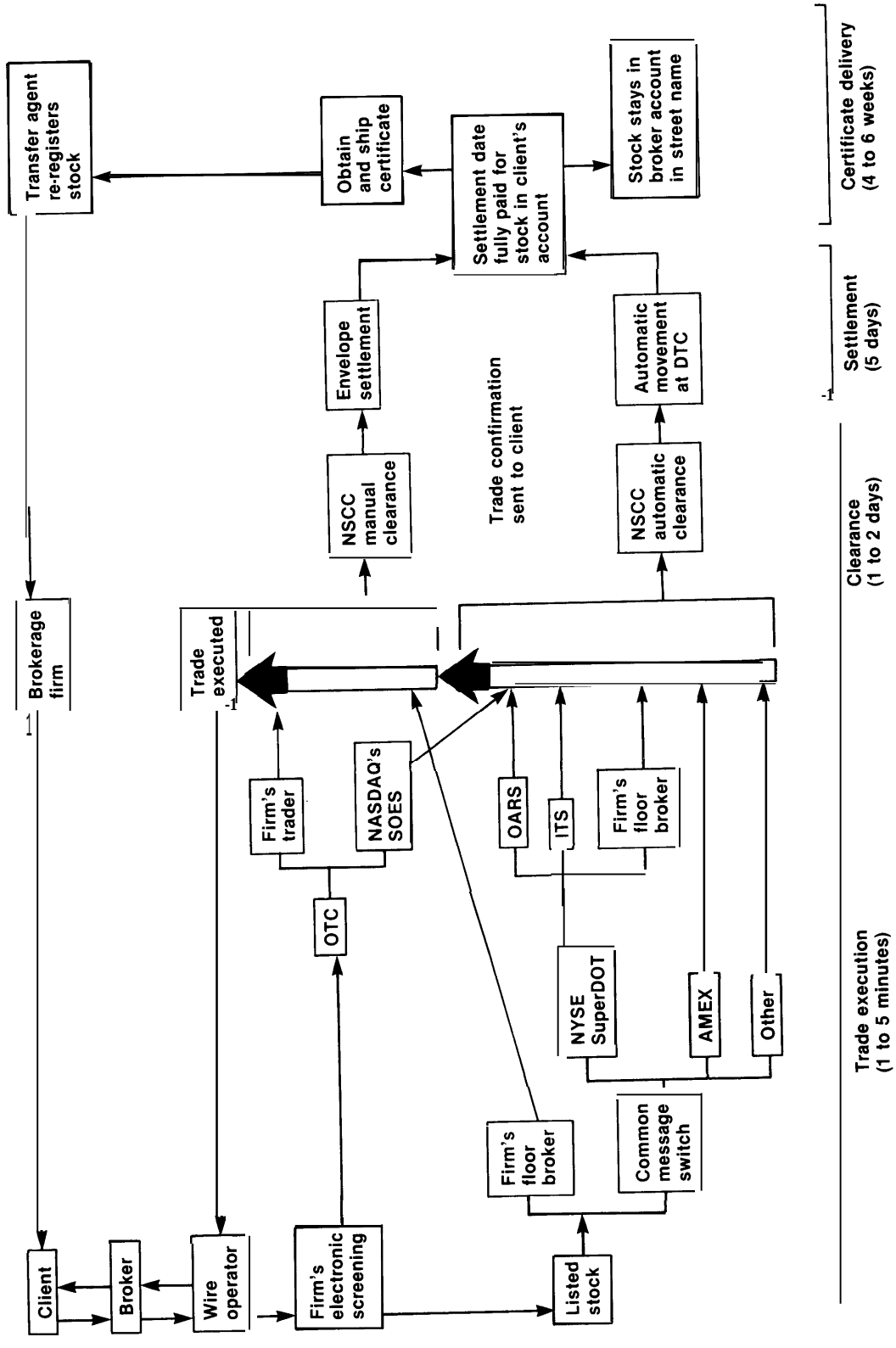
[8]A special kind of limit Order is a stop order, with which a customer specifies that the order should be executed when the stock price drops to a certain price level, or rises to a certain price level.

[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.

Figure 3-1—Saga of a Stock Transaction



SOURCE: *The Individual Investor*, vol. 3, No. 3, June/July 1989.

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] A&pt~ from "The Saga of a Stock Transaction," *The Individual Investor* **vol. 3, No. 3, June-July 1988 (American Association of Individual Investors).**

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.*

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 be firm 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, "The National Market System for Over-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 other markets. In NASDAQ 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., buy all 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.

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 fins, 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.[22] 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

[22]Securities Exchange Act, sec. 11A(a)(l). 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.

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.

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.

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.

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]''Ketchum 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.

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.

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 tbat 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.

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 1east 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,

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[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.

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 Innovations 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. Gammill, 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, December 1989.

[50] The largest pension fund indexed investors are now TIAA-CREF ($26 billion), New York State and Local ($15.9 billion), New York State 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*.

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 personastrain living up to theiraffirmative 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 MarketActivity During October 1989,* May 1990, p. 3; SEC, Division of Market Regulation *Trading Analysis of Oct. 13 and 16,1989, May* 1990, p. 5.

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 second market; 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 ''fourth market'' program trading does not involve stock-index futures, but is for the purpose of liquidating or balancing 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.

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[@] 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.

@sw 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.

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]

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

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

67Report 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.

69Between 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.

70Correspondence from the NYSE, July 1990.

71Note 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.

72From 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.

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-

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[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.

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.

terns. . . From the beginning . . . each advance in automating the market was greeted with apprehension by many if not most of the market makers . . . To ease that apprehension and, more importantly, to sell the systems to its membership, the NASD found it necessary to build in trading procedures and rules which were not necessarily aimed at achieving the most efficient trading system but were believed necessary by the membership to protect their economic interests. . . Unfortunately many of these compromises came back to haunt the over-the-counter market during the October market break.[81]

This judgment applies to exchanges as well as OTC dealers. The American stock markets have by and large used technology to facilitate and support, rather than replace, traditional trading methods and practices. The exchanges and OTC markets have each automated some of their functions (order routing, data display and communication, monitoring and analysis, and small order execution), but they have preserved the central role of the market-maker.

Domestic Exchanges of Tomorrow

The capabilities of information technology in data collection, matching, aggregation, manipulation, storage, and dissemination have enormously increased over the last four decades and can reasonably be expected to make comparable advances over the next four decades. The limitations and vulnerabilities of information technology are also becoming better known. Information technology could be used more extensively for automatically routing orders among market-makers, matching like-priced bids and offers, automatically executing and recording the transaction, carrying it through the clearing and settlement process, and providing an audit trail for regulatory purposes.

Alternatively, technological and personal-intermediation trading systems might be operated in parallel, with the customer and/or broker given a choice. Technology might be used to change the nature of exchanges from continuous auctions to periodic single-price auctions, or to offer other alternative trading mechanisms—some of which are growing up around and outside of traditional securities markets, as proprietary trading systems. The fundamental policy question is whether it is desirable to encourage and facilitate the replacement of the current exchange and OTC market structures with fully automated trading systems, or to allow this to happen incrementally, slowly, or not at all. There are assuredly risks in either course.

Proponents of computerized trading systems say that they provide more information more equally to all participants, reducing the advantage that market professionals have over public investors, and that they would provide better liquidity by encouraging bids and offers anonymously from all geographical locations and aggregating them for all to see-thus encouraging new buyers (or new sellers) to enter the market when an imbalance exists and bargains are to be found.

Opponents of computerized trading systems extol the advantages of personal presence on the floor for both stimulating and gathering or perceiving information (i.e., better price discovery), and providing the incentives for vigorous trading. They stress the advantage to investors of the obligation of the specialist to assure liquidity and immediacy, and the specialist's ability to negotiate prices. Opponents of electronic markets also insist that specialists (or other intermediaries and market-makers) are uniquely able to position and manage large block trades.

The SEC has approved Rule 144a, to allow institutional investors to trade unregistered securities (usually corporate bonds) without the financial disclosure otherwise required. In the past, investors who bought private placement securities often had to hold them. Now the market should be more liquid, and many foreign corporations may participate. But there is a real risk that such developments may accustom institutional investors to using electronic trading systems off-exchange, and in so doing create a two-tiered market where the best prices and deals occur in an electronic market for institutions only, while individuals are left in outmoded physical markets.

The only example of a fully automated trading system in the United States is the Cincinnati Stock Exchange. Its National Securities Trading System is a "black box" that lets brokers instantly execute orders up to 2,099 shares through the computer. Bids or offers are entered automatically, the highest bid or lowest offer is filled first, and identical bids/offers are taken in the order in which they arrived, except that public orders take precedence over specialist or

81 Brady Report, op. cit., footnote 41, VI-52-53.

dealer orders. However, the Cincinnati Stock Exchange failed to attract customers and does little business (0.46 percent of trades in NYSE-listed securities in 1989). The Exchange is now only a computer at the Chicago Board Options Exchange, of which it has become an affiliate.

A number of securities markets in other countries have recently installed computerized trading systems. The Toronto Stock Exchange has a Computer Assisted Trading System, or CATS. This is an order-driven system. Those wishing to trade put their orders (with price and size of the order) into a computer that establishes a queue of bidders and offerers arranged first by price, and then by the time of arrival of each order at that price. The computer also displays the number of shares offered or bid for. When the order at the top of the queue is filled (that is, when the offer is taken or the bid accepted) it is replaced by the next order at the same (or the next best) price. A complete record of all trades is automatically generated. In this system, there is still a "registered trader' who is committed to buy or sell for his own account when the size of orders does not match—i.e., when the number of shares offered at the best price is not sufficient or is in excess of the number of shares bid at the matching price. Equity, futures, and options "floor traders" use CATS to maintain their responsibilities for designated stocks and to trade on their firm's or their own behalf. Other users are upstairs traders, with CATS terminals on their desks.[82]

CATS now handles about half of Toronto-listed stocks and 22 percent of the total trading volume on the exchange. Toronto also has an electronic execution system for small-sized floor transactions. As a result, automated assistance applies to at least 75 percent of Toronto trading. The volume of trading in Toronto is, however, extremely small compared to that at the NYSE. Only about 50,000 trades a day, on average, are done on CATS, with a projected maximum trading capability of 250,000 trades.

Interviews at the Toronto Exchange indicate a high degree of support and enthusiasm for the automated systems, as allowing the exchange 'to be more competitive in the cost and level of service. . .' '[83] Some skeptics feel that the CATS will not be able to handle the needs of traders for the kind of information that they think comes only from perceptive observation on the trading floor. Others are concerned that an attempt to improve market quality and service might have an opposite effect. It could give people with sophisticated computer support an unfair advantage over others, and encourage institutional dominance of the market. Some are concerned that computer techniques could encourage market manipulation (in Canada, surveillance has historically not had adequate computer support) .84 Finally, there is a concern that a failure in computer systems could cause catastrophic losses.

Other foreign exchanges are also automating. The Paris Bourse, the Belgian Bourse, the Spanish exchanges, and the Sao Paolo exchange in Brazil have all adopted CATS. The Copenhagen stock exchange is being restructured and will eventually include three automated trading systems, one based on CATS.

As another possible alternative to the current systems in the United States, several experts argue that a computerized single-price auction should either supplement or replace the continuous auction market and the specialist function .85 In a single-price auction, trading takes place at specific times, as contrasted with a continuous auction market. All outstanding bids and offers are collected, compared by computer, and executed at the price that will come closest to clearing the market. Bids above or offers below the clearing price are held for the next round. A single-price auction might be held once or twice during a trading day, with a continuous auction on the side for those who want to trade immediately. It would provide an automated and open display of the specialist book. It might replace the specialist system, because "a continuous market requires the participation of a dealer who is willing to trade

[82]Contractor Report on Canadian Market Systems, prepared for OTA by Digital Equipment of Canada, Limited (Robert G. Angel, marketing manager, Capital Markets), July 241989. Hereafter cited as "Digital Report to OTA."

[83]Ibid. The report also describes extensive upgrading and enhancement in the Montreal Exchange, with introduction of a FAST automated trading system which includes a screen based knit order book with executable orders.

[84]Digital Report t. OTA, op. cit., footnote 82, p. 4.

[85]Steven Wunsch, in written communication to OTA, February 1990; see Steven Wunsch, "SPAworks-The Single Price Auction Network: Question-and-Answer Series," manuscript provided by author; and Joel Chernoff, "Trading Plan Stirs Debate," *Investment Age*, July 25, 1988.

immediately, while a call market can operate without dealers. ' '[86]

It may also be necessary to consider whether the national market system that might evolve because of current economic pressures should be a unitary system, or should include "subsystems for particular types of securities with unique trading characteristics, " as contemplated by the 1975 amendments.[87] The NYSE and the AMEX use the same trading system for all listed stocks, regardless of the level of trading activity, even though this varies from fewer than five trades per day for some stocks to several hundred, or more than a thousand, trades in a day for others. On the Tokyo Stock Exchange, by contrast, the trading of the 150 most active stocks is done though a continuous auction process (without the intervention of dealers), while 2,000 less active stocks are traded by matching orders through computer terminals. The early development of proprietary trading systems operated by market data service vendors (and soon by U.S. futures exchanges) is discussed in chapter 7.

Around-the-Clock, Around-the-Globe Trading

U.S. OTC dealers, through the National Association of Securities Dealers, have begun several initiatives aimed at competing in international markets. NASD is installing computer facilities in London to extend the NASDAQ network to the United Kingdom. In September 1990 NASDAQ will begin "dawn trading sessions," beginning at 3:30 a.m. e.s.t., to coincide with the London opening and continuing until just before the regular NASDAQ trading day begins at 9:30. In addition, NASD has opened the "PORTAL" system for electronic trading by institutional investors of private placement stock issues around the globe.

Until mid-1990, there was no discernible movement by security exchanges to recognize the growing international securities markets, or to prepare for 24-hour trading.[88] In June 1990 the NYSE announced that it was planning a five-step process "to prepare for continuous 24-hour trading by the year 2000. ' The NYSE'S plan is conservative, cautious, and limited in scope.

The first step consists of proposed rule changes filed with the SEC a year ago. It would extend pricing procedures now used on "expiration Fridays,' '[89] which guarantee that already-paired orders received at "close-of-market" will be executed at the market's closing price. These trade executions can be done within a few minutes after the exchange closes. This change, to be implemented as soon as approved by the SEC, merely seeks to recapture some of the trades now done in Tokyo or London after the NYSE closes.

The second step would involve a 45-minute "crossing session " immediately after the end of the trading session, using SuperDOT Members could, as the market closes, submit either matched or unmatched orders, to be executed on a first-in, f~st-fried basis at the closing price. This step too is intended to recapture trades now lost to London, by letting index arbitragers rebalance or close-out their positions. A third step would add to this a second ''crossing session" of about 15 minutes, in which paired orders that are part of inter-market trading strategies (i.e., related stock/stock-index futures or options transactions) could be completed rather than being done on the domestic fourth market (i.e., Instinct or Posit).

The fourth, and comparatively more daring, step could involve several single-price auctions—as described above-in which all 1,700 listed stocks might trade. These computer-assisted auctions might occur, for example, at 8 p.m., midnight, and 5 a.m. e.s.t. The NYSE says that these ''pricing sessions" would be essentially the same procedures now used by the specialists to open each day's trading system; but it is not yet clear whether they would involve a dealer or even the daytime specialist firm.

Only the fifth step, which the NYSE does not envision occurring for another decade, would allow continuous 24-hour trading, possibly but not surely from remote locations. NYSE officials are not convinced that there is or will be any real demand for such trading until 2000.

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[86] Stoll, op. cit., footnote 12, p. 3.

[87] Securities Exchange Act 11A(a)(2).

[88] See OTA background paper, op. cit., footnote 27.

[89] The last Friday in each annual quarter, on which stock-index futures and stock-index options expire—the ''triple witching hem."

Immediately after the NYSE announcement of its plans, which would not have been made so soon except that they were prematurely disclosed by the press, three other stock exchanges (the AMEX, the Cincinnati, and the Chicago Board Options Exchange) announced that they were working with Reuters to develop plans for systems for eventual 24-hour trading. U.S. futures exchanges and Reuters have already developed a system (GLOBEX, described in ch. 4) for global trading of futures contracts. The NYSE strategy emphasizes the need to encourage many brokers and vendors to plan ways to supply the services NYSE would need for providing global access to investors, to avoid ''becoming the captive of one vendor. The suggestion here is that when the original contract between exchange or exchanges and a vendor expires, exchanges could be left without a viable mechanism for serving (and monitoring) remote members. With the NYSE strategy, however, vendors may decide independently to offer transaction services before the NYSE target year of 2000. These risks have to be compared in planning strategy for the future.

Chapter 2

The Organization of Futures Markets

CONTENTS

	Page
FUTURES MARKETS TODAY	69
REGULATION OF FUTURES MARKETS	71
THE OPERATION OF FUTURES MARKETS	72
ISSUES RELATED TO PIT TRADING	73
Audit Trails	73
Dual Trading	74
INNOVATIONS IN FUTURES CONTRACT'S	75
STOCK-INDEX FUTURES	76
THE USES OF STOCK-INDEX FUTURES	78
THE DEBATE ABOUT STOCK-INDEX	80
MARGINS	84
PREPARING FOR THE FUTURE	88

Figure

Figure	*Page*
4-1. Futures Contracts Traded by Commodity Group	71

Table

Table	*Page*
4-1. Incentives for Using Stock-Index Futures	78

Chapter 4
The Operation of Futures Markets

A futures contract is a standardized agreement to buy or sell a specific amount of a commodity (now including financial instruments) at a specified price on delivery at a future date. The contract creates an *obligation* of the buyer to purchase, and the seller to sell, the underlying commodity. This report focuses particularly on one kind of futures contract-stock-index futures[1]-because of its importance to securities markets and to current public policy issues.

The origins of futures contracts go back to "forward sales" in the grain markets of the Middle Ages, but futures contracts in the United States began in the 19th century.[2] The grain trade, essential to an agrarian economy, suffered from cycles of shortages and surpluses because of weather or other variable conditions. These caused sharp price fluctuations at harvest time. Both farmers and grain merchants wanted to reduce the uncertainty about the prices they might receive or pay when crops were brought to the market. Merchants therefore began to use 'forward contracts,' pledges to buy or sell grain to be delivered in the future.

Forward contracts were unreliable in that they were not standardized as to the quality of the commodity or as to delivery terms. Commitments by contracting merchants were sometimes abandoned. To remedy this, 82 businessmen formed the first organized futures exchange in the United States in 1848, the Chicago Board of Trade (CBOT).[3] Chicago rapidly developed into a center of the grain market.

Beginnin g in 1865, futures contracts were standardized and cash bonds, or initial margin payments, were required to ensure that contractual commitments would be met. Clearinghouses were created to match and verify trades and guarantee the fulfillment of each contract. The basic structure of today's futures markets had come into being.

FUTURES MARKETS TODAY

Sixteen exchanges in the United States are authorized to trade futures contracts.[4] Futures markets and futures exchanges are synonymous in the United States. There is no competition from an over-the-counter market, or from proprietary trading systems, as there is for securities exchanges.

Futures contracts need not, and now usually do not, involve any intention to make or take physical delivery of the underlying commodity, whether it be grain, foodstuffs, metals, corporate stocks, or foreign currencies. Less than 1 percent of futures contracts of any kind are now settled by delivery of the underlying commodity.[5] When one buys a December futures contract in September, (e.g., in wheat, metal, or some other commodity), one agrees to pay a specified price in December. The buyer can satisfy this obligation either by receiving and paying for the commodity or by 'offsetting' the obligation, that is, by selling a December futures contract.

Each futures contract is now standardized with respect to quantity, quality, and month of expiration. The trading is conducted by intermediaries (floor brokers) for customers and by "locals" or floor traders, trading for themselves, on the floor of a

[1]This futures contract covers the basket of stock counted in a market index such as the Standard & Poors 500 (the index is the weighted average price of 500 heavily traded stocks, and is used as an indicator of price trends). The stock-index future is settled in cash, not by delivery of the stocks.

[2]Futures Industry Association, *Futures Trading Course*, Washington, DC, 1988, p. 1. Historical material in this section was also adapted, in part, *from Futures: The Realistic Hedge for the Reality of Risk*, Chicago Board of Trade, 1988. "To arrive" contracts were used in Liverpool, England, as early as 1780.

[3]Futures exchanges are authorized to trade futures contracts, options on futures, and options on physical goods.

[4]The 16 exchanges are: the Chicago Board of Trade (CBOT); Chicago Mercantile Exchange (CME); New York Mercantile Exchange (NYMEX); Commodity Exchange, Inc. (COMEX); Coffee, Sugar & Cocoa Exchange (CSCE); New York Cotton Exchange (NYCE); New York Futures Exchange (NYFE); MidAmerica Commodity Exchange (MidAm); Kansas City Bored of Trade (KCBOT); Minneapolis Grain Exchange (MGE); Chicago Rice & Cotton Exchange (CRCE); AMEX Commodities Exchange (AMEXCC); Philadelphia Board of Trade (PHBOT); Pacific Futures Exchange (PFE); Pacific Commodities Exchange; and American Commodities Exchange.

[5]Commodity Futures Trading Commission, *A Follow-Up Report on Financial Oversight of Stock-Index Futures Markets During October 1987*, Jan. 6, 1988, p. 15.

futures exchange.[6] For every buyer, there is a seller.[7] But after the buyer's and seller's understanding of the terms of the trade have been matched, a clearing organization places itself between the buyer and seller; i.e., the clearing organization becomes the seller for every buyer, and the buyer for every seller. It thereby guarantees each transaction. In the example above, if the futures price rises from the September purchase price level, the buyer collects from a futures commission merchant, which collects from the clearinghouse, or pays the futures commission merchant, who pays the clearinghouse, if the price declines.

In 1989, 267.4 million futures contracts were traded, compared to 18.3 million in 1972, when financial futures were introduced.[8] About 75 percent of this trading occurs on the CBOT and the Chicago Mercantile Exchange (CME), the two largest futures exchanges in the world. Financial futures began in the early 1970s, with contracts on currencies and debt instruments, but as late as 1978 they constituted less than 7 percent of the futures market. This had increased to about 38 percent by 1982, when stock-index futures were introduced; and by 1990, 61 percent of futures contracts traded were financial futures.[9] Financial futures now account for over three-quarters of the business of the CBOT and the CME.

The CBOT began trading grain contracts in 1848, and now trades futures on metals, oil seed products, and financial instruments. The CME specialized in foodstuffs until 1947; then added livestock and frozen meat futures, which by 1969 accounted for 86 percent of its trading volume; and now mostly trades financial futures. Currently, about 80 futures contracts are traded on commodities ranging from wheat and oil to Treasury bonds.

Almost any commodity might be considered suitable for developing a futures market, if there is considerable variation and hence uncertainty in price.[10] At one time or another, at least 79 produc have been covered by futures contracts,[11] but by 1967, grains and foodstuffs accounted for more than half of all futures trading. Today, however, futures contracts on agricultural commodities account for only 20 percent of total contract volume. Interest rates accounted for 46 percent in 1989; energy products, 12 percent; foreign currencies and currency indexes, 10 percent; precious metals, 6 percent; stock-price indexes, 5 percent; and nonprecious metals, 0.8 percent.[12] (See figure 4-l.)

U.S. Treasury bond futures are the most heavily traded U.S. futures contract, with a volume of 70.3 million contracts, valued at $6.3 trillion, each contract based on $100,000 face value. Eurodollar[13] futures are even more heavily traded in terms of dollar volume (each contract is for $1 million), but are second highest in volume of trades.

The main function of futures contracts is still to shift risks from those less willing to bear them to those willing to assume them for a price, or in hope of profit. With the appropriate futures position one can hedge or offset price risk that arises in the 'cash market. " If the price of grain falls, the value of a short futures contract will rise. (It should be noted that hedging is not cost free; if the market price moves up, having hedged will cut into one's profits.) Futures markets also allow one to speculate on one's expectations about price trends with the possibility of profiting by a successful forecast.

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[6]At present, futures contracts are traded only face-to-face on futures exchanges. The CME and the CBOT will soon begin trading futures on GLOBEX, an electronic after-hours trading system (see OTA Background Paper, *Trading Around the Clock: Global Securities Markets and Information Technology,* OTA-BP-CIT-66 (Washington, DC: U.S. Government Printing Office, July 1990). Trades executed on GLOBEX will still be cleared, margined, and guaranteed by futures clearing organizations.

[7]Typically the customer deals with a futures commission merchant (FCM) firm, which in turn deals with a clearing member of the exchange! or, if the FCM *is itself* a clearing member, then directly with the clearing organization. Details of clearing and settlement are described in the appendix.

[8]FIA Monthly Volume Report, December 1989. Also, 55.4 million options contracts were traded on futures exchanges in 1989, when U.S. futures exchanges traded 322.8 million futures and options contracts.

[9]FIA Summary by Year, December 1989.

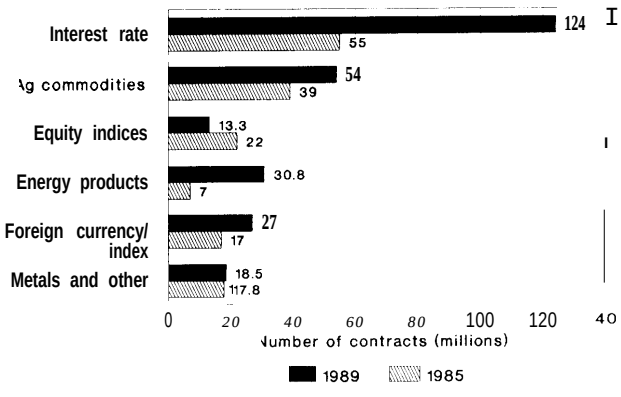
[10]Dennis W. Carlton, "Futures Markets: Their Purpose, Their History, Their Growth, Their Successes and Failures, " *The Journal of Futures Markets 4, No. 3, 1984,* pp. 237-271. Carlton, pp. 242-244, also discusses other factors: correlations in price with related products such as would allow hedging, many different producers and distributors, industry structure, large value transactions, government regulation influencing price.

[11]Ibid., p. 242.

[12]Futures Industy Association, FIA Monthly Volume Report, December 1989.

[13]Eurodollars are U.S. currency held in banks outside the United States, and commonly used in settling international transactions.

Figure 4-1—Futures Contracts Trade by Commodity Group



SOURCE: Futures Industry Association, 1990.

From the standpoint of the economy, futures contracts on physical commodities tend to lower prices to the consumer by allowing producers and merchants to plan more effectively, to carry smaller amounts of inventory, and to price their goods more competitively. But financial futures are not well-understood by the general public. Because they are divorced from the underlying commodity or stock,[14] many people view them as only instruments for gambling and as a diversion of resources from more productive uses. This lack of understanding, which the industry has done little to correct, creates problems for the industry. Futures markets, by providing ways to hedge stock investments, may increase the willingness of investors to put their savings into securities rather than other kinds of investments, and most economists say that they do not divert money from capital formation.[16]

Another benefit of futures markets is ''price discovery. ' Prices in futures markets, based on different information and insights acted on by experienced traders risking their own capital, forecast prices in cash markets. This ''price discovery" function is valuable in a market-based economy .17 One expert on futures markets says that in the late 1970s the pivotal development in securities law was the recognition of futures trading as an economic function involving risk transfer and price discovery, and divorced from any specific commodities.[18]

REGULATION OF FUTURES MARKETS

Futures trading was regulated for decades by the Department of Agriculture,[19] but as the futures market expanded beyond agricultural commodities into financial instruments, the Department's role became less appropriate. Recognizing this, Congress in 1974 created the Commodity Futures Trading Commission (CFTC)[20] to oversee all trading in futures contracts under the 1936 Commodity Exchange Act. The responsibilities of the CFTC include:

1. direct surveillance of futures markets and market participants,
2. oversight of futures trading Self-Regulatory Organizations (SROs),[21]
3. approval of all new futures contracts and changes in the terms of existing ones, and
4. dealing with investigations and disciplinary and enforcement actions.

[14]According to the Internal Revenue Service, futures contracts are nOt aSSetS, but Contractual agreements.

[15]For example, a Letter to the Editor of the *New York Times* read: "The millions of futures contract trades executed each year, representing trillions of dollars, are in reality engagements for mutual speculation conducted in an environment of institutionalized chicanery, which except for the employment of several thousand floor brokers in Chicago and NewYork, serve no useful economic purpose. ' (signed A. GeorgeGianis), Dec. 6, 1989, p. A30.

[16]A Federal Reserve Bored *paper, Financial Futures adoptions in the U.S. Economy,* December 1986, said: "The conclusion that futures and options markets will not diminish the total supply of funds available for investment seems quite strong and widely accepted."

[17]The Commodities Exchange Act requires that a futures contract market demonstrate to the Commodity Futures Trading Commission [CFTC] that designation of anew futures contract would be in the public interest. Under CFTC practices this means that it would have to be shown that it had a hedging or price discovery function.

[18]Charles M. Seeger, *The Development of Congressional Concerns About Financial Futures Markets,* The American *Enterprise* Institute fOr Public Policy Research, Project on the Economics and Regulation of Futures Markets, p. 3.

[19]Abuses in grain futures markets led to passage of the Grain Futures Act of 1922. It was administered by the Grain Futures Administration within the Department of Agriculture. In 1936, the Commodity Exchange Act extended this regulation to other agricultural commodities, and this Act was administered by the Commodity Exchange Authority, also in the Department of Agriculture.

[20]The Commodity Futures Trading Commission Act of 1974.

[21]Self-Regulatory Organizations are the exchanges and the National Futures Association, an industry association to which the CFTC delegates the responsibility for registering and overseeing floor brokers and futures commission merchants. The Commodity Futures Improvements Act, now before Congress, would authorize theCFTC to register floor traders.

Oversight of the CFTC remains with the House and Senate agriculture committees, although agricultural commodities now underlie only a quarter of futures contracts at most.

As the growth of financial futures trading continues, the appropriate locus of regulatory responsibility is again becoming an issue. The "commodities" that underlie the financial futures contracts fall under the regulatory jurisdiction of the Department of Treasury, the Board of Governors of the Federal Reserve System, and the Securities and Exchange Commission (SEC). The invention of stock-index futures has linked futures markets to stock markets in new ways, and raised questions about the effects of those linkages.

THE OPERATION OF FUTURES MARKETS

Futures contracts are traded in auction markets, where prices are determined by "open outcry. " In this colorful and noisy form of trading (which has often been described as archaic or anachronistic[22]), bidding is conducted in a crowded, tiered floor or ''pit.' Floor brokers and traders, each wearing identifying badges, trade by shouting their orders and using hand signals. The pit crowd may have more than 400 participants. There are currently no alternative methods of trading futures in the United States; upstairs block trading and over-the-counter trading of futures is forbidden by statute.

Floor traders-also called "locals' '-trade exclusively for their own accounts; floor brokers are allowed to do "dual trading," that is, to both transact customers' orders and trade for themselves.[23] When an order to buy or sell financial futures contracts arrives by telephone at the floor booth of an exchange member, the order taker either walks the order to the floor or (for large orders) "flashes" the order by hand signals to a floor trader in the pit, who makes the trade and flashes back to the booth the price at which it was filled. This information is then repeated to the customer, usually still on the telephone. The entire transaction takes about 3 seconds. Futures brokers insist that this is the speediest way to carry out a transaction, and that nothing slower would be satisfactory to the majority of their customers who are simultaneously trading in cash markets in some form of speculative or arbitrage maneuver. It is not clear however that computerized trading support systems would be slower.

Unlike stock exchange specialists, floor traders have no obligation to stabilize prices. There are other stabilizing mechanisms in futures markets; CFTC analysts stress the importance of price limits and speculative position limits in providing "a similar stabilizing influence. "[24]

In futures markets, each broker and trader can buy at the lowest offered price and sell at the highest bid price[25]; liquidity is achieved through the participation of many buyers and sellers. Some of these buyers and sellers are hedgers, seeking to protect their investments in securities markets. Some of the buyers and sellers are speculators. Speculators-a term neutral and without opprobrium in futures markets-are professional risk-takers, individuals or firms trading for themselves (or sometimes for institutional funds), who through their willingness to trade in pursuit of profit incidentally keep bid and ask prices close together and facilitate rapid and efficient trade executions by hedgers.[26] Ordinarily, hedgers hold about 71 percent of long and 66 percent of short open positions. Speculators are listed as holding about 4 percent of open long positions and 10 percent of open short positions in S&P 500 stock-index futures. The remainder of open positions (about one-quarter) are held by people not

22As a recent example, Richard A. Miller, editor-in-chief of the *Commodities Law Letter*, wrote: "Dual trading, imprecise audit trails, andclub-like self-governance are anachronisms more appropriate to the 19th century than to the 21st. " *Commodities Law Letter ix, No. 9-10,* November-December 1989.

23''Dual trading'' occurs when an individual (or representative of a firm) sometimes trades on behalf of customers (i.e., as a broker) and sometimes trades for his own or the firm's proprietary account (i.e., as a dealer).

24OTA correspondent from staff of the CFTC Division of Trading and Markets, Apr. 6, 1990. The CFTC analysts maintain also that the case fOr the specialist system as a maintainer of stabilized prices in securities markets is not strong.

25The exception is a situation when daily price limits are in effect or when the trade would exceed a speculator's position limits.

26CBOT, Futures, The Realistic *Hedge for the Reality of Risk,* 1988, p. 12. The *Dictionary of Finance and Investment Terms (2nd cd.)* says that the term "speculation" implies that a business or investment risk can be analyzed and measured, and it differs from "gambling' which is based on random outcomes.

covered by large-trader reporting requirements. Most of these are also speculators.[27]

Futures contracts are designed so that their prices should always reflect underlying cash market prices.[28] The activities of "spreaders' and arbitragers also bring price alignment. In "calendar spreading" traders sell the current delivery-month contract and buy a later delivery-month contract, or vice-versa. This reduces price variance between the contracts. Arbitrage also helps keep the cash and futures prices aligned. If, for example, futures contracts seem overpriced in relation to the underlying commodity, arbitrageurs will sell the futures contract and simultaneously buy the commodity, making a profit on the difference.

ISSUES RELATED TO PIT TRADING

At least three characteristics of open outcry trading may cause problems: crowding in the pits, the lack of an automatically generated audit trail, and dual trading. The presence of as many as several hundred participants, without a central checkpoint (whether computer or designated market-maker), makes it uncertain that a customer will get the best price, or the market price. His floor broker may have a less penetrating voice than others, or be shorter in statue, or unlucky, or unpopular. Pit-based trading is deeply embedded in the history of futures trading, but it has become a problem as the number of participants and the volume of trading greatly increased, and as the speed with which orders can be transmitted also greatly increased (the last being an effect of information technology). It is possible that the pits cannot accommodate additional pressure, as may result from the growth of translational trading. It is also difficult to spot and control collusive and fraudulent trading given the difficulties of visually monitoring the hectic trading.

Audit Trails

The inadequacy of audit trails in futures exchanges is currently a lively issue. Rules require that the exchange assign a time of execution, within 1 minute, to each trade. The CME reports that it uses the following information to assign times to transactions:

- the time that an order reaches the floor,
- the *Time and Sales Report*, a record of reported sales prices timed to the nearest 10 seconds,
- a 15-minute bracket character recorded by the trader,
- ''other trade information,"
- the timing information with respect to the opposite side of the trade,
- the length of time it takes an order to reach the trading pits,
- "unique price information, " and
- ''in limited cases, reported execution times. "

Each transaction is run through approximately nine computer processes before a time is assigned at the end.

Using such procedures (which differ somewhat from exchange to exchange), an exchange's computer is said to be able to "reconstruct" an audit record of the trade that establishes its timing within 1 minute. But at best, these systems still have serious shortcomings that are known both to the CFTC and the exchanges.[29] For example, a single minute during active trading may include hundreds of trades, several of which could be made by a single floor participant at different prices.

Moreover, the CFTC says that in some instances, members are not "providing accurate data which will permit an exchange to meet the performance standard, ' and that exchanges have ''failed to implement adequate measures to address this situation. ' The CFTC has just changed the rules to require that trading cards contain preprinted sequencing information; that they identify the user, that they be used in exact numerical and chronological sequence, and that they be promptly time stamped and submitted to a clearing member or to the

[27]These figures are based on the average of month-end open positions for 23 consecutive months ending November, 1989, as reported in CFTC's *Commitments of Traders.* (Reported positions are those of the owners of the account, not their brokers or clearing members.)

[28]CFTC Regulations, Sec. 22247, Appendix A-Guideline No. 1, B(3). CFTC contract approval guidelines require "evidence that the cash settlement of the contract is at a price reflecting the underlying cash market [and] will not be subject to manipulation. . .."

[29]General Accounting Office, *Chicago Futures Market: Initial Observations on Trading* Practice Abuses, GAO/GGD-89-58, March 1989. This GAO report studied the "level, or intensity, of CFTC [and the CME and CBOT] exchange efforts to detect and penalize trading abuses" between 1984 and early 1989, and made "no recommendations. " Ibid, pp. 13-17.

exchange within 30 minutes of the trade (to be shortened later to within 15 minutes of the trade) .30

Even highly automated trading and surveillance systems may not be able to deter certain types of abusive trading practices, especially given the opportunities for collusion among floor brokers and traders in the pits, which are difficult to detect except through undercover investigations.[31] It may nevertheless be necessary to replace "trade reconstruction" techniques with devices that can establish more precise and verifiable audit trails from the beginning-i.e., at the time of the transaction. Technology is being developed to meet the complex needs and difficult environment of the pits. The CME and CBOT have each appropriated $2.5 million for design of a hand-held computer for recording trades, and are reviewing vendors proposals. NYNEX has developed a wrist-strap or hand-held computer for floor traders, capable of storing trade data and transferring it to a main computer. These will be tested in 1990 by traders at the Commodity Exchange (COMEX) in New York.[32] There is likely to be resistance from some floor professionals who may resent the intrusion on the floor of technology that will erode the value of their unique skills and experience.

Dual Trading

Dual trading, fully legitimate, has become increasingly controversial in the last 2 years. As already noted, floor traders are allowed to trade both for themselves (proprietary trading) and for customers. They charge a fee for executing customer orders brought to them by futures commission merchants (FCMs), who are analogous to retail stock broker/dealers. From 12 to 25 percent of floor traders' profits come from proprietary trading.[33]

Dual trading has been strongly defended as necessary and desirable by the industry, by the CFTC,[34] and by academic experts.[35] It has, nevertheless, often been criticized because of two potential conflicts of interest. First, dual traders can, when trading for their own accounts, use information communicated by their customers, putting other traders at an information disadvantage. Second, a broker may be tempted to trade on his own behalf before he trades for a customer, if the customer order is likely to move the price. That would constitute ''frontrunning, ' and regulations prohibit brokers from trading for their own accounts before filling customers' orders and from filling customers' orders from the broker's own account, whether or not there is any effect on price.

Futures industry representatives point out that dual trading also occurs in securities markets; for example, 1) an upstairs firm acting as a ''block positioner' for a customer (see ch. 3) may buy or sell some of the stock for (from) its own inventory; and 2) specialists trade both for themselves and for other brokers. Securities market practitioners say in rebuttal that this form of dual trading is different in kind from dual trading in the pit; for example, specialists have a' 'negative obligation' to trade for themselves only when no other customer is willing to trade at or near the last-sale price).

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[30] The CBOT has, since Sept. 1, 1989, "made members accountable" for keeping trading cards in numerical order and timestamped by the clearing member when they are collected for clearing and settlement.

[31] According to U.S. attorney Anton Valukas, who headed the Justice Department probe into trading abuses in the Chicago exchanges, ...''experience suggests that some of the things we found couldonly have been discovered by having people actually in the pits. . . . The whole aspect of how audits are conducted and what type of audit trails are kept is something tbat should be reviewed. "As quoted in "Paladin in the Pits," Barren's, Aug. 21, 1989, p. 6.

[32] Demonstrations and conversations with NYNEX scientists in White Plains, New York; see also 'Will Paperless Trading Clean Up the Pits," news item in *Business Week,* Oct. 16, 1989, p. 90A.

[33] The CFTC estimates 12 percent (in written comments t. OTA); several knowledgeable futures markets participants told OTA it was probably 20 to 25 percent in financial futures pits, and the Chicago Mercantile Exchange declined to provide information on the grounds that it is confidential. The CFTC estimate does not distinguish between commodity futures pits and financial futures pits. They mayor may not be different in this regard, but durd trading is more common in highly active markets, according to CFTC studies.

[34] In background discussion published in the *Federal* Register, vol. 55, No. 8, Jan. 11, 1990, p. 1048, in connection with a proposed rule to restrict dual trading in some circumstances, the commission stated that its traditional position had been that notwithstanding concern over possible abuses, ''(1) dual trading was necessary to achieve adequate market liquidity and accompanying market efficiencies, and (2) the potential for abuse could be addressed adequately. . . . CFTC Division of Trading and Markets analysts in discussions with OTA also emphasized that dual trading increases liquidity and that abuses can be adequately controlled by regulation and surveillance.

[35] For example, Professor Sanford Grossman says: "Dual trading increases the supply of both brokers and floor traders because a dual trader can earn income from two activities to cover the costs of training, an exchange seat, and time spent on the floor. . . . The direct effect is an increase in the quality and quantity of brokers. . . . The indirect effect derives from an increase in the liquidity of the market caused by an increase in the numbers of market makers." Prof. Sanford Grossman, *Economic Analysis of Dual Trading,* Research Paper, Rodney L. White Center for Financial Research 4 1989.

Both critics and defenders of dual trading may have exaggerated its frequency. A recent study by the CFTC found that most floor traders do in fact usually limit themselves to one kind of activity. About 90 percent of them either do at least 90 percent of their trades for themselves or else do 90 percent of their trades for customers. The other 10 percent—frequent dual traders-account for only 7.4 percent of total market volume. The incidence of dual trading may however be higher in financial futures pits.[36] The issue is important because dual traders were heavily implicated in recent FBI charges of abuses in futures trading.

Section 4 of the Commodity Exchange Act required the CFTC to reassess the effects of dual trading and its continued permissibility from time to time. In 1976, an extensive study by a CFTC Advisory Committee found that the record systems then used by exchanges were inadequate to permit verification that dual trading was important in maintaining liquidity, yet recommended that the Commission continue to permit it, which it did. In 1984 another CFTC report[37] said that if dual trading were to continue an improved audit trail was needed for more effective surveillance.

The CME, in May 1987, began experimentally to disallow dual trading on the top step of the stock-index futures trading pit. The exchange says that this was done because the top step, where most of those trading for customers stand, had become over-crowded. Also, locals (trading for themselves) complained that those on the top step (some of whom were dual trading) had an advantage over them in visibility. The CME concluded after the first 2 years that there was little effect on liquidity; but decided that this might not be the case with less actively traded contracts, and that for them "dual trading is a necessary practice to maintain adequate liquidity. . .."[38]

In 1989 the CFTC Economic Analysis Division conducted yet another study on the effects of dual trading.[39] It concluded that dual traders generally specialize in one or the other form of trading, as noted above; that the incidence of dual trading tends to be higher in high-volume markets than in low-volume markets (which challenges the assumption that it is useful because it assures liquidity); and that dual traders do not, as often asserted, secure better trades for their customers than do non-dual traders. The agency therefore issued a proposed rule in January, 1990, concerning Restrictions on Dual Trading by Floor Brokers. Regulation 155.5 would prohibit a floor broker from trading for himself and for customers during the same trading session, "except to the extent permitted by contract market rules. " The notice of proposed rulemaking cited the economic analyses in its November report, and also emphasized that the enforcement actions, indictments, and plea agreements from the Chicago undercover investigation of floor trading practices "indicate that some brokers have used their dual status to facilitate abuses of customer orders. '

This rule change will not end all dual trading. It is intended ''to curb dual trading-related abuses," while permitting the practical results to be tested ''on a limited basis before the restriction is extended to all markets. ' It would apply at first to only one or two commodities futures contracts and one financial futures contract at each exchange, and would allow exceptions, for example, a ''customer opt-out. '

INNOVATIONS IN FUTURES CONTRACTS

The CFTC must approve a new futures contract before it is traded. It must be satisfied that the contract has an economic purpose and is not contrary to the public interest.[41] Innovations in futures instruments have been frequent during the past 15

[36] CFTC Division of Economic Analysis, *Dual Trading Study, Nov.* 17, 1989. Neither this report, or the CFTC staff responsible for the study, distinguished between commodity futures trading and financial futures trading; these statistics were broken down only by exchanges. The study concluded, however, that dual trading tended to be higher in the most active markets. This would include financial futures markets, although CFTC does not draw this conclusion.

[37] U.S. Commodity Futures Trading Commission, *A Study of th, Nature, Extent, and Effects of Futures Trading by Persons possessing Material Nonpublic Information,* Washington, DC., September 1984.

[38] *Report of th, Chicago Mercantile Exchange: Special Committee to Review Trading Practices, to the Board of Governors, Apr.* 19, 1989, pp. 7-8.

[39] *Economic Analysis of Dual Trading in Commodity Exchanges,* Nov. 17, 1989.

[40] *Federal Register*, vol. 55, No. 8, Jan. 11, 1990, p. 1050. The proposal of the new rule stressed that ''the current systems are not capable of detecting all abuses related to dual trading,"

[41] Until 1974, futures contracts could be issued and traded *unless* disapproved by the Department of Agriculture. The SEC is not required to assess the economic value of new securities, but bas evaluated the economic purpose of proposed options, such as those on stock indexes and Treasury securities.

years, and are likely to continue.[42] For example, two exchanges announced plans last year to introduce trading in futures contracts on computer memory chips-commodities whose prices tend to be volatile.[43]

Exchanges introduce new products if they may make money. But it is really the profit or cost-saving for a particular group of market participants (e.g., floor traders, or speculators, or hedgers) rather than profit for the exchange that drives the process, because U.S. exchanges are not-for-profit organizations. According to the CFTC, exchanges sometimes may introduce anew product if there is demand for it by one of these member groups even if it is marginally nonviable, because there can be cross-subsidization from more viable contracts.

Not all new products are approved by the regulators, and those that are approved are not always successful. *Success* depends in large part on the needs of investors. For example, the rapid success of interest rate futures reflected a widespread investor demand to reduce risk from adverse movements in this market.[44]

Futures contracts tend to be traded on only one exchange; that is, even if the product was introduced almost simultaneously on several exchanges, the trading quickly concentrates. There is intense competition among exchanges to be the frost to introduce new products, and they sometimes submit copy-cat products for regulatory approval. Significant costs are associated with developing and introducing new products, and they have a high risk of failure—according to the CFTC, from 20 to 30 percent of new contracts fail within 2 years, and 50 to 55 percent endure less than 9 years. This has led some exchange officials to suggest an exclusive right to a new product for a specified length of time, similar to a patent.[45] However, this right would have to be recognized by all of the world's major exchanges in order to protect fully the original innovating exchange. This is unlikely, given the present state of international law on protection of intellectual property.

Some innovations do not fall neatly within the jurisdictional boundaries assumed when the Securities Exchange Act and the Commodity Futures Exchange Act were written. This has been the cause of heated disputes between the two regulators, as discussed later in chapter 6.

STOCK-INDEX FUTURES

The most important innovative product in this decade is stock-index futures, introduced in 1982. This product and the various trading strategies that rely on it are the critical link between stock and futures markets. Since they were first introduced in 1982, stock-index futures trade volume has grown faster than volume of stock transactions, exceeding the daily volume of New York Stock Exchange (NYSE) trades in the first 2 years. However stock-index futures still constitute only about 5 percent of all futures trades.

The volume of stock-index futures trading has increased primarily because the number and size of institutional investors have grown. Futures markets have always been used heavily by institutions.[46] Some individual traders participate, both as speculators and as hedgers, but many retail clients cannot meet brokerage house annual income and net worth requirements for margin accounts.

Institutional investors are hedgers, using futures contracts as a means of reducing market risks and lowering transaction costs. To hedge investments in any cash market they may take an equal but opposite

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42dzFor a discussion of competition between futures exchanges as a source of innovative products, see William L. Silber, "Innovation, Competition, and New Contract Design in Futures Markets," *The Journal of Futures Markets, vol. 1, No. 2, 1981,* pp. 123-156.

43These are dynamic random access memory chips or DRAMs. The Pacific Stock Exchange and the Twin Cities Board of Trade (Minneapolis) hope to start trading a futures contract on computer memory chips in 1990 or early 1991. Approval of applications to trade new contracts generally take 3 to 6 months; innovations that present complex issues or require new exchanges may take much longer.

44For a discussion of various types of risks, particularly from f[illegible]ign [illegible]urre[illegible] movements, and a process toward managing such exposures, see: Jeffrey Barr, "Coping With Financial Risk," *Institutional Investor,* vol. 3, April 1989, pp. 112-113.

45This was advocated, for example, by Richard Chase, Executive Vice president of the Philadelphia Stock Exchange, at an OTA workshop, June 30, 1989.

46Carlton, op. cit., footnote 10. Before the d[illegible]elopment of financial futures, many of those using the commodities futures market were "commercials," such as large cereal companies or meat packing companies.

position in the futures market.[47] They can switch back and forth rapidly and cheaply, since transaction costs are low, and small or medium-sized futures trades tend not to move market prices because of the liquidity in these markets.

Institutional investors often choose to allocate the assets they manage in specific ways, e.g., by keeping 60 percent in bonds, 25 percent in equities, and 15 percent in cash, depending on factors such as the outlook for interest rates or equities prices. Asset allocation strategies are not new, but until recently, allocation readjustments could not be made rapidly or efficiently because transaction costs were high. Today's futures contracts let asset managers reallocate assets rapidly because of their low costs and narrow bid-ask spreads. This links the equity, options, futures, and government/corporate bonds markets in the United States and, increasingly, the major world markets.

Stock-index futures are used for speculation, hedging stock market investments, and index arbitrage. The most popular stock-index futures contract is the CME S&P 500 Stock Price Index Future (it accounts for 79 percent of total volume). There are also options on stock indexes, traded on securities exchanges, and options on stock-index futures traded on futures exchanges.

Parties to a stock-index futures contract agree to settle by receiving or delivering a cash sum equal to the difference between an amount stipulated in the contract and the weighted prices of the stocks in a stock index (usually the S&P 500)[48] at a stipulated later time. The contract obligations can only be settled by cash payment, not by actual delivery of stocks. One trading in stock-index futures is, in effect betting on the movement of the stock market as a whole-whether the average stock price will move up or down. A more academic way of saying this is that the trading is based on an analysis of the return to be derived from a projected movement of the stock market as a whole.

Both stock-index futures and stock-index options are based on (or derivative of) the stock market. Their nominal value is derived from the weighted average of values of the stocks represented in one index.[49] But stock-index futures (and options on stock-index futures) are traded on futures exchanges and regulated by the CFTC, while the SEC regulates stock-index options as well as stock.

While stock-index futures and stock-index options serve some of the same purposes, they are different in effect and in risk-return characteristics. Stock-index futures create the *obligation* to deliver or receive the cash equivalent of a portfolio of stocks. Stock-index options gives the holder the *right* but not the obligation to receive or deliver the cash equivalent. For the holder of either a long or short stock-index futures position, the risk is limited only by how much stock prices can move in a given time-it can be a ruinous amount. With the option contract, the purchaser can lose only what he paid for it (the premium), since the option need not be exercised; and he has unlimited potential for gain if stocks appreciate so as to increase the value of the options contract. The *writer* (seller) of an uncovered or "naked" option contract (as opposed to the holder of the contract) unless he is fully hedged, has unlimited risk like that of the unhedged futures contract holder, cushioned only by the premium the writer received for writing the option.

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[47]For example, a financial institution may be concerned that interest rates will rise, causing a drop in the value of the firm's long-term U.S. Treasury bonds. The firm may hedge that risk by selling interest rate futures contracts. If interest rates rise, the futures contracts can be closed out for a profit, which would compensate for the loss of value in the bonds. An investor having non-U.S. funds invested in a foreign country may wish to reduce the risk of a fall in the value of that country's currency against the U.S. dollar or other countries' currencies. The investor might sell the appropriate foreign currency futures contracts to hedge the risk of the currency's fall relative to the U.S. dollar, or, as do many U.S.-based international mutual funds, might shift to futures contracts based on the currency of another country whose currency movements are highly correlated with that of the United States (cross-hedging).

[48]The contract is based on the value of the S&P 500 index multiplied by $500. If the weighted average of the value of the 500 stocks represented in the index is 245, one futures contract would be worth 245X $500 or $122,500. The contract would call for the buyer to buy or "go long in" the S&P 500 at 245 on the expiration date. If on some earlier date the S&P 500 stood at 247 the holder might choose to sell or offset the futures contract. He or she would make a profit equal to the current market price minus 245 multiplied by $500, or a profit of $1,000. If instead, he or she holds the contract until the expiration date and the S&P 500 has risen to 248, the buyer's profit would be $1,500. If at expiration the index stood at 242, the buyer would have lost $1,500.

[49]There are no futures contracts on a specific stock. The SEC has opposed such contracts on the grounds that the futures contract could be used to manipulate the price of the stock to the detriment of the corporation and its shareholders. At the insistence of the CFTC, the Shad-Johnson Accord, an agreement between the CFTC and the SEC (discussed in ch. 6), left open the door by saying that there should be further study of the practicality and safety of allowing futures on individual stocks. Subsequent legislation prohibited such contracts. [Information based on oral and written discussion with staff of the CFTC and SEC.]

From 1982 through September 30, 1989, the CFTC approved and exchanges began trading 33 index futures contracts, of which 6 are now trading. The others are dormant or have been withdrawn. In 1989, the CME'S S&P 500 Stock Price Index Futures Contract accounted for over 79 percent. The New York Futures Exchange Composite Index accounts for 12 percent, and the Chicago Board of Trade's Major Market Index (MMI), 8 percent.[50]

THE USES OF STOCK-INDEX FUTURES

The trading of stock and stock-index futures is dominated by institutions and brokerage proprietary accounts, while that of stock-index options has until recently been dominated by individual investors and retail brokers. (Stock-index options are now being increasingly used by institutional investors in hedging.) The reason they were preferred by individuals is in part the size of the contracts. The S&P 500 futures might, for example, have a nominal value of $142,500 (the value of the index times the multiplier of $500); and at the same time the S&P 100 options contract might have a nominal value of $28,000. For institutions, the futures contract is more attractive because there is greater liquidity in its trading, and there are also cost incentives (see table 4-l).

In the S&P 500 futures trading pit at the CME there are usually several hundred brokers and floor traders or locals. With so much competition, spreads under normal circumstances are much tighter than price spreads in the underlying stock.[51] On a typical day, floor traders may be responsible for over 50 percent of the trades, and customers (both institutional and individual) for less than 30 percent.[52] Floor traders may buy and then sell the same contracts in as little as 1 or 2 minutes, perhaps buying or selling 100 or more contracts at a time,

Table 4-1-incentives for Using Stock-Index Futures

	S&P 500 Portfolio of Stock	S&P 500 Futures
Cost Incentives:		
Volume	2.3 million shares	800 contracts
Transaction cost per unit	$0.07 cents per share	$12.50 per contract
Total transaction costs	$318,000	$20,000
Market Impact Incentives:		
Market	Bid: 292.35	Bid: 294.85
	Ask: 293.65	Ask: 294.90
Bid/ask spread	1.30 index points	0.05 index points
Dollar value	$520,000	$20,000

SOURCE: R. Sheldon Johnson, Morgan Stanley

hoping to make a profit of $2,000 to $5,000.[53] Because of the great liquidity of the stock-index futures market, large incoming orders can usually be executed rapidly, often with two or more locals (floor traders) sharing the other side of an order.

Changes in stock-index futures prices usually precede changes in stock prices. An investor can buy or sell the S&P 500 Futures Index with one trade, while to assemble a comparable portfolio of stocks might take 500 separate transactions. Thus investor opinions about the stock market are registered more quickly in the futures market than in the stock market.[54]

Stock-index futures are used in inter-market arbitrage and in inter-market hedging. These maneuvers are implemented, on the stock market side, through program trading-i. e., the use of computers to send sell (or buy) orders simultaneously for a large basket of stock.[55] About half of program trading is in the form of index arbitrage.[56]

Index arbitrage exploits the fleeting price differences that occur between a stock-index future and

[50] Monthly Volume Report December 1989.

In August 1988 one study found the S&P 500 average spread to be 0.0185 in contrast to 0.55 in the underlying stock Salomon Brothers, *Stocks Versus Futures for the International Investor: Trading Costs and Withholding Taxes,* Aug. 31, 1988, p. 3.

[52] For example, on Feb. 8, 1989, CBOT data showed that 52.9 percent of that day's trades were floor traders trading for their own account; 20.9 percent were trades for a clearing member's house account; and 26,2 percent were trades for another exchange member or for any other type customer.

[53] Brady Commission Report, W-20.

[54] Hans Stoll and Robert Whaley, "Futures and Options On Stock Indexes: Economic Purposes, Arbitrage, and Market Structure," *Review of Futures Markets,* vol. 7, No. 2, 1980.

[55] NYSE defines 'program trading'' as the purchase or sale of 15 or more stocks with a value of over $1 million. The volume of program trades per month varies typically between 7 and 14 percent of total trades. Not all program trading, however, involves both stock and futures markets.

[56] NYSE monthly program trading press releases.

the underlying basket of stock.[57] For example, on January 27, 1989 (to take a day chosen at random), the S&P 500 closed at 293.82 and the S&P 500 March futures closed at 296.30. In index arbitrage one might sell the futures contract at 296.30 and buy the underlying stocks at 293.82.[58] If the final index average were at 300 on March 17 (the third Friday of the quarter, when contracts expire) the institutional investor could let the futures contract expire with a loss of 3.70 (300-296.30) and sell the underlying stocks for a gain of 6.18 (or 300-293.82), preserving the spread that existed on the day of the original transactions. The actual profit on this transaction would be the price difference of 2.48 minus the cost of the transactions (and the foregone interest not recouped as dividends).

Locking in the spread between stocks and stock-index futures is not automatic; an apparent opportunity to do profitable index arbitrage may be lost in the time it takes to execute the orders in the two markets. This risk from the time gap is especially signficant when the arbitrageurs buy the futures and sell index stocks short (i.e., sell stocks they do not yet own, expecting to buy them subsequently at a lower price), because under SEC Rule 10a-1, short sales of stock must be executed at a price the same as, or higher than, the last price (the uptick rule). If the market is declining, arbitrageurs may not be able to sell stocks when they need to.[59]

If the arbitrageur already owns the underlying stocks, he or she could buy the futures, sell the stock, and invest the proceeds in a risk-free debt instrument, such as a Treasury bill. At expiration, when the differential between stock and future disappears, the stocks could be repurchased with the proceeds of the Treasury bill, and the futures contract be allowed to expire.

Opportunities for index arbitrage should disappear rapidly as arbitrage brings the stock and futures prices into convergence. In fact, the opportunities sometimes persist, both because of the difficulties posed by the uptick rule and because there are not many firms with the capital necessary to do index arbitrage.[60]

Index arbitrage should also act to stabilize the markets by continually bringing stock prices and futures prices closer together. But four times a year, the expiration of stock-index futures and options contracts places a great strain on equity markets. As futures and options traders 'unwind their positions' by selling the stock that has been hedged by index options or futures, specialists on stock exchanges are called on to match those orders by finding buyers or buying for their own account. (Alternately, "unwinding" could involve arbitrageurs buying stock and specialists or customers selling them stock.) At the last trading hour of the quarter, called the "triple witching hour, "[61] large imbalances of orders can develop and price volatility increase accordingly.

This problem was helped some by moving the expiration of the S&P 500 futures and options to the opening, rather than the closing, of the third Friday of the quarter. In this way, orders can be matched and executed on that day's opening price, and other efforts can be made to restore balance before the market opens. The CBOE'S S&P 100 option and AMEX's Major Market Index option still expire at the close, with resulting stress. The SEC is encouraging them to change also.

Hedgers use stock-index futures in reducing the risk associated with a broad portfolio of stocks. Institutional fund money managers often develop and hold an ''index" of stocks (i.e., a portfolio that

[57]Such price differences reflect several factors: 1) transaction costs for stocks and for stock-index futures; 2) the time remaining to expiration of the index and the volatility of the index; 3) the institution's cost-of-carry, and 4) the dividends to be paid on the stocks in the index, through expiration of the futures' contract.

[58]In theory, one would sell the future and buy the stock if the differential in their price exceeded the (risk-free) interest rate to expiration of the futures plus the transaction costs in the futures and stock markets, minus the dividend yield on the index, to expiration. When the index futures contract expires, its terms require that its value will be determined by the underlying stocks; that is, the differential or spread disappears.

[59]The SEC warned on Apr. 25, 1990, that it would act to discourage brokers from ''misinterpreting'' a 1986 exemption to the rule that applies to transitional index arbitrage [e.g., buying a basket of stock in London, selling the S&P 500 in Chicago, and then selling the stock portfolio in New York if the prices are falling]. Firms unwinding a stock position acquired overseas, according to SEC, will be more strictly monitored in the future to prevent them from using translational trading to avoid the uptick rule that would apply to trading in New York.

[60]Estimated in 1987 to be at least $25 million; see N. Katzenbach, *An Overview of Program Trading and Its Impact on Current Market Practices, 1987, p. 13.*

[61]Options and futures on stock-indexes expire concurrently, causing large-scale trading of the options, futures, and stocks.

mimics the basket of stocks represented in a standard index such as the S&P 500). They do this to be sure that their investment does at least as well as the market (even though this also means they will usually do no better). Replicating an index has other advantages over assembling a portfolio from scratch: it is less expensive to manage, since it does not require comparable investment advisory fees, and transaction costs are less. About 20 percent of all stock owned by pension funds is estimated to be indexed.[62]

Most institutional funds also hedge their indexed funds to further reduce their market risk. This could be done with index options, or with stocks and riskless assets such as Treasury bills, but typically it is done with stock-index futures. Some institutional investors do "dynamic" hedging, a continuous effort to lock in gains or minimize losses by buying and selling baskets of stocks and/or the stock-index future, depending on which is momentarily most attractive. Some index funds may turn over every share in the portfolio a half-dozen or more times a year.

One means of hedging that became popular during the 1980s was portfolio insurance, a mechanical hedging strategy that involves 'the sale of securities into a declining market in order to protect a portfolio against large losses. "[63] The concept may predate stock-index futures and options but now regularly uses them, and is also now generally exercised through a series of computer algorithms or models. When some marker such as the S&P 500 declines to a trigger level, the investor's computer might generate an order to sell S&P 500 stock-index futures or alternatively to sell the stock portfolio, to ensure against further declines. A typical goal in portfolio insurance is to make sure that at least 95 percent of the value of a current portfolio is safe from loss.

THE DEBATE ABOUT STOCK-INDEX FUTURES

After the 1987 crash, there was widespread concern that program trading-especially portfolio insurance and index arbitrage-may have contributed strongly to the debacle. Immediately after the crash, several reports said that inter-market programs (using stock-index futures) were a major factor. The Brady Report said that "By reasonable estimates, the formulas used by portfolio insurers dictated the sale of $20 billion to $30 billion of equities over this short time span [Oct. 19-23],' and thus "played a dominant role" in the crash.[64] The SEC reported that at least 39 million shares were sold by institutions on October 19 alone because of portfolio insurance strategies that called for stock sales either in lieu of futures transactions or as a supplement to them.[65] That report said that "the various strategies involving program trading were a significant factor in accelerating and exacerbating the declines.'

This was not universally accepted, and especially not within the futures industry and the CFTC. The Chicago Mercantile Exchange concluded that "index arbitrage does not appear to have played a major role in the crash," and program trading "does not by itself explain the magnitude of the crash. ' The CFTC report said that the trading data "does not provide empirical support for the theory that hedging in the futures market and index arbitrage activities interacted to cause a technical downward price spiral of stock prices."[66] Both have continued to maintain that position.

The suspicion voiced by critics of futures markets was that when stock prices began to decline, program trading *using* stock-index futures accelerated and magnified price movements. The problem, according to these critics, is twofold: 1) the program trading may cause traders to dump stock in a declining market, and more importantly, 2) many

[62]The largest index investors are New York State Common Fund, and the pension funds of New York State Teachers, the Exxon Corp., California State Teachers, and Central State Teamsters. From 74 to 100 percent of each of their portfolios is indexed. In 1988, this was a total of about $38 billion for these five investors. (Reported by *Wall Street Journal,* Oct. 20, 1989, using figures provided by *Pensions & Investment Age* Magazine.)

[63]William S. Haraf, "Lessons of the Stock Market Crash: What We Have Learned About Securities Markets and Their Regulation," *The AEI Economist, May* 1988.

[64]*Report of th presidential Task Force on Market Mechanisms, Washington* DC, 1988, p. 41.

[65]The Securities and Exchange Commission, Division of Market Regulation, *The* October *1987 Market* Break, 1985, pp. xiii and 1-5.

[66]Commodity Futures Trading Commission, Fi..l Report *on Stock Index Futures and Cash Market Activity During October 1987,* Washington, DC, 1988, p. 137.

institutional investors, with very large portfolios, may **act in concert, using the same or very similar** formulae and the same market signals, rather than disparate bits of information that might add up to a balanced assessment.

The Brady Commission said, however, that the real problem was the failure of index arbitrageurs to hold the stock and futures markets' prices together once prices began to slide: ". . . the problems of mid-October can be traced to the failure of [stock markets, options markets, and futures markets] to act as one. A third view was that, at worst, stock-index arbitrage had increased volatility slightly by increasing the speed with which new information is reflected in market prices.[67]

The particular form of inter-market program trading described above as portfolio insurance was most vulnerable to criticism because in 1987, many large institutional investors were using the same or very similar formulae. A sudden sharp fall in stock prices would call for an increase in the portfolio share allocated to lower risk debt securities and hence a corresponding decrease in the equity proportion; stocks sales would surge. Portfolio insurance programs would trigger buying and selling that reinforced the direction of the initiating stock market move.

Some defenders of portfolio insurance and stock-index futures point out that ''traders have always dumped stock in a declining market and bought in a rising market. ' But the classical theory of market equilibrium holds that a declining market will attract buyers who follow the rule of 'buy low, sell high.' In portfolio insurance, situations occur where either all participants are using similar algorithms to make decisions, or so many sellers attempt to sell so many shares so quickly, there is no time for buyers to be recruited.

One problem with this kind of portfolio insurance became clear to users after the 1987 crash. The typical formula directed that stocks be sold when their price dropped to a certain level or "stop-loss price," but prices were falling so rapidly that they often skipped over the trigger price, with **no** transaction occurring close to that price on the slide downward. 'Stop loss' orders did not get fried and it may have been some time before the would-be seller could establish that fact. This is the problem of the "gapping market." It clearly contributed to the panic that set in on October 19.

Until the 1987 crash, the use of portfolio insurance was growing rapidly, increasing fourfold in the frost 9 months of that year, and covering an estimated $60 billion to $90 billion of equity assets.[68] Some large securities firms publicly renounced both index arbitrage and portfolio insurance strategies after the market crash in 1987. Program trading fell to about 6 percent of NYSE average daily volume. Most of those firms subsequently resumed their use at least for customers.[69] But after a severe one-day market decline on October 13, 1989, there was renewed agitation against "program trading. " Several firms again publicly renounced the practice. The NYSE called for voluntary restraints and announced that it was initiating controls and establishing a blue ribbon panel to study the whole question of volatility.[70] The CME announced that it would "tighten its rules on trading halts in falling markets. " These measures were to some extent attempts to disarm public hostility and head off more drastic congressional actions. They were criticized both by those who saw the limits as too weak, and by many institutional investors who saw any limits on computer-based inter-market trading strategies as harmful to risk management. Some institutional investors threat-

[67]William S. Haraf, then of the American Enterprise Institute, pointed Out: *"Because trading index futures is the best way to quickly adjust the proportions of debt and equity in a portfolio, trades based on news about the near-term macroeconomics outlook . . . are often directed first toward the index futures markets. . . . Arbitrage ensures that stock prices adjust quickly to the new information initially transmitted to the index futures markets. To those on the floor of the stock exchanges, it may look as though futures trading *caused the* market to move, but that is only because it is the preferred market for trading on macroeconomic information, op. cit., footnote 63, p. 3.

[68]Brady Task Force Report, 1988, P. 29.

[69]For example, Dean Witter says that it ceased using program trading for its own account in 1987 but continued to do it for customers until July 18, 1989. Merrill Lynch, Salomon Brothers, Paine Webber, and Shearson also program-traded for customers but not for their proprietary accounts for some period after October 1987.

[70]The panel, chaired by Roger B. Smith, chairman of General Motors Corp., reported in June 1990. It did not recommend restrictions on program trading, but did recommend stronger circuit breakers to control volatility.

ened to continue program trading manually or move their equities transactions to off-exchange markets.[71]

The debate continues as to whether the use of stock-index futures in some or all kinds of inter-market trading strategies: 1) caused or contributed to the crash of 1987, or 2) in general, leads to or contributes to excess volatility in securities markets. The empirical studies that deal directly with this issue do not, in the aggregate, provide conclusive, answers:

- G.J. Santoni (whose research was concluded and reported prior to the 1987 crash) concluded that daily cash market volatility was slightly lower after 1982 (when stock-index futures were introduced) and weekly volatility was slightly higher, but neither difference was statistically significant.[72]
- Professors Stoll and Whaley, a year before the 1987 crash, found that stock price volatility increased around the triple-witching hours, but this volatility did not last long.[73]
- Professor Frank Edwards found, in June 1987 that stock return volatility was not higher on average since the beginning of trading of futures and options, but was higher on futures expiration days, especially in the last hour.[74]
- Lawrence Harris, using data covering 1982-86, reported that before 1985, the volatility of stocks represented in the S&P 500 index was not significantly greater than the volatility of non-index stocks when allowance was made for relative risk, price, firm size, and trading frequency. He concluded that the stock-index futures did not affect stock volatility in the first 3 years. In 1985 and 1986 index stock did show more volatility .75 Harris nevertheless said that rather than destabilizing the cash markets, trade in futures and options may serve to make the cash markets more efficient, causing them to adjust more quickly to new information.
- In another study of the week of the crash, Harris concluded that "the crash might not have been as large' had it not been that exchange regulation, congestion in the order and confirmation systems, and other difficulties in executing sale orders in the stock market "removed a significant flow of buy orders in the futures market" and increased the number of sell orders coming into the futures market.[76] This, Harris says, accelerated drops in futures prices, and they were transmitted to the stock markets since ''the evidence strongly suggests that the cash follows the futures market."
- Professor G. William Schwert concluded that over the long run, stock market volatility of rates of return "have not been unusually high in the 1980s, except for very brief periods such as October 1987. " Therefore "there is little evidence that the level . . . has increased *since* the beginning of trading [of stock-index futures] . . . in the early 1980s.' Schwert *also* says that there is evidence that large levels of trading occur when volatility is high, but he cannot tell ''whether the large volume causes high volatility, or whether large volatility and trading volume are caused by the arrival of important information. ' '[77]

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[71]About 6 million shares a day are exchanged by several hundred large institutions in the third market, through two off-exchange electronic systems: Crossing Network (Reuters/Instinct) and Posit, a system run by a Los Angeles securities company. Most of these program trades do not involve stock-index futures (for which there is no legal off-exchange trading), and are done to liquidate or rebalance portfolios built during the trading day. But it is possible that if program trading is forbidden on the exchanges, much of it could move to these off-exchange systems.

[72]G.J. Santoni, "Has Programmed Trading Made Stock Prices More Volatile,' *Economic Review,* Federal Reserve Bank of St. Louis, May 1987, pp. 18-29.

[73]Hans Stoll and R. Whaley, "ExpirationDay Effects of Index Options and Futures, " Monograph Series in Finance and Economics, No. 1, Salomon Brothers Center for the Study of Financial Institutions, New York University, 1986.

[74]Frank Edwards, ''Financial Futures and Cash Market Volatility,'' CSFM Working Paper 159, Columbia University, June 1987. In subsequent papers, Edwards concluded on the basis of review of major agency and' academic studies of the crash that higher margins and price limits cause price inefficiency. "Does Futures Trading Increase Stock Volatility, " *Financial Analysis Journal,* January-February 1988, pp. 63-69.

[75]Lawrence Harris, ''S&P 500 Futures and Cash Stock Price Volatility,' Working Paper, University of Southern California, Los Angeles, CA, May 1988.

[76]Lawrence Harris, "The October 1987 S&P 500 Stock-Futures Basis,' *Journal of Finance,* vol. 44, No. 1, March 1989, *pp. 77-79.* Nonsynchronous trading refers to the fact that the S&P 500 index lags behind the real value of the underlying basket of stock when some of the constituent stocks have not recently traded (since the "true' value of the stock may change between trades). If the price of the futures contract is efficiently mirroring the 'true" value, Harris says, spurious conclusions about volatility, market efficiency, and the relation between the futures and cash markets can be obtained.

[77]G. William Schwert, "Stock Market Volatility," NYSE working paper No. 89-02, December 1989.

- Al McGartland and George Wang, in a study for the CFTC,[78] developed a model that compared exchange-traded stock volatility with volatility in the over-the-counter (OTC) market (which has no derivative futures contracts). They concluded that in 1984 and 1985 stock-index futures decreased cash market volatility somewhat and in 1986 and 1987 [data after Oct. 1, 1987 were not included] "cash market volatility increased somewhat as a result of stock-index futures. ' McGartland and Wang said: "However, even if daily volatility is increased slightly by stock index futures, like Harris (1988) we do not know if this is good or bad. It maybe that stock index futures allow the S&P 500 cash market to reflect market fundamentals more rapidly than the cash OTC market. In this case, the increased volatility is beneficial since prices more accurately reflect market fundamentals. The increase in volatility may be due to temporary shortages of liquidity.
- Dean Furbush, in a study for the SEC, analyzed data over 5-minute intervals for October 14 to 20, 1987, and concluded that: 1) index arbitrage was insufficient to keep futures prices from falling to unprecedented discounts relative to their fair value; 2) the size and persistence of the futures price discount induced much of the heavy portfolio insurance selling to spill from the futures market into the stock market; 3) despite the increased volume of program trading on October 19, "this study does not find that greater price declines systematically occurred at times of more intensive selling by portfolio insurance or any other program trading strategies. ' '[79]
- Lawrence Harris, George Sofianos, and James E. Shapiro, in a 1990 paper for the New York Stock Exchange, examined data on the relationship of volatility to program trading and concluded that futures price changes instigated program trading which led to stock price movement.[80]
- Chen-Chin Chu and Edward L. Bubnys found that volatility in S&P 500 futures is higher than volatility in the cash market.[81]

There is no clear consensus on the effects of stock-index futures on stock market volatility. The researchers have used differing definitions and criteria for volatility, different time periods and data sets, and different research hypotheses.

The policy debate . has been shaped by a bitter battle for market share between the futures and stock exchanges and by rivalries between their respective federal regulators. . .."[82] The SEC has generally maintained that the presently inadequately regulated use of stock-index futures threatens stock market stability, and wants these products under its own jurisdiction (see ch. 9).[83] The CFTC, nearly always defensive of the industry it regulates, denies that there is any causal relationship between stock-index futures and stock price volatility. Alan Greenspan, Chairman of the Federal Reserve Board (FRB), said that the FRB was concerned "about what seems to be a higher frequency of large price movements in the equity markets, but he was ''not convinced that such movements can be attributed to the introduction of stock-index futures and the opportunities they offer for greater leverage.''[84]

As already noted, this debate is made more heated because many people in the general public, and many small investors, view the use of derivative products in general and stock-index futures in particular as merely gambling. They argue that this gambling increases the velocity of trading in the underlying stocks and increases the risks borne by other market participants.

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[78]Al McGartland and George Wang, "The Effects of Stock Index Futures on Cash Market Volatility: An Empirical Study," Staff Working Paper #89-3, *Commodity* Futures Trading Commission April 1989.

[79]Dean Furbush, ''Program Trading and Price Movements Around the October 1987 Market Break" Office of Economic Analysis, U.S. Securities and Exchange Commission, May 9, 1989, p. 35.

[80]Lawrence Harris, George Sofianos, and James E. Shapiro, "Program Trading and Intraday Volatility," New York Stock Exchange Working Paper 9003, March 1990.

[81]Chen-Chin Chu and Edward L. Bubnys, "A Likelihood Ratio Test of Price Volatilities: Comparing Stock Index Spot and Futures," *The Financial Review 25, No.* 1, February 1990, pp. 81-94.

[82]Haraf, op. cit., footnote 63.

[83]Former SEC Chairman Ruder told Sen. Proxmire that the existence of these products, ". . . may encourage additional trading in the equity markets, with a resultant increase in intra-day volatility. " Letter to Sen. William Proxmire from SEC Chairman David S. Ruder, Mar. 30, 1988, reprinted in *Black Monday, the Stock Market Crash of October 19, 1987, Heat-ings* before Senate Coremittee on Banking, Housing, and Urban Affairs, 100th Cong., 2d sess., 1988, pp. 515, 516.

[84]Testimony before the Subcommittee on Securities of the Senate Committee on Banking, Housing, and Urban Affairs, Mar. 29, 1990.

Whether there is or is not a fundamental difference between buying stock and buying stock-index futures, this difference in perception has direct political/economic implications. It has led to demands that stock-index futures and options should be abolished by regulation, or that at a minimum their trading should be discouraged (perhaps by higher margins or by a substantial tax on short-term investments, or by requiring transfer of stock rather than the much less expensive current method of cash settlement) .85 The debate over stock-index futures has recently shifted grounds, to the issue of which regulatory agency (the CFTC or the SEC) should regulate stock-index futures. This issue is explored in chapter 9.

MARGINS

In futures markets, financial integrity is bolstered by a system of margins, defined by the industry as a security deposit, or performance bond,[86] the purpose of which is to make sure that the futures market participant will be able to meet the obligations embodied in the futures contract. Futures margins have two elements, initial margin and variation margin. Initial margin is paid in advance, by anyone entering either a buy order or a sell order. It remains on deposit at a clearing firm (or is passed through to a clearinghouse) while the contract is open. It might be, for example, 5 percent of the face value of the contract, but this requirement changes from time to time. A futures customer must deposit additional funds if the equity in his account falls below a maintenance margin level, to bring it backup to the initial margin level.

Variation margin must be paid to cover losses on a daily, pay-as-you go basis. This is called "marking-to-market,' and it is done twice daily and more often during periods of significant market swings. Thus to maintain a futures position, a customer must have on deposit an amount equal to at least maintenance margin, and must be able to pay out in cash 100 percent of all losses daily. (They may also withdraw their gains.)

The level or amount of the initial margin is set by the futures exchange, and is intended to be high enough to protect against contract nonperformance, but low enough to make futures contracts very economical for the user. It has typically been 5 percent or less of the face value of the contract,[87] and for the market professionals it is typically much lower, about 3 percent, especially at the CME and CBOT

The subject of futures margins has sporadically been controversial, and since the 1987 market crash it has again been hotly debated. This issue, like that of dual trading, is not directly related to information technology. Yet information technology, by facilitating the linking of futures markets and stock markets and by encouraging portfolio trading, has given new life and new urgency to the issue.

The issue involves the level at which futures margin requirements are set. This controversy follows much the same industry and jurisdictional lines as that about the use of stock-index futures. Some policymakers and financial experts believe that low margins allow speculators to hold large open positions with relatively small amounts of money (i.e., high leverage). This, they reason, may cause excessive volatility in futures markets, and that through inter-market arbitrage and other less direct effects this volatility is extended to stock markets. This concern is most acute in the case of margins on stock-index futures. These critics usually argue that futures market margins should be raised, to a level that is more consistent with margins in stock markets.[88] They often argue also that the locus of responsibility for setting margin requirements

[85] Allen B. Paul, "The Role of Cash Settlement in Futures Contract Specification," *Futures Markets: Regulatory Issues, Anne* E. Peck (cd.) (Washington, DC: American Enterprise Institute, 1985).

[86] "Open positions in futures represent legal obligation either to make or take delivery, and margins are security deposits—a performance bond—intended to ensure performance on the contract. . . . Since most initial positions in futures are canceled by taking opposite positions rather than by delivery and since both short (a sale) and long (a purchase) positions are margined, it should be clear that the margins are not downpayments.' William G. Tomek, "Margins on Futures Contracts: Their Economic Roles and Regulation," *Futures Markets: Regulatory Issues, Anne* E. Peck (cd.) (Washington, DC: American Enterprise Institute, 1985), p. 144.

[87] In May 1990, the CME was requiring speculators to post $9,000 initial margin and hedgers $4,000. In July, as this report went to press, initial margin for speculators was $22,000 and for hedgers $8,000. (Margin requirements change frequency.) When the index is at 350, a stock-index future contract is worth $175,000 (350 x 500, the S&P multiplier), and the initial margins are set at $9,000 and $4,000, the margins would be 5.1 and 2.2 percent, respectively.

[88] In stock markets, margins are defined as downpayments on stock purchases (the seller pays no margin, in contrast to futures markets); the required level is set by the Federal Reserve Board, and has been 50 percent since 1974, but much less for specialists. Options margin requirements for broad-based stock-index options were raised after the 1987 crash to premium plus 10 percent (from 5 percent) and raised again to 15 percent in May 1988.

should be changed, the assumption being that so long as requirements are set by the exchanges (or their clearing organizations) they will remain too low.

The futures industry (and the CFTC, which oversees but does not directly determine margin levels except in emergency situations) counters that futures margins are fundamentally different in purpose and function from margins in securities markets; that they are and have been consistently proven to be adequate to protect the financial integrity of the markets and their participants; that they have no demonstrated adverse effects on levels of volatility; and that low margins are desirable to increase market liquidity. Futures margins levels are supposed to be determined by the level of volatility (indicating risk) in the market. Both buyer and seller deposit margin to guarantee performance of the contract.[89]

The longer time to settlement in stock markets, and the fact that stock margins are not "marked-to-market' justify some difference in absolute levels of funds required. The industry's premise that stock and futures margins are "fundamentally different" is questionable.[90] More pragmatically, the concept that futures margins need only protect futures clearing organizations and do not effect other markets, is questionable. After the 1987 crash, then SEC Chairman Ruder, among others, suggested changing margin requirements in order to "limit leverage in the futures markets' and control market velocity. He cited SEC staff findings that the ''illusion of liquidity' in futures markets and the use of stock-index futures as surrogates for stock basket positions pushed up stock prices and thus led to their drastic readjustment.[91] The Brady Report also recommended that margin requirements be ' 'harmonized between the equity and derivative markets. ' '[92] The Katzenback report (for the NYSE) made a similar recommendation.[93]

Among those who have called for harmonized (or for higher) margins on stock-index futures since the 1987 market break are Congressmen, securities exchange officials, other representatives of the securities industry, and securities law practitioners.[94] These recommendations were based On the reasoning that when futures prices begin to fall and there are margin calls during the day, investors may sell stock to meet those calls, thus transferring stress to the stock market. There are strong differences of opinion about this. The futures industry and CFTC point out that during the crash the largest sellers of futures were pension finds which held large inventories of stocks and could have sold them to meet

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[89] If at maturity of the futures contract, the buyer wishes to take possession of the underlying asset the total cost of the asset must be supplied. However, stock-index futures cannot be settled by taking possession of the stocks in the index. For more information, see Hans R. Stoll, "Margins on Stock Index Futures Contracts," Chicago Mercantile Exchange Working Paper No. 89-21, Oct. 2, 1989, p. 1.

[90] For example, Professor James Gammill of the Harvard Business School has reproved the futures industry for its insistence that "'Stock margins are down payments but futures margins are not.' I believe that nothing beats this slogan for creating confusion about margins on the part of policy-makers and analysts who are not familiar with financial markets. The main source of the communication problem is the fact that the term 'margin' is sometimes used as shorthand for 'margin account equity,' while other times it is used as shorthand for 'margin requirement.' (And neither use of the term 'margin' is directly analogous to a down payment.)' James F. Gammill, Jr., "The Case for Federal Regulatory Oversight of Futures Margins," in Proceedings of the Fall Research Conference on Regulatory Issues in Financial Markets, *The Review of Futures Markets,* vol. 7, No. 3. Washington DC, November 1988. The final sentence in the quotation is, in the original, a footnote to the preceding sentence.

[91] SEC Recommendations Regarding the October 1987 Market Break: Testimony of David S. Ruder Before the U.S. Senate Committee on Banking, Housing and Urban Affairs (Feb. 3, 1988), pp. 7-8 and 14-15. Commissioner Edward HFleischman reaffirmed in 1988 the SEC's position that margins on futures and options should be increased to increase investor confidence, to decrease speculation in futures and options, and to reduce the illusion that the futures and options markets provide sufficient liquidity to allow quick portfolio liquidations in large amounts. See Panel Discussion on Regulatory Issues Facing the Futures Industry, Chicago Board of Trade, *The Review of Futures Markets,* vol. *7, No.* 1, May 1988, p. 202.

[92] *Report of the Task Force on Market Mechanisms,* May 5, 1988, pp. 64-66.

[93] Nicholas Katzenbach, *An Overview of Program Trading and Its Impact on Current Market Practices,* December 1987, p. 31.

[94] A sampling includes: Rep. Edward Markey, Subcommittee on Telecommunications and Finance, House Energy and Co mmerce Committee, in hearings July 14, 1988, and press release, May 4, 1989; Arthur Levitt, Chairman of the American Stock Exchange, writing in *The Washington Post,* July 12, 1988, A23; John L. Watson, President of the National Security Traders Association in a letter to the SEC Division of Market Regulation, Mar. 10, 1988; George L. BaChairman of Prudential-Bache Securities, in testimony before the Senate Finance Committee, May 11, 1988; Peter Buchanon, President of The First Boston Corp., in a letter to the Chairman of the NYSE, Jan. 29, 1988; Jeffrey B. Lane, President of Shearson Lehman Hutton, in testimony before the Subcommittee on Telecommunications and Finance, House Energy and Commerce Committee, July 14, 1988; Philip Purcell, Chairman of Dean Witter Financial Services Group, Inc. letter to the Chairman of the SEC, Feb. 24, 1988; Felix Rohatyn, Partner, Lazard Freres, in testirnonybefore the Subcommittee on Telecommunications and Finance, House Energy and Commerce Committee, July 14, 1988; Stanley B. Shopkorn, Vice Chairman and Managing Director, Salomon Bros., at a Center for National Policy Symposium on Mar. 8, 1988; Thomas A. Russo, Partner, Cadwrdader, WickerSham & Taft, in testimony before the Subcommittee on Telecommunications and Finance, House Energy and Commerce Committee, May 3, 1990.

even higher margin calls;[95] CFTC analysts say that some pension funds use as margin their significant cash or cash-equivalent holdings and would have no need to sell stock, which in any case would take 5 days for clearing and settlement. By contrast, many individual speculators were net buyers of futures during the crash, but might have been forced to liquidate by higher margin requirements. The CFTC chairman claims that 'margin call sell-off" was not a factor in the crash.[96]

" A Federal Reserve analysis, however, notes that '. . . speculators will shift to markets where initial margin requirements are effectively lower,' and thus "excessive volatility, as well as nonfundamental pricing, may be transmitted from one market to another. "[97]

Again, empirical studies of the relationship between futures margin levels and stock market volatility reach conflicting findings and are in the aggregate inconclusive. Both sides of the debate can marshal some statistical evidence, depending on the times studied, the definition of volatility that is used, and the way the question is framed. Only a few empirical studies directly relate to this point; many of those sometimes cited deal with stock margin levels, but not futures market margin levels. G.A. Hardouvelis, who found a negative relationship between margin levels and volatility, and Hsieh and Miller, who claimed to have refuted this finding, both analyzed stock market margin levels.[98] G. William Schwert (University of Rochester) analyzed many factors thought to affect stock volatility and concluded that leverage has a relatively small effect on stock volatility, and there is no evidence from the stock market that increasing margin levels would change volatility.[90] A CFTC study of events during the crash concluded that low futures margins "could not be shown to have contributed to excessive volatility." [100]

The debate on this issue, like that on stock-index futures and volatility, often reflects long-standing industry/agency positions. The CFTC holds that the margin on stock-index futures should be 28 to 29 percent as high as the margin on the underlying stocks (but also maintains that futures exchanges should set margin requirements without government interference).[101] The President's Working Group on Financial Markets reported in May 1988 that it 'was not able to agree on whether or not it is appropriate or effective to raise margins above prudential levels in an attempt to reduce leverage or dampen velocity. " Their report was specific about the disagreement; the SEC chairman wanted higher futures margins, while the CFTC chairman, the Department of Treasury representative, and the FRB chairman "do not believe that the evidence supports the conclusion that higher margins will reduce volatility, ' and were reluctant to raise them because this would increase transaction costs and ''could have a negative effect on market liquidity and efficiency, possibly increasing volatility and risking the movement of futures trading into off-shore markets. ' After the Working Group's report the futures markets subsequently reduced their margin requirements, to levels below those at the time of the crash.

By 1990, this line-up was changing. Secretary of the Treasury Nicholas Brady had chaired the President's Working Group and had acquiesced in its

[95] Many pension funds (and other institutional investors), however, had short futures positions and had no margin calls as the market fell.

[96] ''. . . An examination of the magnitude of open interest in the S&P 500 stock-index futures contract on high volatility days contradicts the supposition that margin call sell-off exacerbated the market decline. On both Oct. 19, 1987, and Oct. 13, 1989, open interest at day's end was higher than on the previous day-more positions were opened than were closed. "Wendy L. Gramm, Ph.D., statement before the Securities Subcommittee of the Senate Committee on Banking, Housing, and Urban Affairs, Mar. 19, 1990.

[97] Arturo Estrelia, "consistent Margin Requirements: Are They Feasible," Quarterly *Review*, Federal Reserve Bank of New York, vol. 13, No. 2, Summer 1988, pp. 69.

[98] G.A. Hardouvelis, "Margin Requirements and Stock Market Volatility," *Federal Reserve Bank of New York Quarterly Review, 1988*, pp. 80-89. David A. Hsieh and Merton H. Miller, "Margin Regulation and Stock Market Volatility," Graduate School of Business, University of Chicago, April 1989. Hardouvelis tested the historical effect of stock market margins on volatility, and concluded that margins are related inversely to volatility and low margins are associated with speculative bubbles. Kusark and Salinger, in two separate working papers for the CFTC, reexamined Hardouvelis' study. Kusark said that its regressions were unstable and biased both by the pre-1945 time period that was included and by the method of calculating volatility. He concluded that margins had no effect on volatility. Salinger concluded that Hardouvelis' thesis did not hold up regarding the bull market of the 1920s—low margins did not cause it.

[99] G. William Schwert, "why Does Stock Market Volatility Change Over Time'?' GPB 87-11, May 1988, and "Stock Volatility and the Crash of '87," BC 89-01, January 1989, General Working Papers: Bradley Policy Research Center, University of Rochester.

[100] McGartland and Wang, op. Cit., footnote 78.

[101] Wendy L. Gramm, CFTC Chairman, in a statement to the Subcommittee on Telecommunications and Finance of the House Energy and Commerce Committee, May 19, 1988. Chairman Gramm said that margin on stocks should be roughly 3.5 times higher than the margin on stock-index futures.

findings, although the 1987 President's Task Force which he had also chaired, had called for harmonization of margins across the markets. However, Brady later announced that he intended to ask the Working Group to reconsider the issue, because "there is a public interest involved beyond the private interest of the exchanges. "[102]

Debate about the appropriate level of futures margin usually becomes debate about where the ultimate responsibility for these decisions should lie: in the private sector, as it does now or in a regulatory agency? If the latter, should it be the SEC (which does not set stock margin requirements, but wants higher futures margins), the FRB (which does set stock margin requirements, but does not currently want the responsibility for futures margins), or the CFTC (which has generally favored leaving this responsibility with the futures exchanges, and has generally defended low margins)?

On the issue of futures margins, and who should determine their levels, the two U.S. regulatory agencies disagree. The CFTC has consistently affmed the futures industry's position that futures margins are fundamentally different from securities margins, that they should be kept low and flexible, and that as a policy tool, margin regulation is "poorly adapted to controlling or even limiting volatility. "[103] Higher margins might reduce the activity of speculators, leaving the markets without liquidity. The agency position has been that there is no need for regulatory control of futures margin levels, either by CFTC or other Federal authorities.[104]

When stock-index futures were first proposed in 1979, the FRB asserted that it had the authority to impose margin requirements, and would do so, on the grounds that the proposed contract would be a functional equivalent of stock-index options and therefore should be subject to equivalent regulation and margin requirements. The FRB's responsibilities are broader that those of the SEC and the CFTC; its mandate includes caring for the stability of U.S. financial markets generally. In this context, the FRB may have considered assuming responsibility for stock-index futures margin requirements as another kind of credit control. After the futures exchanges set higher margins for the index futures contracts than those for other kinds of futures, the FRB did not insist on setting margin levels, and it has not renewed its claim to responsibility.

Congress has several times considered the possibility of futures margin regulation as a potential policy instrument to restrain market behavior and to protect naive investors. For example, in 1974 when the CFTC was created, in 1980 after a silver market scandal, and after the 1987 market crash there were proposals to authorize either the CFTC or the Federal Reserve Board to set futures margins. With the development of financial futures, and especially stock-index futures, this interest in margin requirements focused especially on the issue of parity of regulation of margins among futures, options, and stocks.[105]

Margin requirements may have different functions in futures markets and in securities markets, but they have two common purposes in both markets when viewed from a public policy perspective: protection of the integrity of the markets, and control of excessively speculative activity.[106] Margins limit the credit risks of individual participants, primarily not to protect those participants but to insure that in times of stressed markets, cascading failures could not in the aggregate cause the breakdown of the market as a whole. The question is whether harmonization of margin levels-or "consistency in margin requirements across equity-related markets"—would achieve those two objectives. In this case, ''consistency' could mean allowing the various parameters of margin requirements (i.e., initial, maintenance, and variation margins, posting periods, exemptions) to be set at different levels, but in such a way that the probability of default are about the same in each market.

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[102]Testimony before the Senate Committee on Banking, Housing, and Urban Affairs, Oct. 26, 1989, p. 12.

[103]Andrea M. Corcoran (Director of the CFTC's Division of Trading and Markets), ''Aftermath of the Crash: Policy Assessments, Public Perceptions, and prospective Reforms, " a speech for the Japan Center for International Finance, 1988.

[104]Gramm, op. cit., footnote 101; Corcoran, op. cit., footnote 103.

[105]William G. Tomek, ''Margins on Futures Contracts: Their Economic Roles and Regulations, " Anne E. Peck (cd.), Futures Markets: Regulatory Issues (Washington, DC, American Enterprise Institute, 1985), p. 195.

[106]This formulation draws on that of Arturo Estrella, Federal Reserve Board analyst, in ''Consistent Margin Requirements: Are They Feasible?" *Quarterly Review,* Federal Reserve Bank of New York, vol. 13, No. 2, Summer 1988, pp. 61-79. Estrella concludes that if speculation is a real issue, the consistency of at least initial margins should be seriously considered.

The Bush Administration has asked that authority to regulate stock-index futures be transferred, which presumably would transfer responsibility for their margin requirements either to the SEC or to the FRB, which is responsible for stock margin requirements. This issue is discussed in chapter 6.

PREPARING FOR THE FUTURE

Two Chicago futures exchanges have recognized the challenge posed by the strong movement toward international trading.[107] The CME and the CBOT are developing an electronic system for "24-hour trading," or the execution of transactions at a geographical distance or outside of trading hours of local markets. CME and CBOT are taking the calculated risk that their own automated systems for off-site trading, if successful, may eventually put out of business their traditional form of market, the ''open outcry" or pit auction system. They may recognize the likelihood that if they do not take the lead, others outside the industry will do so.

Foreign futures exchanges have began to compete directly with U.S. futures exchanges. There are futures exchanges in Aukland, London, Paris, Frankfurt, Zurich, Hong Kong, Tokyo, Singapore, and Sydney. When they began to offer their own local versions of U.S. contracts, investment firms were able to offer these products to customers without regard to trading hours in the United States, the threatened U.S. exchanges took action.[108] They first attempted to meet this competition through mutual offset agreements,[109] e.g., one between The Chicago Mercantile Exchange (CME) and the Singapore International Monetary Exchange (SIMEX) for Eurodollar and foreign currency contracts. CME/SIMEX was successful, although only marginally so. Another response was to lengthen trading hours; for example, CBOT began both an earlier opening (7:20 a.m.) and an evening session.

In September of 1987, the CME announced that it would develop-together with Reuters—an electronic futures and futures-options trading network, the Post (Pre) Market Trade System, later renamed GLOBEX for "global exchange." CME members accepted the idea, with the assurance that GLOBEX was strictly an off-hours system, and in return for receiving a portion of the revenues generated by GLOBEX.[110]

In early 1989 the CBOT unveiled plans for another off-hours global system, ''AURORA. ' While the GLOBEX system is an automatic order matching system, AURORA attempted to emulate the traders in the pit with icons (symbols) that allow traders to select the counterparts to their trade. The CBOT claimed that AURORA would capture "all of the economic advantages of the auction market combined with the advantage of the ability to conduct trading from any location in the world. ''ill

There were complaints from the financial futures community about the need to install two terminals, and CME and CBOT announced they would consider merging the GLOBEX and AURORA development efforts. While sporadic negotiations continued, development proceeded independently on each system for over a year. In May 1990, the two exchanges announced that they had agreed to merge GLOBEX and AURORA. The details of this plan are not yet worked out. It is possible that AURORA will become an optional user interface with the GLOBEX system.

The network will bean interactive data communications network linking individual user terminals with a central computer at Reuters. It will operate only after normal U.S. hours of trading and will link investors in North America, Asia, and Europe. GLOBEX adjusts the timing of all bids and offers to equalize for distance; i.e., the speed with which they are posted depends on the transmission time for the most distant trader active at that time. For entry of orders, trader terminals consisting of keyboard, monitor, and printer will be located in the offices of CME clearing members and individual members (including overseas members) who are qualified and backed by a clearing member. (See ch. 6 for an

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[107] See OTA's background paper, op. cit., footnote 6.

[108] Karen Pierog, "How Technology Is Tackling 24-Hour Global Markets," *Futures*, June 1989, p. 68.

[109] ''Offset'' (in this context) means that one can open a position in one country and close it in another, and pay only one brokerage fee.

[110] The rights conferred by membership in CME, or "a seat,'' are to be divided into access to pit trading and access to trading through GLOBEX. Members will have the right to "lease" one of these rights; e.g., a pit trader can lease to someone else, presumably overseas, his access to GLOBEX, thus generating additional income. If GLOBEX (or other electronic trading systems) comes to dominate futures trading, the increase in value of their access to it will presumably compensate the pit members for this competition.

[111] ''AURORA—EOS,'' promotional literature distributed by CBOT.

explanation of the responsibility of clearing members.) Administrative terminals, in the offices of clearing members only, would also receive confirmations of all trades resulting from orders entered into associated trader terminals. The terminals will display the 10 best bid and 10 best offer prices, along with the quantity bid or offered; the last sale price, and other data.

Reuters will provide the computer hardware and software and also make available other Reuters' services (e.g., news and cash market quotations) through GLOBEX terminals. CME will determine the instruments, and the rules and procedures for trading, and will provide clearing facilities, auditing, compliance, and market surveillance. Despite Reuters being a British company, the joint effort is largely seen as a globally strategic move for the preservation and enlargement of the U.S. position in commodities and financial futures trading. It may also be a harbinger of global ''floor-less' trading in the future. It is significant, however, that Reuters has recognized the value of partnership with an organized and regulated marketplace, the exchanges.

Chapter 5

The Operation of Options Markets

CONTENTS

	Page
THE OPTIONS MARKETS	93
OPTIONS EXCHANGES	95
TRADE SUPPORT SYSTEMS IN OPTIONS MARKETS	96
OPTIONS MARKETS IN THE 1987 CRASH	96
SIDE-BY-SIDE TRADING	97
MULTOPLE-TRADING OF OPTIONS	97
OPTIONS MARGINS	100
Cross-Margining	101
Futures-Style Margining	103

Chapter 5
The Operation of Options Markets

THE OPTIONS MARKETS

Options are financial contracts that confer the *right* to buy or sell a specific asset or financial instrument at a given price-the "strike price. "[1] Thus they differ from Futures contracts, which create an *obligation* to buy or sell. There are listed options on individual securities, on securities indexes, on foreign currency, foreign currency indexes, and Treasury instruments, on "physicals other than securities' (e.g., metals), and on futures contracts.

Options on individual securities and indexes of securities are traded on securities exchanges, and are regulated by the Securities and Exchange Commission (SEC). Options on commodities (non-securities, e.g., farm products and oil), and on futures and stock-index futures are traded on commodity exchanges and are regulated by the Commodity Futures Trading Commission (CFTC). Most options on foreign currency are regulated by the CFTC, except those that are traded on a securities exchange (the Philadelphia Stock Exchange, which trades options on seven foreign currencies and is regulated by the SEC).

Call options give the holder the right to buy; put options give the holder the right to sell. For example, the holder of a call option on a stock might find that the market price of the stock has risen above the option contract's strike price. The holder can exercise the option, buying the stock at the lower strike price and selling it immediately at the higher market price. Or the holder can sell the option itself at a higher price than was paid for it. (Most options contracts are closed out in this way rather than exercised.) The holder of a put option, on the other hand, watches for the market price of the security to fall below the strike price. The holder can buy stock at the lower market price and then exercise the put option to sell the stock at the higher strike price. An option contract on stock is normally for 100 shares of stock.

All options on a specific asset or financial instrument, for example, Stock X, are a "class' of options. All options of the same class with the same strike price and expiration date are a "series" of options.

Both call and put options are sold by an option writer, the person who in theory must deliver stock when the call option is exercised, or buy it when the put option is exercised. (In fact, transactions are handled through the options clearinghouse.) The option writer is paid a premium when the option is purchased, and keeps the premium whether or not the option is exercised.

The premium earned by an options writer is determined in the market place and has several elements. An option may have an intrinsic value when it is written. Thus a call option on Stock X with a strike price of $40, at a time when Stock X opens at $48, would have an intrinsic value of $8. An option with intrinsic value is said to be ''in the money.' An option also has "time value,' the extra amount a purchaser will pay for an increased possibility that the price of the stock will move in the desired direction before the option expires. The longer the option has to run, the greater its time value. Other factors also affect the price or premium paid for an option, such as the volatility of the price of the security or of the market in general, and the effect of supply and demand.

Exchange trading of standardized options began in 1973 with creation of the Chicago Board Options Exchange (CBOE); this was followed quickly by options trading on the American (AMEX), Philadelphia, and Pacific Stock Exchanges. The New York Stock Exchange (NYSE) did not begin trading options on stocks until 1985. Stock options trading is still dominated by CBOE, with 60 percent of the total volume.

Before 1973, non-standardized options had been bought and sold for years, in an unregulated

[1]Much of this section of the report draws on an OTA contractor report: Joel Seligman (University of Michigan Law School), *Stock, Options, and Stock Index Futures Trading, 1989,* pp. 100-200. See also, Joel Seligman, "The Structure of the Options Markets," *IO Journal of Corporate Law* 141, *1984;* David Lipton, "The Special Study of the Options Market: Its Findings and Recommendations," 7 *Social Regulation and Law Journal 229,* 1980; *Report of the Special Study of the Options Markets to the SEC,* House Committee on Interstate and Foreign Comrneree, 96th Cong., lst seas. (Comm.Print 96-1FC3 1978).

over-the-counter dealer market. The non-standardized options were typically written in bearer form by professional investors or dealers, and then bought and sold over the counter. In New York there was a Put and Call Brokers and Dealers Association, with 20 members who did most of the Nation's options writing. Over-the-counter (OTC) options writing nearly disappeared after 1973. But after computerized "portfolio insurance' was discredited by the 1987 crash (see chs. 3 and 4), some large brokerages began writing put options for institutional customers to allow them to protect their portfolios.[2] When stock prices began to slide on October 13, 1989—according to SEC and CFTC analyses—the brokers rushed to increase their own hedges by selling futures and stocks, thus contributing heavily to the market break.[3]

Most listed options in both the United States and Europe are 'American-style' options, which means that they can be exercised at any time up to or on the expiration date. "European-style" options can be exercised only on the expiration date.

Total U.S. trading in options contracts increased from 1.12 million contracts in 1973 (all at CBOE), to 305.17 million contracts in 1987 (56 percent of it at CBOE, 22 percent at AMEX). Options contract volume declined more than one-third in 1988, after the crash; and then partly rebounded to 227.02 million in 1989. Stock-option volume as a percent of trading volume in the underlying stock peaked in 1981, at 92 percent of NYSE trading volume. The continued decline from 1981 to 1988 may have been related to the introduction of index options in 1983 (although there had already been some decline) because many investors had been using options on such highly capitalized stocks as IBM to take hedge positions on the market as a whole.[4] By 1986, stock-index option volume was nearly equal to volume of options on individual stocks. After the *1987* crash, index option volume dropped sharply—down 42.5 percent in 1988 at the CBOE, 59 percent at AMEX, and 68 percent at the NYSE. This may have been because many individual investors who had been using stock-index options stopped doing so, but there was also a 40 percent drop in stock-index futures trading volume at the Chicago Mercantile Exchange (CME), and these contracts are mostly used by institutional investors.[5]

The CBOE created modern options in 1973 by pioneering two concepts: contract standardization (by fixing of expiration months and strike price intervals) so that options are fungible; and establishment of a clearinghouse to be the issuer and guarantor of the options. This clearinghouse, the Options Clearing Corporation (OCC), is now jointly owned by all the equity options exchanges, and acts as the issuer and intermediary for all listed options. The clearing-house becomes one counterpart to every trade; the other party being either the writer of the option or the buyer of the option, regardless of whether the option is a put or a call. The holder of the option looks to OCC rather than to an individual writer of options for performance when the option is exercised.[6] If an options writer wants to close out a position without waiting for an option to be exercised or to expire, the writer can buy an identical option, balancing out the obligation to OCC. If a purchaser does not want to exercise or hold an option, the purchaser can sell it in the secondary market (i.e., on the exchange).

A stock option is generally eligible for options trading on an exchange if the stock is exchange-listed (or is a NASDAQ National Market System security) and is widely held and actively traded. At the end of 1989, CBOE was trading 237 classes of options, AMEX 207, Philadelphia 148, Pacific 144, and NYSE 33. Most stock-index options are based on broad-based indexes such as the Standard and

[2]In this form of hedging, if stock prices fell, the institutions would require the broker to honor the put, that is, to buy back the institution's stock at the higher strike price.

[3]SEC, Division of Market Regulation, *Trading Analysis of October 13 and 16, 1989, May* 1990, p. 5; Commodity Futures Trading Commission, Division of Economic Analysis, *Report on Stock Index Futures and Cash Market Activity During October 1989,* May 1990, p. 3.

[4]According to Charles J. Henry, President and Chief Operating Officer of the CBOE, personal communication to OTA. Information On trends in options trading volume was provided by the CBOE, March 1990.

[5]About 11.4 percent of total futures accounts are retail, and 34 percent of securities options accounts are retail. OCC estimates that between 25 and 40 percent of the OCC's total open positions are part of covered call programs, usually retail. Retail investors include both small investors and wealthy large investors, but investors in futures markets are typically wealthy. (OTA staff discussion with John Hiatt, Options Clearing Corp., Sept. 20, 1989.)

[6]The OCC makes sure that when an option is written to a purchaser, a writer of the same series of options is contractually obligated to OCC through a clearing member of OCC. The aggregate obligations of the OCC always equal the aggregate obligations of writers to the OCC. If the writer fails to perform, the clearing member firm is obligated to perform.

Poor 100 (S&P 100), although there are some on the Oil and Gas Index (AMEX), Gold/Silver Index (Philadelphia), and other narrow-based indexes. Settlement of index options is always in cash, never in the stocks that composed the index.

OPTIONS EXCHANGES

Options are traded on U.S. exchanges in two ways. The CBOE and Pacific exchanges use competitive market-makers who trade for their own accounts, with an exchange employee called the Order Book Official (OBO) handling the limit order book. The AMEX, NYSE, and Philadelphia Stock Exchanges adapted the specialist system to options trading, but with additional market-making provided by "registered options traders" (ROTS) who trade on the floor for their own account; but have an affirmative obligation to make markets, as a specialist does.[7]

In the CBOE, still the largest options market, there are several market-makers (dealers) for every stock option group, with dozens for the most active classes of options, and several hundred for the S&P 100 stock-index option. Bids and offers are made by public outcry, as in the futures market. Unlike locals on futures exchanges, however, CBOE options traders cannot act as both agent and principal in a single class of options in a single trading day; i.e., they cannot do dual trading. Also unlike the practice in futures exchanges, CBOE market-makers have affirmative obligations with regard to maintaining ''continuous two-sided markets with limitations on the maximum quote spread," and there is a public limit order book to insure priority of customer orders. The OBO is not like a specialist; he or she is an exchange official, and cannot trade for his or her own account. The OBO accepts and executes limit orders from customers (not from market-makers or firms trading for their own account). In general, limit orders from the book have precedent over those on the floor at the same price, and the OBO must display the highest bid and lowest offer to the trading crowd. The OBO also manages the opening of each trading session, where bids and offers are made from the crowd for each series of options, in rotation, to determine opening prices.

The OBO only handles limit orders in the book. Large market orders and more sophisticated orders such as spreads and straddles,[8] firm proprietary orders, and market-maker orders must be handled by floor brokers, who work only as agents and do not trade for their own account. On the CBOE there is also an automatic order execution system for public customer orders up to 10 contracts, called the Retail Automatic Execution System (RAES).

This kind of trading floor may have an advantage over the specialist system when trading reaches a certain volume. Limited empirical evidence suggests that the competition among market-makers on the CBOE at high volume levels may lead to narrower price spreads[9] than the specialist system produces.[10] It may not work as well when volume of trading is consistently low. The CBOE currently has a pilot program[11] to use a designated primary market-maker (DPM), much like a specialist, for some classes of options. The Pacific Stock Exchange (PSE) has a similar program that establishes a Lead Market-Maker (LMM) for multiply-traded option classes with volume in the lowest 20 percent. Exchange members appointed as LMMs would "assume responsibilities and acquire rights in their appointed options classes beyond the obligations and rights of market-makers that trade in the same options class. '[12] Both the CBOE and the PSE

[7]In the NYSE these are called competitive options traders, or COTS.

[8]Spread orders involve buying and selling a different series of options of the same class (i.e., on the same stock but of different expiration date); straddle orders consist of both a put and call on the same stock, at the same expiration date.

[9]The price spread is the difference between the highest price that any potential buyers *bid* for an option, and the lowest amount that potential sellers *offer* to sell it for. When a market-maker is buying and selling, competition will lead him or her to keep the spread narrow; i.e., to sell for only a little more than he can buy the option for.

[10]Chicago Board Options Exchange, *Exchange Dual* Listing: *A Six Months Review, 1977,* reported that for 10 dual-listed options classes the average bid/ask spread was 1.8 to 4.0 cents narrower on the CBOE. The CBOE volume in these stocks ranged from 19 to 86 percent of total. A second CBOE study, "Summary of Analysis of Quality of Markets Measures in Dually Traded Option Classes," October 1978, had comparable findings. These studies dealt with a small number of securities and the studies are over a decade old.

[11]The CBOE program began as a 2-year Pilot pro= in 1987 and was extended in 1989 for 2 years more. SEC Release No. 27167, Aug. 22, 1989, 54 FR 35960.

[12]The LMM has additional Obligation for ensuring accurate dissemination of quotations, must participate in automatic execution systems, and mUSt be present at the trading post throughout the day; in return for these and other duties the LMM would be allocated a 50 percent participation in transactions in the issues.

require a "Chinese Wall," between LMMs and any affiliated upstairs firm to prevent any improper behavior.[13]

TRADE SUPPORT SYSTEMS IN OPTIONS MARKETS

The CBOE began an automated order routing system in 1978, achieving direct routing of orders to the floor in 1979. It was the frost options exchange to have a retail automatic execution system (RAES), in 1985. RAES came into floorwide use in 1988 and now handles about 25 to 30 percent of customer orders, which is about 8 to 10 percent of contract volume. Other options markets also have automatic execution systems; for example, at AMEX, an electronic system for execution of orders for stock and stock-index options, (AUTO-EX), is responsible for handling between 1 and 2 percent of options order flow. AMEX also has an agreement with the European Options Exchange (EOE) by which EOE trades options contracts fungible with the AMEX MMI (stock-index) option contract. A trader can buy on the AMEX and sell on the EOE, and vice-versa.

The CBOE has developed a hand-held personal computer to capture trade data on the floor of the exchange. This "Market-Maker Terminal" (MMT) is scheduled to be pilot-tested during the third quarter of 1990.[14] The device will record trade data, identify the trader, and time-stamp the transaction record to create an audit trail. This will strengthen the exchange's ability to enforce tightly the opening and closing time for trading sessions. The MMT will also allow a trader to review his current position and provide him with analytic and risk management tools.

The MMT uses a touch screen to minimize necessary keystrokes, and has a one-keystroke "repeat" feature for speed in recording similar trades during surging high-volume trading peaks. A wireless communications network will provide the interface between the MMTs, held by traders, and the other trading support systems of the exchanges.

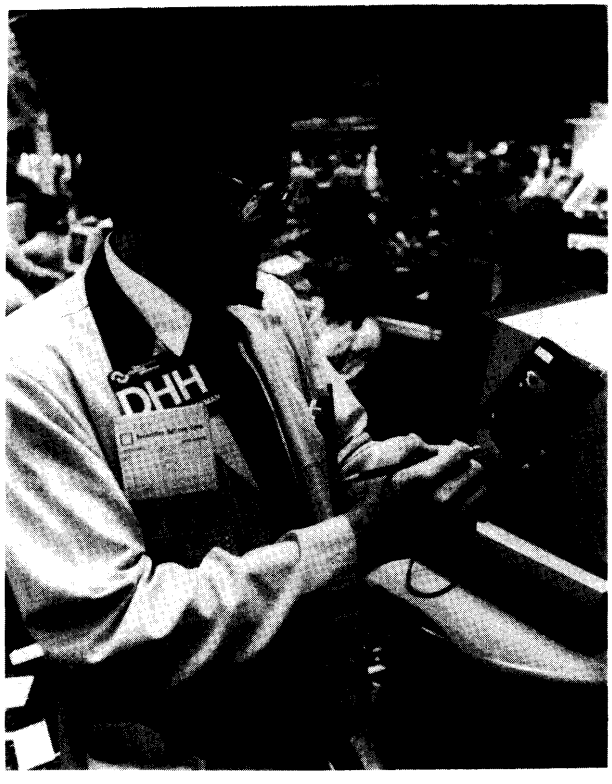

Photo credit: Chicago Board of Exchange

CBOE'S **modern market-maker terminal.**

OPTIONS MARKETS IN THE 1987 CRASH

Options trading volume on October 19-20, 1987—although heavier than normal-declined sharply relative to the surging volume of stock trading.[15] Options exchanges have discretion to halt trading under specified circumstances. They stopped the trading of nearly 100 options at various times during the crash, because of trading halts in the primary markets and order imbalances. In addition, the opening rotations for index options, during which initial prices are determined, were either delayed or long drawn out due to volume and order imbalance.[16] This delayed trading and meant that most

[13] For example, it would be improper for a firm to purchase an option assigned to an affiliated LMM except to reduce or liquidate positions, when approved by a floor official.

[14] Information about MMTs was prepared for OTA by the CBOE, May 1990.

[15] However, on both days, the volume of cleared contracts remained above the year-to-date average, according to the OCC.

[16] At the beginning of each trading session, one options series at a time is called for bids and offers from the floor, which frees the initial prices. Not until after the opening rotation is complete does free trading begin. On the 19th and 20th some rotations in individual options were delayed in part because trading in many of the underlying stocks on the principal stock exchange had not begun. Another factor was that CBOE had just added 112 new S&P 100 series.

orders had to wait a long time to be executed. At some points on the rotation traders could not predict the execution prices. When there were trading halts, rotations had to be repeated to reopen trading.

Market-maker participation declined by 75 percent between October 19 and 23, and quoted spreads between bids and offers drastically widened. Market-makers' performance was sharply criticized by the SEC.[17] Order execution through RAES and AUTO-EX effectively stopped, both because they do not function during rotation, and because the exchange severely restricted the series eligible for these systems due to the reluctance of market-makers to participate.

CBOE and AMEX made some rule changes after the crash (e.g., changing the procedure for opening rotation and strengthening the obligation to participate in automated execution systems). As a goodwill gesture CBOE index options market-makers made refund payments to customers who had bought certain options series during the period of greatest volatility and uncertainty on October 20, 1987.[18]

SIDE-BY-SIDE TRADING

Options trading on stock exchanges raised the issue of side-by-side trading of stock and options, especially at the NYSE. NYSE competitors feared that the exchange, the primary market for most of the stocks on which options are traded, would have unfair advantages in options trading. Many brokerage firms have electronic systems for automatically routing customers' stock orders to the NYSE, and options orders might also be routinely routed there. Combination orders of stocks and options would make it more economical to hedge using options. More importantly, the NYSE would have the possibility of trading stock and options at the same or adjacent posts, or allowing one specialist to handle both, which because of the specialists' possession of the limit order book would raise frontrunning or manipulation concerns as well as tending to give the NYSE strong competitive advantages.

The SEC made a special study of these issues, which delayed the trading of options at the NYSE until 1985. The SEC imposes special conditions on the NYSE, such as a requirement that stocks trading and options trading take place on separate floors. Specialists may however use options to hedge their risks in making markets. The NYSE has so far remained last among the exchanges in the number of equity option classes traded.

MULTIPLE-TRADING OF OPTIONS

Beginning in 1980, the exclusive right to trade a new option on exchange-listed stocks was awarded to one or another exchange by means of a lottery .19 In May 1989 SEC promulgated Rule 19c-5, which after January 21, 1990, allows all newly listed options to be multiply traded, and after January 22, 1991, will allow all options to be traded on all five options exchanges. The agency provided many reasons for the rule change, the most important being that competition among exchanges would lead to improvements in the quality of exchange services. It is expected that multiple-trading will also provide a strong incentive to develop an integrated electronic system that would allow brokers to route options business to the exchange offering the best price at that moment.

The argument about multiple-trading had been going on for 12 years, and illustrates how, in spite of talk about free markets and the dangers of regulation, exchanges often resist additional competition. This resistance sometimes takes the form of opposition to technological systems.

After the introduction of options trading, there was fierce competition between the exchanges. The SEC said that:

> . . .because many brokerage firms automatically **route their small public orders for an option to the options exchange with the greatest volume of trading in that option, market-makers of options exchanges appeared to have engaged in pre-arranged trades, wash sales, and trade reversals to give the appearance**

ITSEC, The October 1987 Market Break, washingto~ DC, pp. 8-8 to 8-10.

[18]Charles J. Henry, **President and Chief operating** Officer **of the** CBOE, **in correspondence to OTA, Mar. 28, 1990, said** that these payments were **not made by the exchange, as reported at the time in newspapers; the payments were advanced by the exchange on behalf of the market-makers and repaid to the exchange by market-maker contributions of one cent per contract. The payments covered the part of the options premium that was determined to be excessive. The AMEX had a similar refund program.**

[19]Exchanges **competitively traded options on OTC stocks, a much smaller** market.

of increased trading volume in multiply-traded options on their options exchanges.[20]

There is a tendency for trading of any asset to concentrate in one market. While at least 22 classes of options were traded on more than one exchange during the 1970s, by 1977 only 15 were multiple-traded. The SEC was asked to rule on whether the AMEX, Philadelphia, and New York exchanges could engage in competitive trading. Long committed to the idea of increasing competition, SEC first acknowledged that 'under appropriate circumstances, the benefits of expansion of multiple-trading appear to outweigh any adverse consequences. "[21] Nevertheless SEC said that it would defer a decision until the options exchanges presented a plan to develop ''market integration facilities' designed to minimize market fragmentation and maximize competitive opportunities. According to SEC staff, delay and inaction by the exchanges discouraged the agency from further increasing the number of multiple-traded stock options at that time.

The argument for and against multiple-trading turns on the effects of competitiveness on option prices. When stocks or options are traded on only a single exchange, the higher volume of trading that results tends to keep bid-offer spreads narrow. When the same volume of trading is divided among two or more exchanges, two factors may influence whether spreads broaden or narrow. The diminution of order flow to each market tends to broaden price spreads, because overhead is divided among a smaller number of transactions and the market-making risk increases. On the other hand, competition should keep price spreads as narrow as possible in order to attract orders. The little comparative data available on options trading in 1977 indicated that with multiple-trading, price spreads narrowed, the average variance of price from one transaction to the next declined, and brokerage and floor broker rates also declined.[22]

Some people argued against multiple-trading of options because of their conviction that competition is not effective in narrowing spreads. They say that brokers, in spite of their legal obligation as agents to execute customer orders at the best price available, usually do not send orders to the options exchange with a superior quotation, but route the orders automatically to a primary options exchange. Benefits from competition, according to this argument, are outweighed by the tendency of multiple-trading to fragment markets and reduce order flow to any one market.

The SEC, in urging the exchanges to develop a market integration facility, insisted that they analyze three approaches to market integration:

- a market linkage system to move orders from one option exchange to another, like the Intermarket Trading System (ITS) operated by stock exchanges (see ch. 3);
- a neutral switch, or automatic routing of individual orders by brokers to the market center with the best quotation; and
- a central limit order file (an order exposure system to simultaneously display all public limit orders to all options exchanges) .23

Several options exchanges insisted that none of these is possible because of the difficulties that options market-makers have in entering firm quotations. These difficulties arise because options are ''derivative' of securities. A change in the underlying stock price will require adjustments in as many as 8 or 10 series of call options and 8 or 10 series of put options based on that stock. The market-maker may be following as many as 25 or 30 stocks, each with 16 to 20 option series. It would be impossible, some said, for market-makers to monitor and constantly update quotations on so many series.

This problem, however, has effectively been solved by the development of "auto-quote' devices that automatically change several series of options quotations when one of them is changed, or when the underlying stock quotation changes. The CBOE describes its Auto-Quote System as "performing mathematical operations that use input on the underlying stock (bid, ask, last sale or mean of the bid/ask) and input from the market makers (industry volatility, interest rates, supply and demand, positions, time to expiration). " As early as May 1989,

[20] SEC Release No. 13433, Options Floor Trading, Apr. 5, 1977. SEC Docke2194.

[21] SEC. Ex. Act. Rel. 16,701, 19 SEC Dock. 998, 1980.

[22] ''Report of the Special Study of the Options Markets to the SEC,'' House Committee on Interstate and Foreign Commerce, 96th Cong., lst sess. 1053, 1056 (Comm. Print 96-1FC3 1978)

[23] Sec. Ex. Act Rel. 16,701, 19 SEC Doc. 998, 1008, 1980.

SEC reported that for this reason "the lack of firm quotations is no longer the impediment it once was to the development of an options intermarket linkage. "[24]

Another problem has been the size of the crowd in index options markets. It may include several hundred floor brokers, market-makers, and ROTS. In contrast to the stock market, where the ''crowd' by the specialist post is usually only a few people, there may be hundreds of traders in the S&P 100 stock-index options pit (as there are in stock-index futures pits at the CME). Merely identifying who entered a quotation is difficult, yet a firm quotation system would have to include market-maker identity, quotation, and size for each series of options.

This problem, too, will soon be solved by technology. As described earlier, the CBOE expects to have hand-held terminals ready to be used by market-makers in the pits before the end of 1990. They can transmit information on quotations, time, and quoter identity.

The SEC preferred a limit order execution system linking the markets (the third alternative above), to either a "firm quotation" or order exposure system. The agency wanted a system that would handle only public limit orders and that would provide a display summary of the orders on each options exchange, and give floor members on each an equal opportunity to execute the orders.[25] An inter-exchange task force objected that only a small percent of trading involved limit orders booked with a specialist or OBO, and therefore a limit order system could not integrate the options markets enough to let market centers compete for order flow. It would not change the practice of brokers always sending options business to the exchange with the highest volume of activity in that options class.[26] The task force said that a central limit order file "was not likely to reduce substantially the adverse effect of multiple-trading." The CBOE also objected that the project would cost many millions of dollars and 'cannot be cost-justified. '[27] The SEC decided that the industry should make the final decisions about technological choices. It did not compel the construction of the limit order market integration facility, or any other kind of market integration system immediately. But it has since resumed its pressure on the exchanges to develop such a system.

The SEC did permit multiple-trading of subsequent new options products, most significantly the multiple-trading of options on over-the-counter (OTC) stocks-not exchange-listed stocks—beginning in June 1985. Of the first 30 options on OTC stocks, 9 were multiple-traded. But AMEX quickly captured nearly 90 percent of that market. By June 1987 only two of the nine options were still multiple-traded.[28] Nevertheless, subsequent experience has convinced the agency that competition in trading these options has been beneficial. An SEC study in late 1986[29] found that AMEX OTC options which could be traded on other exchanges, had a bid-ask spread nearly 20 percent narrower than the spreads of AMEX options that could not be traded on other exchanges. Moreover, in the first group 38.6 percent of trades were inside the quote (i.e., between published best bid and best offer), a measure of market-maker performance, compared to 21.7 percent in the second group. Another SEC study concluded that the cost to investors of single-exchange options trading exceeds $150 million annually.[30] SEC concluded that evidence showed that multiple-trading may be beneficial to the markets and at worst "has not resulted in any deterioration of those markets."[31]

In June 1987 SEC proposed Rule 19c-5 providing for unlimited multiple-trading. For hearings in February, 1988, the CBOE brought in evidence of

[24]Sec. Ex. Art Rel. 26,871, 43 SEC Dock. 1519, 1529, 1989.

[25]Sec. Ex. Act Rel. 16,701, 19 SEC Dock. 998, 10009-1010, 1980.

[26]*Supplementary Report of the Amex, Pacific, and Philadelphia Stock Exchanges and th, CBOE in Response to Release No.* 34-26,70110, 1981.

[27]Letter from Walter Auch, Chairman and Chief Executive Officer, Chicago Board Options Exchange, to George Fitzsimmons, Secretary SEC, 14-16, Sept. 22, 1980.

[28]Sec. Ex. Act Rel. 24,613,38 SEC Dock. 865,869-870, 1987. In January 1989 AMEX traded 18 multiply-traded options, and held an average 88.12 percent of the market.

[29]Securities Exchange Co remission, Directorate of Economics and Policy Analysis, *The Effect of Multiple Trading on the Market for OTC Options 2,* pp. 16-17, November 1986.

[30]Securities Exchange Commission, Office of the Chief Economist, potential Competition *and Actual Competition in the Options Market* 2, *November 1986. The* options allocation plan distributed options among the exchanges for single-exchange trading.

[31]Sec. Ex. Act Rel. 24,613, 38 SEC Dock. 865. 871, 1987; see also Sec. Ex. Act Rel. 26,870, 43 SEC Dock. 1498, 1501-1503, 1989.

''trade-throughs" (cases in which customers did not get the best execution) in a specific multiple-traded stock option,[32] and also argued that expansions of multiple-trading would lead to market fragmentation and would give the NYSE unfair competitive advantages. Other options exchanges argued that it would be especially harmful in the absence of effective electronic market linkages. AMEX and NASD defended multiple-trading as providing more liquid markets and narrower spreads, and criticized the allocation system for leading to the proliferation of redundant options in which investors had little interest. The SEC says that multiple-trading should also encourage enhancements in services, as exchanges compete with each other. Rule 19c-5 was issued in 1989, to take full effect after a phase-in through 1990.

This debate about technology continues, revived by the approach of multiple-trading. A contractor for the Philadelphia, Pacific, and New York Stock Exchanges recommended that a market linkage system like the ITS be adopted. Two other contractors, Professors Amihud and Mendelson, carried out an assessment of such an Option Markets Integration System (OMINTS), calling it a "cloned ITS. "[33] They condemned the ITS model as "likely to produce a number of undesirable results," because it would violate principles that are important to the proper functioning of the options markets. Specifically, an ITS-like link would ignore the growing interdependencies between the options market and cash markets, and

> . . . effectively forego the opportunity to develop alternative forms of linkage that take advantage of the price interdependencies that are so important in the options markets.

Amihud and Mendelson recommended two intermediate technological systems:

- an automatic routing system based on individual exchanges' limit order books and automatic execution systems, designed so as to preserve important secondary priorities of time and size, and developed by either the OCC or a commercial vendor of market information; and
- automating the opening transactions with a kind of single price auction (see discussion in ch. 3).

The SEC called for new systems proposals for electronic integration of markets-linking systems—by October 1, 1990. Two proposals are under discussion. The Philadelphia Stock Exchange has suggested an 'Auction Intermarket System' (AIMS). Four exchanges (the CBOE, NYSE, AMEX, and Pacific Stock Exchange) are developing ideas for a "Public Investors Privileged Express' (PIPE, now—as improvements are planned-called PIPE-PIus).

The President of the Philadelphia Stock Exchange, Nicholas Giordano, told OTA:

> If we are going to have a multiple trading environment we must have electronic linkage in order to provide the public customer the opportunity to receive the best price available. Otherwise they will become the victim of the arbitrageur.[34]

Although the SEC has approved a rule to allow multiple-trading of securities-based options beginning in 1991, it is unlikely that competition will be achieved easily. Trading may still tend quickly to concentrate in one dominant market to the exclusion of others, unless there is an intermarket order routing system. SEC staff, however, say that the possibility—or threat-of direct competition for the market in options goes far toward forcing exchanges to improve the quality of their services.

OPTIONS MARGINS

Efforts are underway to strengthen and streamline the process by which securities transactions and related derivative product transactions are cleared and settled (see ch. 6). (Clearing is the matching for the buyer and seller of their records of a transaction to be sure that they agree on terms; settlement is the exchange of payment for ownership of the security or derivative product.) There are differences in the processes by which clearing and settlement is carried out for securities, futures, and options, especially as related to the way margins are handled (see the discussions in chs. 4 and 9). Now that those

[32] See "Regio@ Exchanges Clash With AMEX, NASD Over Multiple Trading of Options," 20 *Securities Regulation& Law Report* (BNA) 253, 1988. SEC objected that this option was a thinly traded option with infrequent updating of quotes, and argued that the benefits of narrower spreads in multiple trading exceeded the cost of trade-throughs. See Securities Exchange Commission, Office of Economic Analysis, Memorandum on Trade-Throughs in Multiply-Traded Options, Sept. 23, 1988.

[33] Yakov Amihud and Haim Mendelson, ''Option Markets Integration: An Evaluation.L" January 1990, to be published.

[34] Telephone interview, April 1990.

markets are closely linked by hedging techniques and arbitraging practices, differences in margining systems between the markets are increasingly controversial.

In all markets, margin is a way of limiting the risk that a market participant will fail to deliver what he has sold or pay for what he has bought. When a clearinghouse is the party to the trade, as in most U.S. markets, margin requirements serve to reduce clearinghouse risk.

The options buyer pays a sum which is known as the premium; this is all the buyer owes for the life of the option. (Of course, if he chooses to exercise the option and buy the underlying product, he will at the time of purchase owe additional amounts.) The settlement (payment) of premium obligations occurs next day. The current system of options margining requires the premium to be credited to the account of the writer (seller) of the option, who must keep it posted as margin and also must post additional margin to cover the risk that the market may increase the cost of the writer's obligation underlying the option. The writer also must put up more margin collateral when the market moves against him (beyond the maintenance margin level) during the life of the option. However, these margin requirements may be met with assets other than cash (e.g., U.S. Government securities, letters of credit, stock), because option holders pay their premiums in full and thus do not realize gains or losses until the position is closed out.

Some innovative margining mechanisms were recommended by several market crash studies, and are still under consideration. A proposal for cross-margining is being reviewed by the SEC and CFTC (pending the results of two pilot programs), while a proposal for futures-style margining for some options is being considered by the CFTC, but only for use on a limited basis, because of prudential concerns by regulators. Proposals for changing margining methods often evoke controversy because significant problems could result from adopting a system that might under stressed market conditions result in failure of market participants. However, some of the arguments for and against cross-margining and futures-style margining are also intended to ward off potential losses of business by some market participants, or to gain market share at the expense of another segment of the industry.

The potential costs and benefits of alternative margining schemes are difficult to assess because margin mechanisms are probably well understood only by a relatively few experts with a stake in the issue. The challenge to regulators is to separate socially sound, functionally robust, innovations from other proposed innovations that are merely self-serving.

Cross-Margining

Four of the reports on the '87 market break—those of the Brady Commission, the Working Group on Financial Markets, the SEC, and CFTC reports—recommended some form of intermarket cross-margining. Since that time, two cross-margining programs have been set up. The Options Clearing Corp. (OCC) and its futures clearinghouse subsidiary, the Intermmket Clearing Corp. (ICC), began a cross-margining program in 1988, but at the end of 1989, the program had only one participant (a firm that is a clearing member of both the OCC and the ICC). The OCC and the Chicago Mercantile Exchange (CME) in October 1989 began another cross-margining program that had three participants as of late 1989.

The basic idea in cross-margining is to reduce the extreme demands for collateral that occur in meeting the original margin requirements of firms which are members of multiple clearing organizations, and are using inter-market transactions to hedge. Cross-margining recognizes the reduced risk resulting from hedges across markets, for example, between an S&P 500 futures contract traded on the CME and an S&P option traded on the CBOE. A clearinghouse recognizes the counterbalancing or hedging effect of positions that one market participant may have at different exchanges, and allows such market participants to reduce their margin obligations accordingly. It is a form of netting which reflects an overall assessment of the net risk of default and provides an estimate of the amount of margin required to cover that risk.

Advocates of cross-margining argue that it reduces the gross amount of payments due, and payments owed, by market participants and clearinghouses, and thereby both reduces the possibility that a counterpart to the trade may default and relieves some stress on the payment system. Cross-margining also reduces differences between pay and

collect schedules, and increases the sharing of credit information between clearinghouses.

The CME normally pays clearing members and collects margin at 6:40 a.m., while the OCC collects at 9 a.m. and pays at 10 a.m. However, for CME-OCC cross-margining accounts, there is only one time to collect margin-6:40 a.m.—and only one time for clearinghouses to pay clearing members-10 a.m. Thus, a cross-margined member cannot use money due from the OCC to pay the CME, but instead must find another source of funds for the 3 hour and 20 minute interval between making and receiving payments. Nonetheless, cross-margining reduces the number of calls for payment flowing through the settlement systems.

However, an SEC analysis pointed out that cross-margining does not solve the problem of asynchronous cash flows:

> [In] essence, these commentators focus on the need for cash to meet futures variation margin payments when it is the futures leg of an intermarket hedge that declines in value and the options leg appreciates in value. In that circumstance, because options contracts [can] appreciate in value but do not pass through profits and losses on a daily basis, the clearing member holding the option must finance, from his own or borrowed funds, payment on the futures contract.[35]

In the CME and OCC cross-margining program, each participating clearing member maintains a cross-margin account at CME and OCC, and designates which positions are to be cross-margined. Each day, CME and OCC transmit to each other information about the positions in each cross-margin account, so that each clearinghouse knows the entire portfolio of index option, futures, and futures option positions. This is run through each clearinghouse's portfolio risk analysis margining system, and the cross-margin account at each clearing organization collects half of the total margin determined by that calculation. Each clearinghouse retains the right to make an independent assessment of the amount of risk and of whether a greater amount of margin should be required.

The CME and the OCC are currently working with their settlement banks and regulators in an effort to setup cross-margining with bank financing. For example, participants could pledge profitable long options positions in their cross-margining account to a bank, in order to secure that bank's financing of variation margin payments for unprofitable hedged positions owed to the CME clearinghouse.[36] However, the CFTC questions the appropriateness of granting priority over the proceeds of liquidated positions to a bank in the event of a member's default, because this would increase the liquidity risk to the clearinghouse.[37]

OCC-cleared long securities options can currently be pledged to banks to secure financing (separate from any cross-margining programs), but no futures clearinghouse has a corresponding program for its members because banks are reluctant to accept futures positions as collateral. Both the CME and OCC argue that expanding the ability of market participants to pledge cross-margined positions to banks to obtain financing is an important step towards reducing liquidity problems in times of market stress.

Both the CME-OCC and the OCC-ICC programs are currently limited to the cross-margining of clearing member holdings which are defined as "proprietary" (under CFTC regulations) or "non-customer" (under SEC regulations) .38 This restriction is rooted in regulations which govern the disposition of customer property in the event of a bankruptcy by a Futures Commission Merchant. Both the CME and the OCC have been discussing ways to resolve these regulatory issues and to expand cross-margining to include market-makers and commodities market professionals.

Critics of cross-margining have argued that in the event of a crisis involving defaults, cross-margining would increase liquidation risks to the banks and the clearinghouses. The risk would increase because of

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[35] SEC. Ex. Act. Rel. 27,296, 44 SEC Dock. 1328, Oct. 10, 1989.

[36] Money owed t. the market participant by each clearinghouse would be paid directly to the bank, thereby reducing the size of the Participants bank loan.

[37] The OCC points out that "the granting of a secured lien on securities positions carried in the accounts of brokers/dealers is at the heart of the capital formation process and is the longstanding practice within the securities industry.' OCC letter to OTA, Feb. 5,1990. This issue is about different markets' views of how safety and soundness should be achieved in different markets.

[38] The CME-OCC program is open t. two categories of clearing firms: joint members of both CME and OCC, and pairs of affiliated firms, one of which is a CME clearing member and the other an OCC member.

the larger amounts of capital in the markets, capital which would have been tied up in margin under traditional margin systems. Further, they argue, risk might be increased if offsetting positions cannot be liquidated at the assumed values during times of market stress. This issue highlights the need to balance efforts to increase liquidity and concerns about the stability of markets in times of turmoil.

Futures-Style Margining

Some of the advocates of unified or improved clearing systems acknowledge that the different margin systems for different markets are an obstacle. One proposal to reduce these differences is "futures-style margining" of options, currently being discussed only for futures options. The current system of margining options requires the buyer of the option to pay a sum, the premium, which is all that the buyer owes for the life of the option. The premium (for a call option) is credited to the account of the writer (seller) of the option, who must keep the premium posted as margin and also must post additional margin to cover the risk that the value of the option may increase. The value of the option is marked to market and, when the market moves unfavorably, additional margin must be provided.

The futures-style margin proposal would change options on futures margining so that both buyer and seller must meet mark-to-market variation margin requirements. The value of the option would be marked-to-market daily, with the clearinghouse collecting cash-only variation margin from losing buyers and sellers and crediting the accounts of winning buyers and sellers. This would alter the fundamental nature of each party's overall obligations, since both the buyer and seller would be obligated to post margin. It would also increase overall credit requirements in the marketplace as both sides of the option would have to be financed. The potential for losses on the part of the writer of the option would remain essentially unlimited, while the option buyer's potential for losses would remain limited to the value of the full premium/obligation.[39]

Proponents of futures-style margining (mostly within the futures industry) say that the major benefits would be improved information sharing on risk positions and greater symmetry in the cash flows on hedged options and futures contracts.[40] It could eliminate or minimize three problems of the current margining system.[41] One perceived problem is that the present treatment of risk is asymmetric. The buyer of call or put options on futures has risk limited to the value of the premiums at the time of purchase, but are not permitted to margin and must post the full premium (which is small compared to the value of the underlying asset). The second perceived problem is that the amount of funds collected and held in the margin system exceeds that which is necessary to guarantee performance because options profits must be kept in the account. Holders of long or covered futures options are forced to keep more funds in the margin system than for a comparable position in futures. This applies to all options and results in a significant demand on capital. The third problem is that the options margin system encourages the holder to exercise margins earlier than necessary; profits from "covered" options[42] must be kept in the holder's margin account even though there is no risk of default, and can be realized only by exercising the option (or by offsetting a put option with a new call option).

The OCC, the SEC, and the securities industry, generally, are opposed to futures-style margining because it would create a new and potentially large asynchronous cash flow problem for equity-related options. Covered writers of call options pay no margin to the OCC because the stock position effectively serves as collateral. If futures-style margining were extended to all options, they would be required to pay daily margin payments whenever their options position declined in value, without the benefit of a positive cash flow from the securities position. This would alter the traditional nature of equity-related options and, with it, the types of trading and uses of these financial products. Costs would fall disproportionately on individual investors, who frequently do covered call option writing. The present system of margining securities options

[39]CFTC Cement in "Petition for Rulemaking to Delete CFTC Regulation 33.4 (a) (2)," July 27, 1989.

[40]One of the proponents is the CME. CME letter to the CFTC, July 27, 1989, pp. 2-3, in "Petition for Rulemaking to Delete CFTC Regulation 33.4(a)(2)," 54 Fed. Reg. 11233, Mar. 17, 1989.

[41]Ibid.

[42]"Covered writing" refers to the writing (selling) of call options by an investor who owns the instrument underlying the option contract, as opposed to one who has borrowed or must borrow it to backup the option.

helps to minimize margin calls by permitting various types of collateral to be used (government securities, pledges of approved stock, letters of credit), rather than just cash. It is consistent with the practices of the equities market.

This debate reflects one disadvantage of having two separate, independent regulators. The issue of futures-style margining for options has been centered in the CFTC, but arises from recommendations by the President's Working Group calling for the investigation of futures-style margins for all options, including those issued by the OCC and regulated by the SEC. Discussions of futures-style margining should be examined in parallel with current efforts on cross-margining.[43] They involve inter-market issues, not all of which are within either regulator's jurisdiction. Neither regulatory agency is likely to be able to take into account the full effects of its decisions on other markets.

[43] As recommended by representatives of the SEC and CFTC at OTA's meeting of experts on clearing and settlement Aug. 22, 1989.

Chapter 6

Domestic Clearing and Settlement: What Happens After the Trade

CONTENTS

Page

HOW CLEARING AND SETTLEMENT WORKS 107
U.S. EFFORTS FOR IMPORTMENT 109
PROPOSED STRATEGIES FOR CHANGE IN U.S. CLEARING AND SETTLEMENT 111
EFFORTS BY THE GROUP OF THIRTY TO REDUCE DIFFERENCES IN CLEARING AND SETTLEMENT 117
POLICY ISSUES 122
Risks Associated With Default 122
Risks Associated With the Payment Process 122
Information Sharing 123
Technology 123
Standardization and Harmonization 124
Settlement Period Duration 124
IS AN INTERNATIONAL REGULATORY BODY NEEDED? 125

Box

Box ***Page***

6-A. The Role of Fedwire 112

Figure

Figure *Page*

6-1. Interfaces Among Clearing Participants 108

Tables

Table *Page*

6-1. U.S. Exchanges, Clearinghouses, and Depositories 110
6-2. Recommendations of Major Studies for Improved Clearing and Settlement 113
6-3. Group of Thirty: Current Status of International Settlement Recommendations-Equities 119
6-4. Recommendations From Major International Studies 120

Chapter 6

Domestic Clearing and Settlement: What Happens After the Trade[1]

"Clearing and settlement" is the processing of transactions on stock, futures, and options markets.[2] It is what happens after the trade. "Clearing" confirms the identity and quantity of the financial instrument or contract being bought and sold, the transaction price and date, and the identity of the buyer and seller. "Settlement" is the fulfillment, by the parties to the transaction, of the obligations of the trade. In equities and bond trades, "settlement" means payment to the seller and delivery of the stock or bond certificates or transferring its ownership to the buyer. Settlement in futures and options takes on different meanings according to the type of contract.

Trades are processed differently depending on the type of financial instrument being traded, the market or exchange on which it is traded, and the institutions involved in the processing of the trade (i.e., an exchange, a clearinghouse, a depository, or some combination). The integrity and efficiency of the U.S. clearing and settlement systems is important to both its internal financial and economic stability and its ability to compete with other nations. U.S. markets use clearinghouses to handle the clearing and some of the settlement processes for exchange-traded financial products, and "depositories" to hold stocks and bonds for safekeeping on behalf of their owners.

Major goals of clearing and settlement in the United States are broad public access to the markets and the reduction of risk, through the clearinghouse as an intermediary. These policies are reflected in a hierarchy of protections for the clearinghouse, including minimum capital requirements for clearinghouse members.

Other aims of clearing and settlement in the United States are efficiency and safety. The faster and more accurately a trade can be processed, the sooner the same capital can be re-invested, and at less cost and risk to investors. Therefore, as markets become global, one could expect that investment capital will flow toward markets that are most attractive in terms of risks and returns, and that also have efficient and reliable clearing and settlement systems.

The increasing trend toward global trading and linked world markets heightens the importance of viewing clearing and settlement systems as also linked. The soundness of clearing and settlement systems in one nation can impact other nations. The failure of a major clearing member—the member firms of an exchange or market-at a foreign clearinghouse could affect a U.S. clearinghouse through the impact on a common clearing member. To reduce the risk of such an occurrence, different countries' clearing and settlement systems must be coordinated, for example, by sharing risk information and harmonizing trade settlement dates. Both the private sector and Federal regulators have begun to take steps in this direction. It is doubtful that the private sector can achieve the needed changes (discussed later) without government taking a prominent and concerted role.

HOW CLEARING AND SETTLEMENT WORKS[3]

Many kinds of organizations are involved in clearing and settlement. Their functions vary from market to market. A key role of a clearinghouse is to assist in the comparison of trades and to remove counterpart risk from the settlement process. Clearinghouses provide the buyer with a guarantee that he will receive the securities-or other interest-he purchased, and provide the seller with a guarantee that he will receive payment.

The clearinghouse has a number of working relationships, or interfaces, with other institutions

[1]For a discussion of clearing and settlement in the United Kingdom and Japan, see OTA Background Report: *Trading Around the Clock: Securities Markets and Information Technology,* Appendix, OTA-BP-CIT-66 (Washington, DC: U.S. Government Printing Office, July 1990).

[2]In preparing this chapter, OTA has relied heavily on a contractor report by Bankers Trust Co., *Study of International Clearing and Settlement,* vols. I-V, October 1989, to which many dozens of institutions and individuals around the world contributed expert papers and/or seined on the Bankers Trust advisory panel. This report is hereafter referred to as "Bankers Trust report." OTA has also used the discussions of an expert workshop held at OTA on Aug. 22, 1989.

[3]A detailed description of clearing and settlement in the United States is provided in the appendix.

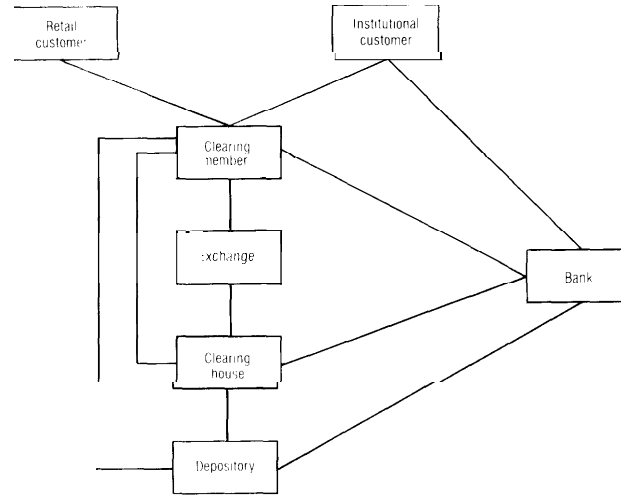
(figure 6-l). A trade cannot settle through the central systems until it has been matched, i.e., until buyers' and sellers' records of the trade are compared and reconciled. A clearinghouse has an interface with a market in which trades are executed and from which the clearinghouse receives information on the trades.[4] The clearinghouse may receive previously "locked-in" trades (trades which have already been matched), or it may match the trades itself.

A second interface is with its clearing members, i.e., the member firms of an exchange or market. A clearing member delivers trade information to the clearinghouse and may hold positions both for itself (proprietary positions) and on behalf of its customers. Other traders in a market, who are not clearing members, must clear their trades through a member of a clearinghouse for that market. The clearinghouse may also provide its clearing members with a trade-matching service and notify members about the way a trade is to be settled (the settlement date, and the way payment and delivery or transfer of ownership will be accomplished). A clearinghouse controls the risks of the clearing and settlement process through its relationships with its clearing members. For example, typically it will have some combination of minimum capital requirements for clearing members; margins or mark-to-market procedures; and requirements that its clearing members place collateral in a guarantee fund as protection against default by other clearing members (one exception is the Board of Trade Clearing Corp.). In the event of the failure of a clearing member, the clearinghouse may also have the ability to assess all other clearing members.

A third interface is with clearing and credit banks. The clearinghouse and the banks work together in the payment and collection process, since clearinghouses do not today have direct access to the payment system (Fedwire in the United States), as banks do. The banks also provide credit to clearing members.

In the securities markets-but not typically in futures and options markets-there is often a fourth

Figure 6-1—Interfaces Among Clearing Participants



SOURCE: Office of Technology Assessment, 1990.

interface, with the depository. The depository records and arranges the legal transfer of ownership of securities, and holds securities for safekeeping. The clearinghouse instructs the depository on how the transaction is to be settled. The depository may act as an agent, on behalf of the clearinghouse, to receive funds to settle the transaction.

In addition to the relationships between clearinghouses and markets, depositories, and banks, these organizations also have relationships among each other. Clearing members of a designated market deal with the banks to settle with the clearinghouse and to obtain credit. There is an important relationship between the banks and the depository. When a bank acts in a custodial role, e.g., delivering securities and receiving payments on behalf of its customers, instructions on payment and title transfer are sent to the bank by the customer. The depository, in turn, as an accounting system for immobilized or dematerialized instruments, and/or as a central vault for the physical instruments themselves, interfaces with the banks as custodian. It may also, as custodian, have an interface with the banks for payment.[6]

[4]The clearing entity could alternatively receive information about a trade directly fromtwo market participants.

[5]This is oft,, referred to as ''delivery versus payment' (DVP) and 'receive versus payment. " These terms mean the buyer and the seller each satisfy their settlement obligations (to pay and deliver) on the sameday. A closely related term is "true DVP," which means that the buyer and the seller simultaneously make good on their settlement obligations. An example of true DVP would be a trade settled througha depository, in which the depository simultaneously transferred the funds and the ownership of the traded financial instrument.

[6]Four depositories in the United States now have links to the Federal Reserve System. These are The Depository Trust Co., the Midwest securities Trust Co., the Participants Trust Co., and the Philadelphia Depository Trust Co.

There are two major thrusts underway for improving clearing and settlement systems, both of which show considerable promise. The frost stems, in part, from U.S. studies of the 1987 market crash. The second is a result of the international efforts of the Group of Thirty. Each is discussed below.

U.S. EFFORTS FOR IMPROVEMENT

Legislative objectives for clearing and settlement include: developing safe and efficient systems; establishing uniform standards and procedures; and establishing links between clearing and settlement organizations.[8] The law in its current form states that Federal policy for clearing and settlement of securities is based on:

> . . . public interest, the protection of investors, the safeguarding of securities and funds, and maintenance of fair competition among brokers and dealers, clearing agencies and transfer agents. . . to facilitate the establishment of a national system for the prompt and accurate clearance and settlement of transactions.[9]

The Securities Act Amendments of 1975 mandated the creation of a national system for clearing and settlement[10] of securities, largely as a result of the increased trading volume of equities that began in the late 1960s and the associated severe problems in back office clearing and transfer operations. Before that legislation, clearing functions were operated by each exchange, a practice that largely still holds in futures markets.[11] Equities clearing is now almost entirely centralized in the National Securities Clearing Corp. (NSCC),[12] which has interfaces with other clearing organizations.

The Securities and Exchange Commission (SEC) has regulatory authority over the clearing and settlement of all equities and equity options. The Federal Reserve has the authority to set minimum initial margin requirements for securities trading.[13] The Commodity Futures Trading Coremission (CFTC) has authority for the clearing and settlement of all futures contracts[14] and options on futures. There is, however, no legislation concerning clearing and settlement in futures markets comparable to that for securities markets. It may be needed in order to strengthen the CFTC's authority to force needed improvements in the process, e.g., by standardizing elements of the clearing and settlement process, such as the liability of Futures Commission Merchants in the event of a clearinghouse insolvency, and to establish whether clearinghouses should have the right to assess their members in the event of a member's default.[15]

In the United States, a relatively small number of organizations provide clearing and settlement services for nearly all domestic transactions. See table 6-1. There have been clearing and settlement organizations in the United States for almost a century. Centralized clearing within each of the equities, options, and futures industries developed more recently, prompted, in part, by Federal legislation.[16]

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[7]It was not until 1975 that the "clearing agency" was added to the 1934 Securities and Exchange Act and those clearing agencies registered witb the SEC became Self Regulating Organizations. Securities Amendments Act of 1975.

[8]June 6, 1934, ch. 404, Title I, sec. 17A (a)(l), as added June 4, 1975, Public Law 94-29, sec. 15, *9 Stat. 14.

[9]The June 4, 1975 amendment [Public Law 94-29, sec. 15,89 Stat. 14] of the legislation of June 6, 1934ch. 404, Title I, sec. 17A (a) (l).

[10]The Securities Act Amendments of 1975 added Sec. 17A, which among other items, required the SEC to "use its authority to facilitate the establishment of a national system for the prompt and accurate clearance and settlement of transactions in securities' with "due regard for the public interest, the protection of investors, the safeguarding of securities and funds, and maintenance of fair competition among brokers and dealers, clearing agencies, and transfer agents."

[11]Futures exchanges that have captive clearinghouses include: the Chicago Board of Trade; Chicago Mercantile Exchange; New York Mercantile Exchange; Commodity Exchange; Coffee, Sugar, & Cocoa Exchange; New York Cotton Exchange; Kansas City Board of Trade; and the Minneapolis Grain Exchange. The ICC division of the Options Clearing Corp. clears for the NY Futures Exchange, the Philadelphia Board of Trade, and the AMEX Commodities Corp.

[12]About 95 percent of equities are cleared through NSCC. The rest are cleared through the Philadelphia Stock Exchange's Stock Clearing Corp. and the Midwest Stock Exchange's Midwest Clearing Corp. Securities options clearing is centralized entirely within the Options Clearing Corp. (OCC). An interface exists between the OCC and each of the equity clearing corporations to effect delivery of the underlying equity securities when options contracts are exercised.

[13]For more on margins, and proposals to change margining systems, see chs. 4, 5, and 9.

[14]Both financial futures and commodity futures are considered "futures" under the Commodities Exchange Act.

[15]Thomas Russo, "The Futures Industry-Its Past and Future,' *Commodities Law Letter*, March/April 1990.

[16]However, a centralized clearing and settlement system, the Regional Interface Operation (RIO), was in place in 1974, and was motivated by the securities industry's goal of improving operational efficiency and lowering costs.

Table 6-1—U.S. Exchanges, Clearinghouses, and Depositories

Equities markets.[a]	*Clearinghouse/depository?*
New York Stock Exchange **(NYSE)**	National Securities Clearing Corp. **(NSCC)/Depository Trust Co.** (DTC)
American Stock Exchange (AMEX)	NSCC/DTC
National Association of Securities Dealers (NASD)	NSCC/DTC, Midwest Clearing Corp./Midwest Securities Trust Co., Stock Clearing Corp. of Philadelphia
Boston Stock **Exchange (BSE)**	NSCC/DTC
Philadelphia Stock Exchange (PHLX)	Stock Clearing Corp. of Philadelphia (SCCP) Philadelphia Depository Trust (Philadep)
Midwest Stock Exchange (MSE)	Midwest Clearing Corp. (MCC)/Midwest Securities Trust Co. (MSTC)
Cincinnati Stock Exchange (CSE)	NSCC/DTC or MCC/MSTC
Pacific Stock Exchange (PSE)	NSCC/DTC
Total: 7 exchanges and the NASD	***Total: 3 clearinghouses***
Futures markets:	***Clearinghouse:***
Chicago Board of Trade (CBOT)	Board of Trade Clearing Corp. (BOTCC)
Chicago Mercantile Exchange (CME)	CME Clearing House Division[c]
New **York Mercantile Exchange (NYMEX)**	NYMEX Clearing House Division
Commodity Exchange Inc. (COMEX)	COMEX Clearing Association (CCA)
Coffee, Sugar & Coma Exchange (CSCE)	CSC Clearing Corp. (CSCCC)
New York Cotton Exchange (NYCE)	Commodity Clearing Corp. (CCC)
New York Futures Exchange (NYFE)	Interrnarket Clearing Corp. (ICC)
MidAmerica Commodity Exchange (MidAm)	BOTCC
Kansas City Board of Trade (KCBOT)	KCBOT Clearing Corp. (KCBOTCC)
Minneapolis Grain Exchange (MGE)	MGE Clearing House Division
Chicago Rice & Cotton Exchange (CRCE)	BOTCC
Amex Commodities Corp. (AMEXCC)	Icc
Philadelphia Board of Trade (PHBOT)	Icc
Total: 13 exchanges	***Total:*** 9 ***clearinghouses***
Options markets:	***Clearinghouse:***
Chicago Board Options Exchange (CBOE)	Options Clearing Corp. (OCC)
American Stock Exchange (AMEX)	Occ
Philadelphia Stock Exchange (PHLX)	Occ
New York Stock Exchange (NYSE)	Occ
Pacific Stock Exchange (PSE)	Occ
National Association of Securities Dealers (NASD)	Occ
Total: 5 ***exchanges& the NASD***	***Total: 1 clearinghouse***

[a]There are numerous additional securities clearing agencies involved in securities markets other than the stock market.
[b]A clearing member may designate any clearinghouse to clear and settle stock traded on any exchange.
[c]A Clearinghouse is a department within the exchange, rather than separately incorporated.

SOURCE: Roger D. Rutz, "Clearance, Payment, and Settlement Systems in the Futures, Options, and Stock Markets," in CBOT, *The Review of Futures Markets, vol. 7, No. 3, 1988,* p. 348.

Securities clearing organizations have a statutory obligation to provide access to the clearing and settlement system to intermediaries **that** satisfy certain nondiscriminatory standards. Minimum capital levels differ among clearing entities as a function of the degree of exposure to default of clearing members. Accordingly, the level of initial net capital requirements of securities clearinghouses is lower than that for futures clearinghouses.[17] Equities exchanges and the over-the-counter (OTC) marketplace compete based on their respective strengths in price, speed of execution, and depth of market. The costs of trade entry and comparison activities are sensitive to economies of scale, which contributed to the trend toward centralized clearinghouses, particularly for smaller exchanges.[18]

Many market participants now simultaneously trade in stock, options, and futures markets (rather than concentrating investment activity in a single marketplace). Markets for different financial instruments, which originally developed independently

[17]See Roger Rutz, "Clearance, Payments, and Settlement Systems in the Futures, Options, and Stock Markets,' table 5, for examples of minimum capital levels, in expert paper in Bankers Trust Co. contractor report.

[18]Recently the Pacific Stock Exchange discontinued most of its captive clearing and depository operations, due to unprofitability; it now clears through NSCC and uses the Depository Trust Corp. for depository operations. OTA staff discussion withPSE official, August 1988. Earlier, the Boston Stock Exchange had ceased its clearing operations in favor of NSCC services.

and are regulated separately, are now linked. As a result of these linkages, participants simultaneously use the clearing and settlement processes of several marketplaces. Many industry observers believe that more attention needs to be given to disparities in cross-border markets, e.g., in timetables for settlement.[19]

Settlement times vary widely by type of financial instrument. For example, forward market trades involving mortgage-backed securities settle once a month; ''when-issued' '[20] trades in government bonds settle within 15 days; transactions in stock settle within 5 business days (but if equities on certain foreign exchanges are involved, settlement can take up to several months); transactions on stock options settle the next day; and futures and options on futures settle the next morning.

These differences in timetables for settlement can influence a market's ability to compete with other markets for investor capital. Many trading techniques now in use, particularly among institutional investors, depend on the ability to trade rapidly across instruments and across markets. Financial instruments with longer settlement time frames may be less useful to these investors. Also, longer timetables for settlement carry comparatively more risk, because they allow more time for events that could cause one of the parties to the trade to default on payment or delivery .21

A related issue is the amount of time required to achieve finality of settlement, i.e., the moment when a transfer of funds becomes irrevocable.[22] The time between the moment when the funds transfer begins (as in writing a check, or wiring money from one bank to another), and the time when payment is actually received or guaranteed varies greatly from market to market. Banks acting for U.S. market participants can use the Federal Reserve's Fedwire electronic money transfer system to achieve immediate (at the time of receipt by Fedwire) finality of settlement. (See box 6-A). Other systems may offer end of day finality of settlement, next day finality of settlement, or some other timetable.

PROPOSED STRATEGIES FOR CHANGE IN U.S. CLEARING AND SETTLEMENT

The 1987 stock market crash put a public spotlight on clearing and settlement and raised questions about whether the process broke down under the strain. In the United States, the events of October 1987 stressed the clearing and settlement process, which while it did continue to function revealed a number of shortcomings. In exchanges, clearinghouses, and clearing member firms, trade processing systems had back ups because of unusually high trading volume. The Options Clearing Corp. (OCC) had difficulty obtaining current data to value options. A number of options clearing members had insufficient capital to meet their obligations. Some futures clearing members' data entry systems became overloaded and some exchange's trade matching systems were not able to reconcile trades within normal time schedules. There were problems with some risk management systems and questions about whether guarantee funds were sufficiently liquid or adequate in size. Late payments into and out of clearinghouses occurred for some participants in the options and futures markets.

On October 19, 1987, the Chicago Mercantile Exchange collected $1.6 billion in margin payments from its clearing members, and another $2.1 billion on October 20th, both far in excess of normal collections. The OCC collected $2 billion in total over those 2 days, also a much higher amount than normal. Stock clearing corporations in the United States processed over $100 billion in stock deliveries during the week of October 26th. A number of market participants were unable to obtain cash from their banks to meet obligations on time, because some banks delayed providing credit to participants until their creditworthiness could be established with confidence and a few banks refused to accept options contracts as collateral for loans. The Fedwire operated by the Chicago Federal Reserve for a few

[19]Comments from participants at the OTA workshop on clearing and settlement, August 1989, among others. See also, Group of Thirty, ''U.S. Working Group Report on Compressing the Settlement Period, " Nov. 22, 1989.

[20]''When-issued'' refers to a transaction made conditionally because the security, although authorized, has not been issued.

[21]J. Peake, A. Madhavan, and M. Mendelson, ''Risky Business: The Clearance and Defilement of Financial Transactions,'' reprinted in the *Journal of International Securities Markets,* London, vol. 3, Spring 1989, pp. 7-13.

[22]Payment with an ordinary bank check becomes final only after several days, when the check is cleared by the bank; a certified check clears quickly, since it adds the backing of the issuing bank.

Box 6-A—The Role of Fedwire

Fedwire, operated by the Federal Reserve Bank System, is an electronic wire transfer system used both for transfer of funds and for book-entry transfer of government agency and Treasury securities between banking institutions. Any depository institution (all domestic commercial banks, foreign banks with branches or agencies in the United States, trust companies, savings banks, savings and loan associations, and FDIC-eligible credit unions) may maintain both book-entry securities accounts and cash accounts with the Federal Reserve. Currently, 3,619 do so.

Financial institutions hold cash and securities both for themselves and for their customers, who could include correspondent banks, governments, corporations, institutional investors, and individual investors. When a customer instructs his bank to move his assets on deposit to his counterparty's account (i.e., to "pay" someone, or to deliver securities for settlement), this is accomplished by simultaneous book-entry (credit and debit) of the cash and securities accounts that each bank maintains at the Federal Reserve System, and corresponding entries in the accounting system that each bank uses to keep track of its obligations to its customers. If the two counterparties use the same bank the transaction is effected by debiting and crediting the bank's internal accounting system, and the bank's account at Federal Reserve is unaffected.

On the day after a trade (T+l), the counterparties instruct their banks to move the money and securities required for settlement. The bank may only move securities if those securities are present in its book-entry account, however, some funds overdrafts are allowed. The Federal Reserve System has sought to reduce the size and frequency of "daylight" overdrafts. Some of the trades entering the Fedwire system have not yet been compared or matched. Even so, all payment instructions which enter the Fedwire system for settlement are immediately final. As a result, it is possible that a trade delivered against payment across the Fedwire might later turn out to have contained some discrepancy in the terms of the trade. If this happens, the trade can be reversed, just before the Fedwire closes for the day.

hours on October 20th, adding to delays in electronic funds transfers.

Studies of clearing and settlement during the 1987 crash include, among others:

- The Brady Commission (formally known as the Presidential Task Force on Market Mechanisms), *Report to the President of the United States,* January 1988;
- The Commodity Futures Trading Commission, Division of Trading and Markets, *Follow-up Report on Financial Oversight of Stock Index Futures During October 1987,* Jan. 6, 1988;
- The Securities and Exchange Commission, Division of Market Regulation, *The October Market Break,* February 1988; and
- The Working Group on Financial Markets, *Interim Report to the President of the United States,* May *1988.*

Among the main conclusions on the need for improvement in the clearing and settlement system were:

- the need to synchronize the activities of key institutions, with greater correlation between the timetables for trading and payments going in and coming out of clearinghouses, and coordinated attention to the credit needs of market participants and the amount of time it takes credit providers to respond to those needs; and
- the need for increased monitoring of market participants by clearing and settlement organizations, and increased sharing of information about the risk exposure and credit positions of market participants.

Studies of the performance of the U.S. clearing and settlement industry during the October 1987 crash, described below, were reasonably consistent on the need for change in these systems. However, some left the impression that problems in clearing and settlement were on a par with those of the markets themselves. They were not, although they were extremely serious. But the crash did call attention to needed improvements. Gerald Corrigan, President of the Federal Reserve Bank of New York, noted that "the greatest threat to the stability of the financial system as a whole, . . . was the danger of a major default in one of these clearing and settlement systems. '[23] David Ruder, former Chairman of the

[23] E. Gerald Corrigan, President of the Federal Reserve Bank of New York, in a speech at Payment System Symposium of the Federal Reserve Bank of Richmond, May 25, 1988, Williamsburg, VA.

Table 6-2—Recommendations of Major Studies for Improved Clearing and Settlement

	Brady Commission	The Interim Report of the President's Working group on Financial Markets	SEC Division of Market Regulation	CFTC	Greenspan Testimony	Chicago Board of Trade
Clarify the legal status of the obligation Incurred by a bank when it guarantees payment to settle a trade or margin call		Yes	Yes	Yes	Yes	
Create a unified regulatory environment for all financial instruments in a country	Yes					
Create a centralized system of market participants positions within and across markets as well as general market conditions	Yes	Yes, start by having more exchanging of information		Yes		
Create a link between all U.S. clearinghouses	Yes					
Facilitate timely payments to meet settlement obligations		Yes	Yes	Yes	Yes	
Allow Brokers to cross-margin their house accounts across several exchanges	Yes	Yes	Adopted trial program after publication of the report	Adopted program publication of the report		No (specific disagreement noted)

SOURCE: Bankers Trust, ***Study of International Clearing and Settlement,*** **OTA contractor report, October 1989, p. 250.**

SEC, said: ". . . a major failure in any one of these clearing systems, or of a major firm, has the potential to affect all the other systems, other participants, and even the banking system. [24]

In a report on the 1987 market break, the Brady Commission commented:

> The possibility that a clearinghouse or a major investment banking firm might default, or that the banking system would deny credit (liquidity) to market participants, resulted in certain market-makers curtailing their activities and increased investor uncertainty.

In other words, it is not sufficient for the clearing, settlement, and payment systems to avoid collapse. Their strength must be such that market participants will have enough confidence in the robustness and integrity of the systems to avoid taking actions which could bring them down.

Table 6-2 shows some of the major recommendations which appeared in all or several of the major U.S. reports on the crash. The first common recommendation is that regulators should clarify the legal status concerning finality of payment of the obligation incurred by a bank when it guarantees payment to settle a trade or margin call. Clearinghouses are concerned about the risk that exists between the time a bank pledges to make a payment and the time the payment is actually made.

Equities in the United States are paid for with clearinghouse checks which are, in essence, next-day funds guaranteed by a money center bank. In futures and options markets, a call for margin is a means of ensuring the investor's ability to meet his obligations; the margin call is made to a bank on behalf of its customer (a clearing member of the exchange in the case of futures, or a member of the clearing organization in the case of options). When banks were queried as to whether they would

[24] David S. Ruder, former Chairman of the Securities and Exchange Commission, "October Recollections: The Future of the U.S. Securities Markets," speech at the Economic Club of Chicago, Oct. 20, 1988, p. 15.

respond to margin calls in the futures industry (prior to October 1987), they would either actively endorse their willingness to pay, or passively endorse it by prior understanding that the bank would honor the payment unless it objected by a certain time of day. Even when a bank gives an active endorsement, the time between that commitment and the actual movement of funds constitutes a risk period, because there is always the possibility that some adverse event could prevent payment.

In several of the crash reports, it was argued that options and futures clearinghouses should firm up the legal agreement with their settlement banks to lock in payment at the same time that the banks confirm their willingness to meet the settlement obligation of the clearing member. But even after clearinghouses have freed up their agreements with their banks, there remains the risk that a settlement bank may refuse to make a margin commitment.

Another recommendation in several of the reports on the 1987 crash was that a system should be created to monitor market participants' positions in all markets, as well as general market conditions, in order to improve the assessment of risk. Information sharing did, in fact, occur in October 1987, despite the fact that there were few, if any, formal arrangements in place across markets. Some arrangements for sharing information have begun to be institutionalized.[25] Although these arrangements provide clearinghouses and banks considerably more information with which to assess risk, liquidity, margin, and credit, they still fall short of providing a full risk profile. For example, participants may have undisclosed positions in unregulated markets, such as foreign exchange, leveraged buyouts, or in foreign markets, complicating risk assessment.

There is some resistance within the clearing and settlement industry and from market users to sharing certain types of information.[26] As one example, the OCC is concerned that shared information would give an unintended competitive advantage to the Board of Trade Clearing Corp., the "system operator, ' or central repository .27 Also of concern are the costs of gathering the information and its timeliness. Another concern is that for increased information sharing to be effective, there must be improvements in the information gathering and utilization operations of some of the organizations involved. For example, many clearing banks need to improve their knowledge of cross-market and cross-product positions within their own holdings and those of their customers. Some organizations might not be ready to incorporate this new data into their decision making; it is not at all certain that a bank, having been supplied risk information about its customers on October 19th, 1987, would have been able to make better credit decisions.

A fourth area of concern in the market crash reports is the need for timely payments to meet settlement obligations. Recommendations range from sharing data on payments and credits to extending the hours of Fedwire. These ideas had been discussed even before the 1987 market crash. Markets have evolved faster than the banking system's ability to move money rapidly. But given the underlying credit implications for the banks, having the ability to speed up the payments still may not ensure that the payments will be made if the banks perceive the borrower's position to be risky.

An earlier morning opening of the Fedwire, and agreement by the major money center banks to provide staff during these early hours, could help in supporting the Chicago futures clearinghouses.

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[25] Arrangements for sharing position and risk assessment information include: the Monitoring Coordination Group, established prior to October 1987, which includes all Securities Clearing Group (SCG) members and all securities and options exchanges and the NASD; and the newer SCG, composed of all equity securities clearing and depository entities in the United States. Futures markets are not yet participating in these groups; however, the futures clearinghouses have shared pay/collect information among themselves since 1986. There has also been some sharing of risk information between the NYSE and the CME, and of pay and collect data between the CME and CBOT since 1982. The OCC recently joined the daily information-sharing system, providing futures clearinghouses for the first time with information on market participants in options on equities.

[26] There was broad agreement among regulators, clearinghouses, and others, about the value of sharing risk-exposure information, "but no agreement on what information, when and where it should be provided, or how much is adequate, as summarized by Gerard Lynch, Morgan Stanley, at OTA's meeting of experts on clearing and settlement, Aug. 22, 1989.

[27] OCC letter to OTA, Feb. 5, 1990. The OCC points out that the repository for shared information, if it is a market participant having vested interests, possesses data that might enable it to protect itself against loss earlier than others who depend on it for information dissemination. This raises the question of whether a disinterested, independent, entity, such as a Federal regulator or a private contractor, would be preferable as the system operator. The NSCC notes concern for BOTCC access to confidential information and raises the question of whether futures clearing organizations may misinterpret pay/collect data and take inappropriate action based on it.

Other measures also should be considered. For example, the U.S. banking system is not equipped to settle transactions in non-U.S. dollar currencies. This is because they can only move foreign currencies with finality at times when the foreign central bank is open.[28] Another example involves the use of letters of credit for margin. Since banks consider some types of letters of credit to be conditional, e.g., "standby" letters of credit, unexpected delays in payment can result, particularly during times of severe market stress.

Two final items common to many of the crash reports were the recommendations for cross-margining and futures-style margining of the accounts of clearinghouse members. These were discussed in chapter 5.

The Brady Commission Report recommended a ''unified' clearance system across all markets.[29] This was later clarified to mean not necessarily a single clearinghouse, but rather coordinated mechanisms among existing clearinghouses to facilitate safe and efficient clearance and settlement of equities and related options and futures that the Brady Commission determined comprise a single market. The SEC proposed legislation in June 1988 that would direct the SEC and CFTC "to facilitate the establishment of linked, coordinated, or centralized facilities for clearance and settlement' for stocks and related futures and options.[30]

The key objectives that policymakers want to achieve are to facilitate assessment of the credit or solvency risk of participants across all markets, to maintain liquidity, and to assure the integrity of the settlement system and the larger national payment system of which it is an integral part. The need for increased attention to the clearing and settlement process was reemphasized in testimony of Treasury Secretary Nicholas Brady before the Senate Committee on Banking, Housing, and Urban Affairs, October 26, 1989. The Administration called for legislation to speed the process of refining and coordinating inter-market clearing and settlement. Yet, consensus on how to achieve these objectives has been elusive, both because of genuine differences in the various financial products and procedures and because of vested interests.

Richard Breeden, Chairman of the SEC, drew a lesson from the Drexel bankruptcy in January 1990: "The clearance and settlement system deserves immediate attention. "[31] The events surrounding the bankruptcy, according to Breeden, demonstrated the necessity of provisions in the proposed Market Reform Act (S.648) that would give the SEC the right to information about holding companies of which securities firms are affiliates. In the case of the Drexel bankruptcy, Breeden said, because the SEC did not have adequate information regarding the Drexel holding company and its unregulated affiates, the broker-dealer's capital ''could have been depleted in a desperate but fruitless attempt to pay the parent firm's unsecured creditors. ' Breeden also told Congress:

> A sudden collapse of a major broker-dealer such as DBL (Drexel Burnham Lambert, Inc.) could have had extremely adverse consequences on confidence in the marketplace, and on the smooth functioning of our clearance and settlement system.

DBL was a major broker-dealer, a member of most of the stock and commodity exchanges and clearinghouses, and a member of the National Association of Securities Dealers. DBL and a sister

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[28]U.S. clearinghouses may have foreign-currency denominated derivative product contracts, although none are traded today, and they may choose to denominate margin calls in that currency. They can do this by having a U.S. bank provide payments and guarantee services, or by having non-U.S. bank provide these services. If a U.S. bank is used, the clearinghouse will require the bank to guarantee payment in the foreign currency until the foreign central bank opens and makes the payment final. In this case, the U.S. bank incurs risk regardless of whether FedWire is open, during that time interval between when its guarantee begins and when the foreign central bank's payment is final. Alternatively, an off-shore settlement bank could be used.

[29]The Brady Report also recommended that a single government agency be given the authority for coordinating margin requirements and monitoring activities across marketplaces. This proposal is based on the view that all activities in the U.S. markets (securities, futures, options) are best coordinated by one agency and that authority should be given to the Federal Reserve Board. The FRB appears unwilling to take on this function.

[30]Treasury Secretary Nicholas Brady later recommended deleting the term "centralized' from a section of S. 648, "The Market Reform Act of 1989,' which, as revised, would direct the SEC and CFTC to facilitate linked or coordinated clearance and settlement of inter-market transactions. Letter from Secretary Brady to Sen. Donald W. Riegle, Chairman, Banking, Housing, and Urban Affairs, Oct. 24, 1989, p. 6. See also H.R. 3656, "Coordinated Clearance and Settlement Act of 1989," Nov. 14, 1989.

[31]This account is based on testimony of Richard C. Breeden, Chairman, U.S. Securities and Exchange Commission, before the Senate Committee on Banking, Housing, and Urban Affairs, concerning the bankruptcy of Drexel Burham Lambert Group, Inc., Mar. 2, 1990. All quotations are from this testimony.

company, Drexel Burnham Lambert Government Securities, Inc. (GSI), a bond dealer, were regulated affiliates of a holding company, Drexel Burnham Lambert Group, Inc. (Drexel), which also had other unregulated affiliates. The holding company and its subsidiaries, at the end of 1989, had approximately $28 billion in assets and nearly $836 million in stockholder's equity, and had long- and short-term borrowings of about $3.5 billion.

Many large broker-dealer holding companies do a great deal of unsecured borrowing by issuing commercial paper. To accomplish this conservatively, however, the holding company should hold liquid, pledgeable, assets as a back-up. This would permit the holding company to satisfy its liquidity needs through secured bank loans if, for any reason, it loses access to the commercial paper market. Drexel (the holding company) was a highly leveraged major company that concentrated on developing and selling high-yield (junk) bonds, and financed its operations largely with unsecured loans (commercial paper, etc.). In 1989, after 47 issuers defaulted on $7.3 billion in bonds, the market for junk bonds declined sharply and became less appealing to banks as collateral. As Drexel's revenue stream dried up, the firm became even more dependent on outside financing. It began to have difficulty in rolling over its short-term loans. Drexel then began to drain off the excess capital of its affiliates DBL and GSI.

The SEC sets net capital requirements for broker-dealers, among other things, to protect customers (whose accounts are insured under the Securities Investors Protection Corp. for up to $500,000 in securities and cash, and $100,000 maximum for cash claims). The New York Stock Exchange (NYSE) can impose additional, even more stringent, financial responsibility standards on its members "when a firm is faced with uncertainties in its business or potential liquidity problems." An objective of the SEC's customer protection rule is to ensure that brokerage firms only use customers' margin securities or free credit balances (cash payable on demand) to finance other customer's lending (i.e., not to finance the brokerage fro's own positions, investments, or operations). To the extent that customer money is not used in this manner, it must be placed in a special bank account for the benefit of the customer. In 1989, the SEC and the NYSE were monitoring DBL closely because the firm had recently agreed to pay $650 million in penalties for felony insider trading.

Neither the SEC or the NYSE have any oversight or regulatory authority over the parent company, Drexel, or its unregulated affiliates. They had no sure source of information about Drexel. As lenders pulled back, Drexel drew capital from both DBL and GSI (in the form of loans) without notifying the NYSE or the SEC. The SEC was informed by the staff of the New York Federal Reserve Bank that Drexel and its unregulated subsidiaries were experiencing financial difficulties.

The NYSE and the SEC then instructed DBL not to make further loans to its holding company, Drexel. Most of DBL's customer accounts had already been sold to other fins, but the broker-dealer was still holding 30,000 customer accounts totaling $5 billion, which would be at risk if DBL's capital was drained off by Drexel. Drexel struggled to come up with plans to liquidate some of its inventory and take other steps to rebuild its capital reserves, but these plans depended on its ability to continue to get short term financing for its day-to-day trading and the renewal of its unsecured loans. As an interim measure, the NYSE and the SEC allowed DBL to lend Drexel $31 million to prevent its commercial paper from being dishonored in the clearing process, and also allowed DBL to post $7 million margin at the Chicago Mercantile Exchange on behalf of DBL Trading (a subsidiary).

The New York Federal Reserve Bank, the U.S. Department of the Treasury, and the Federal Reserve Board, as well as the NYSE and the SEC, became involved in around-the-clock discussions. These regulators worked cooperatively to "reduce the potential for systemic risks of a cascade of failures. " Working closely with the New York Federal Reserve Bank, the SEC facilitated the transfer of DBL's customer accounts to other financial institutions and to liquidate DBL's proprietary positions. These ends were accomplished successfully, without penalizing retail customers or the U.S. taxpayer. However, if at the time of this crisis, the markets had been under stress or other large brokerage firms had been faltering (and thus unable to take on DBL's customer accounts), the U.S. Government might

have had to face extensive settlement gridlock and a potential for ''a cascade of failures. ' '[32]

Among other problems hampering integrated clearing and settlement are fundamentally different forms of margining; unique daily (and intra-day) mark-to-market pricing and margining of futures; and disparate time periods for settlement-1 day for futures and options v. 5 days for equities. Another difference is that both futures and options contracts are generated by the trade itself, and are guaranteed by a clearinghouse. Unlike the fixed number of equity shares outstanding at any time, there is no freed limit on the number of options and futures contracts. Finally, settlement of equity trades generally mark the end of risk to financial intermediaries (banks, brokers, clearinghouses), whereas the settlement of the opening of an options or futures contract, or the payment of variation margin on that contract, reduces, but does not eliminate, financial intermediaries' risk. The latter risk terminates when the position is closed and settled.

Vested interests within the established clearing and settlement systems, and possibly among their Federal regulators, are important barriers to consolidating, or standardizing, domestic clearinghouse operations. There are also arguments concerning the benefits of competition among Self Regulatory Organizations (SROS) and among regulators.[33] Representatives from the clearing and settlement industry and others have been strong advocates for maintaining the status quo.[34]

Consideration for a unified or integrated clearing and settlement system raises a number of public policy issues. Arguments against it range from the inherently different character of futures, options, and equities clearing and settlement systems to the dangers of monopolies-including lower efficiency (or higher prices) and the potential for stifling innovation.[35] Perhaps the most often cited argument is that separate systems can act as "firewalls" to prevent a rapid breakdown of the system in the face. of a major catastrophe. Others point out that futures clearing organizations remain non-standard in their rules.[36]

There is a question of whether the public interest in further strengthening the clearing and settlement system against disruption is sufficiently paramount to foster further concentration, or standardization, of clearing functions at the expense of competition. There is also a question of whether clearinghouses should be unified by products or across markets. One alternative, which is being followed, is to retain specialized clearing and settlement systems while making improvements, such as information sharing concerning participants' risk profiles across markets.

EFFORTS BY THE GROUP OF THIRTY TO REDUCE DIFFERENCES IN CLEARING AND SETTLEMENT

Improvement of clearing and settlement for global or cross-border trading in equities is being addressed by the Group of Thirty, an independent, non-profit organization of business-persons, bankers, and rep-

[32]In the case of the failure of Drexel Burnham Lambert, Inc., markets and clearinghouses were able to minimize the financial impact of the failure by transferring customers' accounts and assets to other, solvent firms. But the experience caused the Federal Reserve Bank of New York president, in July 1990, to encourage the private sector to establish three working groups to identify ways to avoid such problems before they arise, or to better contain them if they arise. One group will focus primarily on improvements in the operation of clearance and settlement systems, e.g., on approaches to reducing counterpart credit risk, including expansion of same-day delivery against payment to a broader class offinancial instruments, particularly for certain transactions originating off-shore, and, sound netting systems. A second group will focus on contingencies, i.e., what should be done if some segments of the clearing, settlement, and payments system appear tgridlock, including ways to establish more structured approaches for coordination during emergencies. A third group will focus on legal and regulatory issues, including possible changes in bankruptcy laws, and regulatory issues in clearing and settlement. Initial agendas were being developed in mid-1990.

[33]See for example: Marc L. Weinberg, ''Unified Clearing Draws Challenge,'' Barron's, February 1988; Roger D. Rutz, "Clearance, Payment, and Settlement Systems in the Futures, Options, and Stock Markets," in CBOT, *The Review of Futures Markets,* vol. 7, No. 3, 1988,pp. 367-368; John C. Hiatt, remarks at CBOT Conference, November 1988; and Charles M. Seeger, *The Development of Congressional Concerns About Financial Futures Markets,* published in conjunction with the American Enterprise Institute for Public Policy Research.

[34]Roger D. Rutz, "clearance, Payment, and Settlement Systems in the Futures, Options, and Stock Markets,' inCBOT, *The Review of Futures Markets,* vol. 7, No. 3, 1988, pp. 346-370.

[35]Ibid.

[36]''In the areas of clearing, for example, despite efforts to enhance cooperation and information sharing among the various clearinghouses, they remain stand-alone entities with very different rules, in many cases, even though they perform essentially the same functions. Some of the most basic questions, such as the liability of Futures Commission Merchant (FCM), should a clearinghouse become insolvent, remain unanswered, or at least subject to dispute.' Thornas Russo, "The Futures Industry-Its Past and Future," Commodities Law Letter, March-April 1990.

resentatives of financial institutions from 30 developed nations.[37] The Group of Thirty addresses multinational financial and economic issues, including Third World debt. The Group's recommendations for the world's securities markets are aimed at ''maximizing the efficiency and reducing the cost of clearance and settlement," and thereby reducing risk. They have set target timetables of 1990 for some objectives and 1992 for others. In a report released in 1989,[38] the Group concluded that:

> While the development of a single global clearing facility was not practical, agreement on a set of practices and standards that could be embraced by each of the many markets that make up the world's securities system was highly desirable, . . and (reached) agreement that the present standards were not acceptable.

Their recommendations are:

1. By 1990, all comparisons of trades between direct market participants (i.e., brokers-dealers, and other exchange members) should be compared within 1 day after a trade is executed, or ''T+l."[39]
2. Indirect market participants-institutional investors, or any trading counterparties which are not broker-dealers-should be members of a trade comparison system which achieves positive affirmation of trade details.
3. Each country should have an effective and fully developed central securities depository, organized and managed to encourage the broadest possible industry participation.[40]
4. Each country should study its market volumes and participation to determine whether a trade netting system would be beneficial in terms of reducing risk and promoting efficiency.
5. Delivery versus payment (DVP) should be the method for settling all securities transactions.
6. Payments associated with the settlement of securities transactions and the servicing of securities portfolios should be made consistent across all instruments and markets by adopting the "same day" convention.[41] *(No date has* been set for achieving this objective.)
7. A "rolling settlement" system[42] should be adopted by all markets. Final settlement should occur on T+3 by 1992. As an interim target, final settlement should occur on T+5 by 1990 at the latest, except where it hinders the achievement of T+3 by 1992.
8. Securities lending and borrowing should be encouraged as a method of expediting the settlement of securities transactions.[43] Existing regulatory and taxation barriers that inhibit the practice of lending securities should be removed in 1990.
9. Each country should adopt the technical standard for securities messages developed by the International Organization for Standardization.[44]

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[37] For a discussion of other international organizations' studies of clearing and settlement and related issues, see OTA's background paper, Op. Cit., footnote 1, ch. 5.

[38] Group of Thirty, *Clearance and Settlement Systems in the World's Securities* Markets (New York& London, March 1989), p. 1.

[39] In the United States, where there is increasing use of automated trading systems in the stock exchanges and OTC markets, data required for comparison and automatic submission to the clearing system is automatically recorded. Such systems now process two-thirds of NYSE transaction volume; a large propotion of AMEX volume; and one-third of OTC equity volume. These transactions are pre-matched and reported directly to the clearing system, and have been reported on T+1 since the mid-1980s. Both the NYSE and AMEX have on-line trade correction facilities. The rules of the National Securities Clearing Corp. require that all trade data not already locked in by the automated trading systems must be reported by both trading counterparties by 2 a.m. on T+l.

[40] The principal function of a central securities depository is to immobilize or dematerialize securities. This function permits the processing of transactions in 'book entry" form, which is the basis for achieving efficient and low risk settlement of transactions by transferring ownership from one account to another by a simple debit or credit on the books of the depository.

[41] Some markets use "same-day" funds, while others use "next-day" funds for settlement. Adoption of a single method will improve the efficiency of the accounting and payment systems, set the stage for subsequent full automation, and facilitate other improvements such as finality of payment, irrevocability, and bank guarantees.

[42] In a rolling settlement system, trades settle on all business days of the week, which limits the number of outstanding (unsettled) trades and reduces market exposure to risk. The goal for the long term is same-day settlement.

[43] Securities lending and borrowing has become an effective tool used by market participants to satisfy their obligations to deliver Or pay a trading counterpart. In its absence, a failure to deliver can have the consequence of creating a series of additional failed transactions as one party's failure to receive becomes the cause of its failure to deliver on its obligations.

[44] The ISO is a worldwide standards-making body. ISO standard 7775 applies to Securities Message Types; standard 6166 applies to International Securities Identification Number (ISIN). Currently, no worldwide securities numbering system is in use. Countries each use their own unique numbering system for identification rendering them impractical for cross-border transactions.

Table 6-3--Group of Thirty: Current Status of International Settlement Recommendations-Equities

Recommendation No. / Country	1 Comparison on T+I	2 Institutional Comparison System	3 Central Securities Depository	4 Securities Netting	5 DVP	6 Rolling settlement on T+5	7 Same-Day Funds	8 ISO/ISIN	9 Securities Lending
Australia	Yes	No	No	No	Yes	Open	No	No	Yes
Austria	Yes	No	Yes	No	No	Weekly	Yes	No	No
Belgium	No	No	Yes	No	Yes	Fortnightly	Yes	No	Yes
Canada	Yes	Yes	Yes	Yes	Yes	T+5	Yes	No	Yes
Denmark	Yes	No	No	No	Yes	T+3	Yes	No	Yes
Finland	Yes	No	No	No	Yes	T+5	No	No	No
France	Yes	No	Yes	No	No	Monthly	Yes	No	Yes
Germany	Yes	No	Yes	No	Yes	T+2	Yes	No	No
Hong Kong	Yes	No	No	No	Yes	T+I	No	No	Limited
Italy	Yes	No	Yes	No	Yes	Monthly	Yes	No	Limited
Japan	Yes	No	No	Yes	Yes	T+3	No	No	Yes
Korea	No	No	Yes	No	Yes	T+2	No	No	No
Netherlands	Yes	No	Yes	Yes	Yes	T+5	No	No	Yes
Norway	Yes	No	No	No	Yes	Tt6	Yes	No	No
Singapore	Yes	No	No	No	Yes	T+5	No	No	Yes
Spain	Yes	No	No	No	No	Weekly	No	No	Limited
Sweden	Yes	No	Yes	No	Yes	T+5	No	No	Yes
Switzerland	Yes	No	Yes	No	Yes	T+3	Yes	No	Yes
Thailand	Yes	No	Yes	Yes	Yes	T+4	Yes	No	No
United Kingdom	Yes	Yes	No	Yes	No	Fortnightly	No	No	Limited
United States	Yes	Yes	Yes	Yes	Yes	T+5	No	No	Yes

SOURCE: Updated fromA *Comparative View: The Group of Thirty's Recommendations and the Current(U.S. National Clearance and Settlement System,* (NewYorkCity,NY:Morgan Stanley & Co.June 1989).

Table 6-3 compares nine of the Group of Thirty recommendations with the present status of clearing and settlement procedures in 21 countries, including the United States. Major changes will be required by many countries in order to meet these recommendations by 1992.[45] Table 6-4 shows the points of agreement from recent studies conducted by the International Society of Securities Administrators (ISSA), the European Community (EC), the Group of Thirty (G-30), and the Federation International des Bourse de Valeurs (FIBC). In the United States, which is well-positioned relative to other countries, automated systems will facilitate trade matching on the trade date and settlement of all trades within three days. But, in the United States, there are non-technological barriers to fully achieving the accelerated trade and settlement objectives, some of which have been acted on recently. For example:

. More stocks must be immobilized in book entry form; this means that retail customers may have to abandon their pattern of receiving certificates of ownership for their stock shares.

- The pattern of mailing personal checks to pay for stock purchases will have to change to a more rapid payment method such as electronic bank-to-bank transfer of guaranteed funds.
- The Federal Reserve System's Regulation T, which addresses margin regulations for broker-dealers, has just been modified. Since the maximum allowable time for clearing and settlement of trades in the United States is different from those of many other countries, some flexibility is needed in tying the customer's time period for payment to the foreign settlement date. In March 1990, Regulation T was modified to allow the maximum time for payment to agree with the foreign settlement period, provided that period does not exceed the current U.S. 35-day maximum allowable period for settling cash (delivery against payment) transactions.[46]

[45]The Group of Thirty met in London in mid-March 1990, to discuss worldwide progress toward implementing its nine recommendations. See Clearance and Settlement Systems Status Reports: Spring 1990, Group of Thirty, New York and London, which covers the progress of 17 countries. While the obstacles facing each nation and the efforts required of each to comply with the recommendations are disparate, there was general acceptance of the recommendations.

[46]See 55 Fed. Reg. 11158, Mar. 27, 1990. This 35.&, period is separate from the 5-day and 3-day settlement periods discussed elsewhere. It refers to the maximum allowable time period for settlement in the event of unavoidable delay, e.g., a payment lost in the mail, and it does not apply to reasons such as a customer being unable or unwilling to make payment or deliver securities.

Table 6-4-Recommendations From Major International Studies

Aspect of operation	Report ISSA	EEC	G-30	FIBV
Two-sided trade matching	—	—	Yes	Yes
One-sided trade comparison	—	—	Yes	Yes
National central securities depository[a]	Yes	Yes	Yes	Yes
Evaluate securities netting	Yes[b]	Yes[c]	Yes	Yes
Delivery versus payment	Yes	Yes	Yes	Yes
Rolling settlement	Yes	Yes	Yes	Yes
Same-day funds	Yes[d]	Yes[e]	Yes	Yes
Use of ISO standards for message formatting	Yes	Yes	Yes	Yes
binding for settlement	Yes[f]	Yes	Yes	Yes
Cross-border Central Securities Depositories should be linked	Yes	Yes	—	Yes
Securities should be immobilized in country of issuer	Yes	Yes	—	Yes

[a]Depositories for securities are already widely used in the United States.
[b]Included as part of the risk reduction/resolution recommendation in the report.
[c]Included as part of the risk reduction/resolution reeommendation in this report.
[d]Included as a subset of the delivery versus payment recommendation of this report.
[e]Included as part of the currency accounting recommendation of this report.
[f]Included as part of the risk reduction/resolution recommendation in this report.

SOURCE: Bankers Trust Co. adapted from Federation International des Bourses de Valeurs (FIBV) document.

- **Changes also** have been made in the margining of foreign securities in U.S. accounts with foreign currency-denominated cash and securities.[47]

Implementation plans for the Group's recommendations were initiated or considered by its members' governments beginning in the spring of 1989. The U.S. Working Committee of the Group of Thirty met in May 1989 with representatives from exchanges, the National Association of Securities Dealers (NASD), clearing corporations, transfer and depositories firms, banks, regulators, and others, to begin discussing the recommendations. David Ruder, then SEC Chairman, noted at the 1989 meeting that the Group's recommendations are consistent with published policy objectives of the SEC.[48] He listed other areas that still require attention, such as capital adequacy standards for market participants, information sharing among clearing entities, and the interaction of derivative markets.[49] The U.S. Advisory, Steering, and Working Committees reconvened a meeting on March 1, 1990, to discuss progress on the recommendations related to same-day funds and shortening the time to settlement. The Federal Reserve Board is taking some actions to accommodate these issues and others. Officials of U.S. regulatory agencies generally are highly supportive of the U.S. Advisory, Steering, and Working Committee's efforts.[50]

These proposals and efforts are a starting point for improvement, but some of these will require supplementary actions by the U.S. Congress and other governments.[51]

The reforms suggested by the President's Working Group on Financial Markets, the Group of Thirty, and other organizations are being taken seriously in the United States. Several recent reforms have been made in the U.S. equities markets, many of which predate the recommendations of the Group of Thirty. These include:[52]

. *Trade Processing*
  —*The* NYSE in 1988, began developing an on-linetrade reconciliation system which has evolved into its current overnight Comparison System.
  —The NSCC implemented earlier input and output time frames to facilitate trade matching on the day after the trade (T+l).
  —The NSCC is participating as part of the Group of Thirty, U.S. Working Committee, in the evaluation of ways to shorten the timetable for settling equities trades to T+3 (from the current T+5).
  —The NASD has implemented a Trade Acceptance Reconciliation System (TARS) for

[47]Ibid.

[48]Policy Statement of the U.S. Securities and Exchange Commission, "Regulation of the International Securities Markets," November 1988 and Release No. 33-6807, Nov. 14, 1988, Fed. Reg. 46963, Nov. 21, 1988.

[49]David S. Ruder, "Remarks on the Group of Thirty Report on International Clearance and Settlement," May 15, 1989.

[50]Comments by G. Corrigan, president of the Federal Reserve Bank of New York and Commissioner Mary Schapiro, SEC, at the March 1990 meeting of the U.S. Committee.

[51]Group of Thirty, op. cit., footnote 19; and Bankers Trust report, op. cit., footnote 2, p. 206.

[52]For an evaluation of progress on implementing the recommendations of the President's Working Group on Financial Markets relating to clearing and settlement, see General Accounting Office, *Clearance and Settlement Reform: The Stock, Options, and Futures Markets Are Still at Risk*, GAO/GGD-90-33, April 1990.

same-day or next-day automated reconciliation of unmatched trades and is currently phasing in its Automated Confirmation Transaction (ACT) system for same-day comparison of all trades not already locked in through automated execution systems.

- *Risk Management*
  - —Information sharing of the financial positions of participants who are active in multiple markets is being worked on by the Securities Clearing Group, which represents U.S. clearing organizations serving equity and equity options markets. This group is working to develop a system for sharing settlement, margin, and clearing fund at-risk exposure information about joint members .53 An earlier, continuing, effort in the futures industry (the BOTCC'S system) to share pay-collect information is being expanded to include OCC pay/collect data. (There is still some concern by the OCC about the confidentiality and perishability of data, and unintentional competitive advantage.) In the United States, the trend is toward interfacing existing centralized risk information systems for derivative markets with the emerging centralized risk information system for equities markets.
  - —The NSCC has proposed to the SEC changes in its criteria for assessing risk-based contributions to guarantee funds from clearinghouse members, and to make earlier calls for additional contributions.[54 55]
  - —The SEC proposed an increase in capital adequacy requirements of full service broker-dealers from the present $100,000 to $250,000 to be phased in by January 1994.[56]
  - —The OCC initiated an intra-day margin call procedure directly to the clearing member's clearing bank, in contrast with the earlier procedure of contacting the member and allowing 1 hour for payment.
  - —The OCC has increased the initial net capital requirement upon application for clearing member status from $150,000 to $1 million.

In both domestic and international futures markets there are differences in clearing and settlement. There is, however, some commonality among U.S. domestic futures markets for financial safeguards, but even those common safeguards vary in form. These safeguards include: original margins for clearing members based on trades carried for their customers and their proprietary accounts; daily and intra-day marking-to-market and calling of variation margins; initial and maintenance margins for customers; clearinghouses serving as guarantors of trades; the posting of deposits by clearing members which may be called by the clearinghouse; systems for monitoring the risk positions of both clearing members and customers; and large trader reporting.

Clearinghouses have tended to structure themselves as fortresses, able to contain significant damage to their systems from internal causes with a hierarchy of safeguards or "firebreaks." Assumpions underlying the adequacy of firebreaks are increasingly less valid because of the growing linkages between futures, equities, and options markets; these linkages have become international.[57]

Concerns about whether or not futures margins levels in the United States are set appropriately have been addressed by the President's Working Group on Financial Markets, which concluded that they are set in a prudential manner and recommended no

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[53]As of May 1990, the SCG was proceedin, with its own system. OTA staff discussion with Robert Woldow, NSCC, May 9, 1990.

[54]Due t. a recent change, now only 70 percent Of ,, NSCC clearing member's collateral may be in the form of letters of credit. In addition, the NSCC has obtained a bank line of credit of $200 million. Data from Robert Woldow, Executive Vice President and General Counsel, NSCC, March 1990.

[55]There is continuing disagreement between the SEC and CFTC about the adequacy of guarantee funds at the Chicago Mercantile Exchange (CME), which the SEC believes is inadequate, particularly with its recent increase to $40 million and credit lines that now exceed about $250 million, and which the CFTC defends; and with those of the OCC, which the CFTC has criticized and the SEC defends. General Accounting Office, *Clearance and Settlement Reform: The Stock, Options, and Futures Markets Are Still at Risk,* GAO/GGD-90-33, April 1990 (SEC Comments), app. III, pp. 64,67,68, and (CFTC Comments), app. IV, pp. 78-80.

[56]SEC Release No. 34-27249, Proposed Rulemaking on Broker-Dealer Net Capital Requirements, Sept. 15, 1989.

[57]Michael Hewitt Senior Adviser, Finance and Industry Department, Bank of England, "Financial Integrity of Futures Markets,'' presented at the Futures and OptionS 'Market Regulators Symposium in Burgenstock, Switzerland, September 1989.

changes in margin-setting systems[58] (SEC Chairman Ruder dissented). Nevertheless, Federal Reserve Board Chairman Alan Greenspan, Secretary of the Treasury Nicholas Brady, and SEC Chairman Richard Breeden have since noted their concern that futures margins that are set too low tend to be raised during periods of market turmoil, reducing liquidity when it is most needed.[59] (See chs. 4 and 9.)

POLICY ISSUES

Six **areas** of major concerns need to be addressed:

1. risks associated with default;
2. risks associated with the payment process;
3. information sharing;
4. technology;
5. standardization and harmonization;
6. shortening the time to settlement and using same-day funds.

Risks Associated With Default

In the United States, the Securities Investor Protection Corp. (SIPC)[60] provides a 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 vary and are extended mainly to clearing members of the exchange clearinghouse.[61] Insurance can never completely cover all losses. Some failures in securities markets are resolved though bankruptcy proceedings under the Federal Bankruptcy Code. The Bankruptcy Code 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).[62] The UCC is being reexamined to reflect the realities of today's marketplace, especially as it applies to third-parties holding securities. Laws dealing with bank liquidation also need to be updated and made more consistent with other bankruptcy laws.[63] In nonregulated markets, such as foreign exchange, there is little investor protection. These are topics that warrant the attention of governments and the private sector.

Risks Associated With the Payment Process

Domestic and world markets have led to innovations in the way payments are made for transactions. Increased volume of trading has heightened stress on payments systems. Issues that have arisen concerning payment risk include: delayed or inadequate bank credit, timetables for finality of settlement, and netting procedures. Problems may arise with 24-hour trading systems, for example, margin calls when banks are closed.

Bank officials must become more familiar with the processes and risks of clearing and settlement to make better and more expedient credit decisions, particularly in times of severe market volatility. At such times, the lack of adequate information on which to base credit decisions may force some banks to restrict credit unnecessarily.[64] This could exacerbate a downward market spiral. Knowledge about

[58] Interim Report of the President's Working Group on Financial Markets, May 1988, p. 5: ". . .current minimum margin requirements provide an adequate level of protection to the financial system. . ." More recently, however, the Administration appears to have taken a different view, namely, that futures margins are set too low, and that a single Federal agency should have day-to-day oversight 'to harmonize margins between futures and stocks to protect the public." Testimony of Robert R. Glauber, Under Secretary of the Treasury for Finance, before the Senate Committee on Agriculture, Nutrition, and Forestry, May 8, 1990. There is also the view that higher initial margins with less frequent reviews might be safer than today's lower margins and more frequent reviews. Hewitt, op. cit., footnote 57.

[59] Oral testimony of Alan Greenspan, Chairman, Federal Reserve Board, before the Senate Committee on Banking, Housing, and Urban Affairs, Mar. 29, 1990. He said: "I was shocked" about the margin setting behavior in the futures markets in October 1989. When margins are set low, they have to be raised during market stress, reducing liquidity just when it is most needed.

[60] SIPC insures an investor's accounts up to $500,000 for securities and cash against certain types of loss, e.g., the default of a broker. This includes a maximum of $100,000 in cash per account. Securities Investor Protection Act, 1970.

[61] It should be noted that customers' losses stemming from Futures Coremission Merchants' insolvencies have been rare. Insolvency losses from 1938 to 1985 amounted to less than $10 million. National Futures Association study *Customer Account Protection, Nov.* 20, 1986, p. 13. The basic protection is the statutory requirement that 100 percent of customer funds be segregated. Commodities Exchange Act, Sec. 4d(2). Also, customers have first priority in commodity brokers insolvencies under the Federal Bankruptcy Code and CFTC bankruptcy regulations.

[62] The UCC is accepted on a State-by-state basis and amendments to it would still leave open the possibility Of non-uniform treatment by the various states. The American Bar Association has a current project which is seeking improvements to this area.

[63] In earlier times, customers were inclined t. keep possession of their securities certificates. More recently, many buyers of securities tend to leave their certificates on deposit with third-parties, e.g., banks, brokers, depositories.

[64] The Clearing Organimations and Banking Roundtable is addressing methods to assure that clearing members have adequate credit during times of market turmoil. There are currently concerns for the privacy and confidentiality of clearing members that hinder the attractiveness of the concept of a single center for complete information on all members' positions in all markets. This organization was started by the CME and BOTCC to begin a dialog among futures and equity-related clearing organizations, their Federal regulators, and clearing banks.

the riskiness of various financial instruments and trading techniques are important for lenders. Educational efforts of this kind are receiving some attention by the private sector, but more is probably needed.

The timetable for finality of settlement is a problem. Some payment systems, such as the FRB's Fedwire, offer immediate finality of settlement; other payment systems offer "end of the day" finality of settlement,[65] and others are on later timetables.[66] The shorter the time to finality of payment, the less is the clearinghouse risk. Timetables for finality of payment of settlement vary within the United States and internationally, as noted earlier.[67] The **private** sector and the regulators should harmonize disparate systems, at least to provide same-day finality of payment.

Netting of payments reduces the stress on payment systems by requiring market participants to pay (and receive) only the difference between the amounts each owes and is owed by others. This increases liquidity for market participants and reduces the risk that a market participant will default on either payment or delivery of securities. There is consensus among experts that legally binding netting should be expanded for payments and for securities delivery obligations. This issue must be addressed internationally by the private sector and regulatory authorities.

Information Sharing

There is no central source of risk information for financial markets participants in spite of the large amounts of money often involved. Although some organizations in the clearing and settlement industry have arrangements among themselves for sharing risk information about market participants, these arrangements are limited in scope. Thus, creditors are at a disadvantage because increasingly market participants trade on more than one exchange, in more than one market, and in the markets of more than one country.[68 69] A Bankers Trust survey of international clearinghouses and exchanges received 18 out of 20 responses favoring the sharing of risk position information "as useful or absolutely essential" among clearing and settlement organizations for the purpose of reducing clearing members' exposure risks.[70]

Increased automation could facilitate information sharing. This could lead to the development of a common format for reporting and distributing risk information, and standards for the timely delivery of risk information. Standards also are needed for evaluation of different risks in different markets: for example, a given dollar amount of financial obligations in one market may not equal the risk of a like financial obligation in another market.

Technology[71]

Technology may or may not have a significant impact on clearing and settlement at low trading volume; but during high volume, technology is often a key to efficient clearing and settlement. Most of the U.S. clearing and settlement system is technologically advanced, although there are some areas needing improvement.

While clearinghouses have made significant strides in upgrading technological levels, the benefits of these upgrades can be diluted if all clearing members are not sufficiently advanced technologically to respond to new requirements of the clearinghouse for which the technology was intended. In

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[65]Immediate finality of settlement is available only in the United States (through Fedwire) and in Switzerland. The CHIPS system in the United States, the CHAPS system in the United Kingdom, and the SAGITTAIRE system in France are examples of payment systems which offer end-of-day finality of settlement.

[66]See Bankers Trust report, op. cit., footnote 2, vol. 1, p. 149.

[67]Respondents to a survey conducted by Bankers Trust Co. identified the use of "same-day funds' and ' 'using electronic funds transfer instead of checks" as the major improvements that they would like to see in the way that payment systems work in clearing and settlement. In answer to another question on what changes or improvements respondents would like to see in the clearing and/or settlement process, the two most frequent responses were "standardization of settlement times internationally' and "centralized depositones in other countries. "

[68]About 39 percent of the North American respondents to the survey conducted by Bankers Trust stated that they trade in markets in more than one country. See Bankers Trust report, op. cit., footnote 2, vol. 1, p. 235.

[69]While U.S. clearinghouses operate in single markets, 20 percent of their member firms trade in more than one market. General Accounting Office, op. cit., footnote 52, p. 4.

[70]Bankers Trust report, op. cit., footnote 2, vol. 1, p. 231.

[71]This section is breed on *IBM Study of Clearance and Settlement for the U.S. Congress—OTA*, Aug. 1, 1989, which is a part of the OTA contractor study: Bankers Trust, op. cit., footnote 2. The IBM study is based on opinions of participating experts from the world's major exchanges and clearing organizations.

some cases, the weakest technological link may limit the responsiveness of the system during operational stress, particularly under high-volume conditions. These are areas where the private sector will have to take the initiative to bring about needed changes.

Standardization and Harmonization

Uniform codes of operation, or standards, for both the process[72] and the infrastructure[73] of clearing and settlement would make it easier to link the world's clearinghouses and depositories.[74] But progress in this area is likely to be slow because of the complexity of effecting change. The United States (with respect to equities and options markets) has standardized its domestic systems both in the process and the infrastructure.

Operating hours and daily schedules for banks and financial markets are not uniform, either domestically or internationally. Banks, including the Federal Reserve Bank, may be closed even if financial markets are open.[75] This is also true of central banks in other countries, which can cause problems as market participants invest in more than one country. The FRB, SEC, CFTC, and the Treasury Department must frost face this issue in the United States.

Settlement Period Duration

The United States must shorten the settlement period for equities. This most likely would require immobilization of securities in a depository and the public would also benefit from a change to same-day funds.[76]

The elimination of physical delivery of certificates is the key to automating the clearance and settlement systems. The U.S. Working Committee of the Group of Thirty concluded that the greatest deterrent to achieving shorter settlement at the retail level, or the ''customer-side, is the physical delivery of certificates (which some retail investors insist on) and reliance on the postal system to accomplish this.[77] The retail customer must pay his broker on or before the settlement date. Each side requires the delivery to the broker of either "good funds' or certificates in a timely fashion. There is no easy way to accomplish these "deliveries" today, without substantial changes for the retail investor or added expense for investors who wish to hold a certificate.

The Group of Thirty's recommendation for a change from next-day funds to same-day funds (SDF) for the settlement of securities transactions has no deadline for implementation, but some expect it to be in place in the United States during the 1990s.[78] The adoption of SDF should contribute to risk reduction and would add uniformity and simplicity across all instruments and markets.

However, the U.S. Working Committee, while recommending the eventual adoption of same-day funds, recognizes the need for assessing a number of complex issues associated with its adoption. There are substantive technical issues and the requirement for significant behavioral changes that warrant study before the changeover. Today's automated payment systems, for example, are considered to be not yet sufficiently developed or "user-friendly" to be viable alternatives to the postal system. Similarly, U.S. clearing corporations that process corporate securities transactions do not settle payment obligations in same-day funds. Further work is needed to

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72 ''Process'' refers to operational functions including trade matching, the number of days to clear a trade, number of days to settle a trade, the use of a depository for holding equities and keeping records of ownership, the use of a recognized numbering system for identifying financial instruments, formats for data transmission, and the method of payment.

73 ''Infrastructure'' refers to all of the many nonoperational features necessary to make the clearing and settlement process work in a consistent and stable reamer. These include the method of regulation, mechanisms to protect the clearinghouse against the financial failure of a clearing member, a reserve of funds to protect customers of a failing broker or futures commission merchant, bankruptcy laws to adjudicate the disposition of customer assets if a broker fails, credit processes at banks, clearinghouse trade guarantees, capital adequacy guidelines, and bilateral tax treaties among nations.

74 Bankers Trust, in its survey of clearing and settlement participants worldwide, asked the question: Which critical clearing and settlement problems should the U.S. Congress address, if any,. . .? The three most frequent responses for attention by the Congress were: Support standardization efforts for global trading; Support immobilization of securities; Support increasing the standardization of the clearing and settlement process. It should be pointed out that a significant number of U.S. respondents did not want increased congressional involvement in issues affecting the clearing and settlement industry.

75 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 far more complicated internationally and far from being resolved.

76 IBM study, op. cit., footnote 71, PP. 20>22.

77 Group of Thirty, U.S. Working Group Report on *Compressing the Settlement Period*, Nov. 221989.

78 Memorandum from The DTC to the Group of Thirty, U.S. Working Committee, Jan. 4, 1990.

examine how these systems would have to be altered to accommodate an SDF environment.[79]

A final issue concerns implementing guidelines issued by the Federal Reserve System to mitigate systemic risk that could be caused by a failure of a private payment system (i.e., a clearing agency) participant to settle its obligations.[80] The guidelines are seen as difficult to apply within NSCC and Depository Trust Corp. (DTC) for the clearing of corporate securities and municipal bonds, and therefore will require additional study .81

Ongoing efforts by the private sector have been laudable. Yet, some of the issues raised by shortening the time to settlement and same-day funds, among others, will require continued assistance from regulatory bodies and, in some cases, the U.S Congress, since they are not within the ability of the private sector to resolve.

IS AN INTERNATIONAL REGULATORY BODY NEEDED?[82]

Global trading has begun to raise many diverse issues; issues that have not received much attention until global trading began to become significant. The list of issues is likely to grow during the decade of the 1990s and change significantly over time. In the past, some of the issues have been addressed, at least in part, by different organizations, often on an ad hoc basis and typically not for all financial instruments or markets. A key question is whether there is a need for a single organizational focus to address international issues on a continuing basis.

Among the many issues currently in need of international attention, are:

- legal issues in cross-border trading,
- information sharing across markets and across national borders,
- the minimum level of technology to be used by various participants with regard to clearing and settlement,
- international regulation of markets,
- the critical interface between international markets and banks,
- means of protecting clearinghouses from externally caused major disruptions,
- minimum financial standards for clearinghouses (i.e., capital and guarantees),
- standards for global custodians, and
- surveillance and enforcement.

These types of issues generally are best addressed in international fora so that the world's markets may evolve in a coordinated, harmonized reamer. The International Organization of Securities Commissioners, among other organizations, has begun examining these types of issues. Although the private sector is already dealing with many issues, government assistance is likely to be needed, for example, to effect changes in laws, such as those needed for the immobilization of securities certificates.[83] The several private sector studies do not fully address all financial instruments, e.g., derivative products, that must also be addressed to accommodate the linked markets of today, nor do these studies address all of the process and infrastructure areas that must be examined. The private sector alone cannot implement the recommended changes fully since consensus will be required among market participants, regulators, and national governments.

[79]Ibid.

[80]Federal Reserve System, Docket No. R-0665, *Policy Statement on Private Delivery-Against-Payment Systems, RIN* 7100-AA76, June 16, 1989.

[81]Group of Thirty, U.S. Working Committee Report on Same Day Funds Convention, February 1990.

[82]For a fuller discussion, see OTA'S background paper, Op. cit., footnote 1, ch. 5.

[83]See, for example, Group of Thirty, "U.S. Working Group Report on Compressing the Settlement Period," Nov. 22, 1989, pp. 6-10.

Chapter 7

How Technology Is Transforming Securities Markets

CONTENTS

	Page
TWENTIETH CENTURY MARKET TECHNOLOGY	129
Trading Support Systems	129
Market Surveillance Systems	130
Clearing and Settlement Systems	131
INFORMATION SERVICES VENDORS	132
Financial News	133
Stock Quotations	133
Value-Added Products	133
Foreign Exchange Data	134
U.S. Government Bond Data	134
Competition and Technological Change	135
Digital Data Feeds	136
Diversification into Transactional Services	136
REGULATIOIN OF INFORMATION SERVICES	137
U.S. BROKERAGE HOUSES	139
Data Compilation and Analysis	139
Trading Support	139
Back-Office Functions	139
Surveillance Activities	140
Customer Services	140
TECHNOLOGY FOR THE INDIVIDUAL INVESTOR	140
THE FUTURE: STRATEGIC TECHNOLOGIES AND THEMES	141
Expert Systems	141
Hardware	142
FURTHER TRENDS	142
THE MARKETS AND TECHNOLOGICAL PROGRESS	143
Standards for Automation	143
24-Hour Global Trading Systems	145

Chapter 7

How Technology Is Transforming Securities Markets

In the early 19th century, delivery of a message (or a market quote) from New Orleans to New York took from 4 to 7 days. The telegraph was first demonstrated in 1844. By January 27, 1846, telegraphic communication linked New York and Philadelphia, via Newark. Until direct lines were installed a few months later, messengers ran between the telegraph office and Wall Street. It was 2 years more before the New York and New Orleans foreign exchange markets could directly communicate, but then message time was nearly instantaneous.[1] Financial markets were quick to realize the possibilities. The New York Herald of March 3, 1846, mentioned that "certain parties in New York and Philadelphia were employing the telegraph for speculating in stocks." The use of the telegraph greatly reduced price differences between the participating markets.

A successful trans-Atlantic cable was completed on July 27, 1866. Four days later the New York Evening Post published price quotations from the London exchange. The first cable transfers occurred about 1870 and arbitrage between the London and New York exchanges began immediately. This led to further reductions in price differences between markets.

The third invention that revolutionized the exchanges was the stock ticker, introduced in 1867. Before that, reports of transactions were recorded by ''pad shovers'—boys who ran between the trading floor and the brokers' offices with messages. Several ticker companies had men on the trading floor to type results directly into the ticker machine. These reports went to the ticker companies' headquarters and were retyped to activate indicator wheels at local tickers, which then printed the results on paper tape.

In 1878, the telephone, successfully tested 2 years earlier by inventor Alexander Graham Bell, reached Wall Street. Until then, a messenger carrying a customer's order could take 15 minutes to get to the floor; with the telephone, it took 60 seconds. By 1880, most brokers had telephones linked directly to trading floors, and in the next few years, telephones were installed by the thousands. Finally, in 1882, the Edison Electric Illuminating Co. gave Wall Street electric lights.[2]

By 1880 there were over a thousand tickers in the offices of New York banks and brokers. In 1885, the New York Stock Exchange (NYSE) began to assemble the information for ticker company reporters to ensure consistency. The New York Quotation Co. was created by NYSE members in 1890 to consolidate existing ticker companies and integrate the information distribution. This did not eliminate "bucket shops," where the ticker tape output was rigged to swindle investors.

TWENTIETH CENTURY MARKET TECHNOLOGY

Trading Support Systems

Fully electronic transmission and storage of trading information began in the 1960s. Quotation devices were first attached to ticker circuits to provide bid and ask quotations and prices. An improved stock ticker was introduced in 1964 that could print 900 characters per minute and report transactions without delay up to 10 million shares per day. The pneumatic tube carried information to the ticker and quotation system, until it was replaced with computer-readable cards in 1966. Reporters on the floor recorded the transaction on a card and put it into an optical seamer. The scanner read the information into a computer where it entered the ticker system. At about this time the Central Certificate Service was created as an exchange subsidiary, to computerize the transfer of security ownership and reduce the movement of paper. In 1973, this became the Depository Trust Company. The computer display of dealers' bids and offers, described in chapter 3 and called NASDAQ (National Association of Securities Dealers Automated Quotations), began to operate in 1971.

Despite these technologies, the securities industry had a severe back-office paper-work crisis during

[1]Kenneth D. Garbade and William L. Silber, "Technology, Communication, and the Performance of Financial Markets," *The Journal of Finance*, vol. XXXIII, No. 3, June 1978, pp. 819-832.

[2]Deborah S. Gardner, ''Marketplace: A Brief History of the New York Stock Exchange," for The New York Stock Exchange, Office of the Secretary, 1982.

the 1960s. Brokerage houses could not keep up with paper-work for the high transaction volume. Finally, in April of 1968, the crisis forced trading hours to be curtailed so that the back-offices could catch up. This led to development of automated systems for back-office processing. In 1972 the Securities Industry Automation Corp. (SIAC) was established by the NYSE and the American Stock Exchange (AMEX) to coordinate the development of their data processing.

Three systems were introduced by SIAC during the 1970s: the Market Data System (MDS), the Designated Order Turnaround System (DOT) and the Common Message Switch (CMS). The MDS, originally introduced in 1964, was improved in the 70s to process last-sale information. DOT, introduced in 1973, automated the delivery of small orders (fewer than 199 shares) from member-firm offices to exchange floors. The CMS let member firms communicate with the other SIAC systems.

Since the 1970s these trading support systems have been improved in speed, accuracy, and efficiency. Regional exchanges have developed comparable systems. In many cases the regional exchanges led the way-e. g., in continuous net settlement (the Pacific Stock Exchange) and bookkeeping systems (the Midwest Stock Exchange). As early as 1969, the Pacific Stock Exchange (PSE) automated some trade execution. This meant that unless halted by the specialist, a trade was completed by a computer without human intervention. This first-of-its-kind system was called COMEX.

In 1979 the PSE introduced an improved version of COMEX, called the Securities Communication Order Routing and Execution (SCOREX). When an order reaches the SCOREX system, the current Intermarket Trading System (ITS) price is determined, and the order and price are displayed at the appropriate PSE specialist post. The specialist has 15 seconds to better the price for market orders, before the order is automatically executed by the computer, at the ITS price, for the specialist's account. For a limit order, the specialist also has 15 seconds to accept, reject or hold the order in his electronic book. If the order is rejected, it is routed back to the member-firm. Otherwise, when the order's designated price coincides with an ITS bid or offer, the specialist executes the order.

Most stock exchanges now have small order execution systems similar in function to SCOREX. There are also systems for small orders in options contracts, and in NASDAQ for small orders of over-the-counter stocks. These electronic small order execution systems were introduced with relative ease despite the reduction in the services of the "two-dollar broker,' but electronic systems for executing larger orders threaten the livelihood of more powerful professionals on the exchange floor, and thus are controversial.

Technology may reshape the entire exchange structure. The Cincinnati Stock Exchange and the London International Stock Exchange (ISE) do not use physical trading floors but operate through computer rooms. The ISE and NASDAQ combine screen-based quotation systems with telephone negotiation. Exchanges in Toronto, Madrid, Brussels, Copenhagen, Zurich, and Frankfurt are also essentially '' floorless. " For the time being, most U.S. exchanges have chosen to maintain their automatic trading support systems at a level that preserves the roles of specialists, floor brokers, and other intermediaries. Enhancements now usually mean faster computers or new devices that work around the traditional trading infrastructure and established participants.

Market Surveillance Systems

Today's financial environment has increased securities markets' vulnerability to illegal activity, even as today's technology has increased the ability to monitor markets. The magnitude and frequency of mergers and acquisitions and other major corporate transactions, and the allure of staggering profits increase the market's susceptibility to insider trading. The addition of new derivative products and new players around the globe further complicates surveillance.

Manual processes for detecting illegal activity are no longer adequate. People are not fast enough to inspect and evaluate the enormous volumes of information. Computers can improve detection of some kinds of illegal activity. They are less effective against the illegalities that occur in the least auto-

3 'The Two-dollar broker" or ' 'Broker's broker' executes overflow trades for other floor brokers too busy to execute them personally. These free agents were once paid $2 for every round lot executed, thus the name.

mated trading arenas-the Chicago trading pits-and insider trading in securities markets. For example, to detect insider trading, exchanges must obtain information from broker/dealers (as well as from the Securities and Exchange Commission (SEC)).[4] Some of them are not yet able to transmit trade data automatically, and paper-based data are difficult to work with.[5]

Surveillance in Self Regulatory Organizations (SROs) (i.e., exchanges, NASD) follows three general steps. First, the SROs monitor market data using computerized systems, to detect unusual price and/or volume fluctuations. Second, when an unusual trading pattern is detected, the SRO's staff conducts analyses to determine the probable cause of the fluctuation. If a satisfactory answer is not found, the staff conducts further investigations, using automated systems and analytical tools.[6] SROs maintain large computer databases of historical information about trades, personal background of traders, news, and past case materials, to identify, compare, and probe suspicious trends.

Market surveillance may be further improved by several emerging technologies, including expert systems (computer programs that incorporate the decision rules and judgment criteria of many human experts). The thrust has been to build systems and databases with great analytical power, to enable market analysts to sift through large amounts of data. If an expert system can give the analyst an advanced starting point in an investigation, the rest of the job can be done faster and more effectively.

Personal computers and "intelligent" workstations are replacing dumb terminals in market surveillance. Although interactive computing requires greater technical expertise, such as a database query language, it also enables analysts to retrieve information faster and integrate applications more effectively. Data feeds and programs from many sources can be combined locally, and better analytical tools can be applied to real-time market information. The emerging trends in software and hardware are entwined. The ability to manipulate data locally is also important for the development of expert systems for recognizing trends and abnormalities in market surveillance.[7] Until recently, market surveillance systems lagged behind the technology for trading support. Now computers offer critical tools such as expert systems, artificial intelligence, voice response, and complex relational databases for further improving market surveillance.

Clearing and Settlement Systems

Clearing and settlement (ch. 6) is the process whereby ownership of a security or options contract is transferred from the seller to the buyer and payment is made. The participants in this process are the principals to the trade (investors or broker/dealers and banks), the market places, clearing organizations, and settlement organizations. In the case of futures, the clearing and settlement process also involves the posting of margin by both the buyer (long) and the seller (short) to the accounts of the clearinghouse.

Banks transfer funds from the buyer to the seller. The 12 Federal Reserve Banks, their 24 branches, the Federal Reserve Board in Washington, D. C., the U.S. Treasury offices in Washington, D. C., and the Chicago and Washington, D. C., offices of the Commodity Credit Corporation are all connected by the Fedwire, a high-speed, computerized communications network over which banks transfer reserve balances from one to another for immediately available credit. The depositories and registrars are involved in the transfer of ownership. Depositories register all securities in the name of the depository as nominee and then transfer ownership via book-entry. Transfer agents physically transfer ownership by creating new registered certificates.

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[4]The SEC has also applied automation to its task of financial filings and registration. The Electronic Data Gathering Analysis and Retrieval system (EDGAR) is designed to receive and display financial filings. When the project is completed it is expected that over 11,000 publicly traded companies and 2,700 investment firms will submit their required filings and disclosures electronically.

[5]As of August 1989, 373 broker-dealers were submitting automated data to the New York Stock Exchange, according to exchange officials, August 1989.

[6]For example, they may monitor the covariance between securities to capture their price interrelationship and hypothesize the Correct price probability distribution for the securities. The parameters are set by computers using a moving average algorithm or standard deviation to determine the "acceptable" ranges of price movement and volume activity. When these limits are violated the staff is alerted by the computer to investigate unusual activity.

[7]In general, an expert system is a computer program that attempts to replicate, to some degree, human logic and decision processes. The long range benefits of using such systems are many, including better utilization of professional time, cost savings and improved quality and consistency of decision making.

Participants are linked by paper, tape, electronic systems, and direct computer-to-computer links. For example, the Options Clearing Corp. (OCC) in Chicago receives taped data from nine exchanges,[8] and has some direct computer-to-computer linkage with them. OCC also has electronic feeds to market data vendors. Communication with banks is via paper and facsimile, and with regulators it is through paper transactions. Clearing members are linked by dial-up capabilities, leased lines, microfiche, tape, and paper media. Clearing corporations communiate with OCC with magnetic tape transfer as well as some direct computer-to-computer linkage. The Depository Trust Co., the Midwest Securities Trust Co. and the Philadelphia Depository Trust Co. are all linked to the OCC via direct computer-to-computer connection.

Since 1982, trade volume has surged. Critical problems can occur in trade matching when heavy volume, manual entry, and tight time constraints combine to strain the system. Continuous net settlement (CNS)[9] and electronic book-entry systems have allowed the processing of these high transaction volumes, as have faster, higher capacity mainframe computers. The critical element in handling rising trade volume on a sustained basis, however, is the first step in processing the trade, i.e., the trade entry or trade capture component. Manual trade entry processes are prone to error and result in a disproportionately high rate of unmatched trades as trade volume rises.

The development, operational and maintenance costs of automation have risen over the past two decades. Rapid technological obsolescence in management information systems and technical infrastructures implies high reengineering costs. Regulatory rules often influence or even dictate specific technologies that must be used. In many cases such rules have had a positive impact. For example, NYSE Rule 386 requires all members to use the Depository Trust Co's. automated Institutional Delivery system or its equivalent. The Municipal Securities Rule-making Board's rules G12 and G15 require municipal bond clearinghouse members to use a municipal bond comparison system. The rules go so far as to define the output specifications for the system.

On the other hand, there are also regulatory, legislative, and political factors that inhibit automation. These include domestic disputes over regulatory jurisdiction, resistance to change, tradition, and customs; and overseas, legislation prohibiting dissemination of some data.

In hopes of achieving a competitive edge, firms are evaluating new relational database management systems and communication systems of copper, fiber-optics, and microwave. Communications networks such as LANs (local area networks), hypernets, and shared terminal networks will also be increasingly used in clearance and settlement. Higher density storage media will be needed to accommodate anticipated increases in on-line storage requireents. As an alternative to the direct access storage devices in use today, optical disk storage technology may have greater use. Optical disk is also an effective data distribution medium; for example, Lotus sells a service providing historical price information on securities on CD for use with the Lotus 1-2-3 spreadsheet. Today's systems are being designed with several levels of backup, fault-tolerant redundant hardware, and data storage backup.

INFORMATION SERVICES VENDORS

As early as 1850 Paul Julius Reuter first used carrier pigeons to fly stock market quotations between Brussels and Aachen, Germany. One year later, an underwater telegraph cable opened between Dover and Calais. Reuter then began delivering news and market quotes from London to Continental Europe. Reuters is, 150 years later, still one of the dominant market information services vendors.

The market for financial information can be broadly divided into three categories-news, data on exchange-traded instruments, and data on over-the-counter instruments. The market structure is different for each of these.

[8]The PHLX, PSE, NASD, PBOT, ACC, NYFE, CBOE, AMEX and NYSE. The PBOT is the Philadelphia Board of Trade, the ACC is the *AMEX* Commodities Corp. and the NYFE is the New York Futures Exchange.

[9]CNS was developed by the Pacific Stock Exchange in the late 1960s and is much more effective than settling on a trade-for-trade basis, which is probably not viable with today's volumes.

Financial News

Financial news may be gathered by information vendors themselves, or they may carry reports from leading news organizations. Dow Jones & Co. Inc., is the leading provider of financial news in the United States. Dow Jones has tried to extend its dominant position in equities news to the fixed-income bond market through the Dow Jones Capital Markets Report, but in-depth news is not as essential for the bond trader as it is for the stock trader.

Reuters has an edge over Dow Jones in news that affects foreign exchange and fried-income prices because of its vast international communications network. Reuters is also a strong competitor in delivering news about U.S. commodity markets, but Knight-Ridder is a major presence in this market through its Commodity News Service, and has also made headway in supplying news concerning financial futures and underlying cash markets. Other providers of online financial news include the Associated Press, McGraw-Hill Inc., Financial News Network, and Market News Service.

Stock Quotations

Five companies dominate the market for securities and futures quotations in the United States—Reuters Holdings PLC, Quotron Systems Inc., Automatic Data Processing Inc. (ADP), Telerate Inc. (now owned by Dow Jones), and Knight-Ridder Inc. These five companies had a total of approximately 426,000 terminals worldwide as of February 1989.[10] For most stocks, all commodity and financial futures, and all options, the market data—bids, offers, last-sale prices, and volume information—are generated by exchanges and the over-the-counter market and delivered to vendors. In foreign exchange and fixed-income markets, where there is no central exchange, price information is contributed by banks and securities firms to vendors.

Quotron Systems Inc. has long dominated the market for U.S. stock quotations, but this market is now in ferment.[11] ADP is a strong competitor. Outside the United States, the leading position is held by Reuters, which recently entered the U.S. market for stock prices. In the past, Reuters supplied quotes and news for foreign exchange, money market instruments, and commodities in this country, but not equities.

The internationalization of the securities markets has prompted foreign vendors such as Reuters and Telekurs of Switzerland to enter the U.S. market, while American companies such as Quotron and ADP have been expanding their operations overseas. The growing links between the equities, futures, freed-income and foreign exchange markets have also led to diversification among vendors who traditionally specialized in one market. Telerate Inc., which holds a near monopoly in the market for U.S. government securities prices, has entered the equities market through acquisition of CMQ Communications Inc., the leading stock quote provider in Canada. It remains to be seen whether Reuters and Telerate can replace Quotron and ADP, or will merely add equities quotes to their existing terminal base. There are about 200,000 terminals receiving real-time prices from U.S. stock exchanges, and some industry observers are skeptical that the pie will become bigger with the entrance of new players.

Nevertheless, the relative ease of acquiring and distributing prices for exchange-traded instruments has attracted several new competitors in recent years, including PC Quote Inc., and ILX Systems, a new venture backed by International Thomson Organization. Despite the competitive conditions in the securities quotation business, there is always room for new ‘‘niche’ companies offering innovative products, such as proprietary analytics.

Value-Added Products

The relative ease with which any vendor can obtain data from American stock markets and many of their foreign counterparts has made the market for

[10]Eric Philo and Kenneth Ng, **“Reuters Holdings PLC,” Goldman, Sachs & Co., New York, NY, February 1989, p. 5. There may be some double-counting here due to screens displaying more than one vendor’s data.**

[11]Following Quotron’s **acquisition by Citicorp in 1986 for $680 million, two major firms—Merrill Lynch & Co., Inc. and Shearson Lehman Brothers, Inc., now known as Shearson Lehman Hutton Inc.-announced they would not renew their contracts with Quotron because they consider Citicorp a competitor. ADP has recently begun installing a personal computer-based stock quotation system for registered representatives at Shearson and Merrill. If these installations are completed, and ADP achieves a one-for-one replacement of the terminals at both Merrill and Shearson, Quotron’s network of approximately 100,000 terminals could be reduced by up to 30 percent and ADP could surpass Quotron as the leading stock quotation provider in the U.S. (Waters Information Systems, Transcript of Quotron-Reuters-Telerate Conference, New York, NY, November 1988, p. 19.) To date, ADP’s conversion of terminals at Merrill and Shearson is running behind schedule, and Quotron has added more terminals than it has lost. (Roxanne Taylor, Quotron, Los Angeles, CA, personal communication August 1989).**

exchange trade data into a‘ ‘commodities” market, in the sense of highly standardized products competing on price or value-added features. In order to maintain their profit margins, vendors are trying to add value through new technology or exclusive products, and to generate as much revenue per terminal as possible. This has encouraged third-party suppliers to offer historical information, research, analytics and tailored news services through the terminals of vendors such as Quotron, Reuters and Bridge Brokerage Systems. Vendors that control the distribution network typically keep 30 to 40 percent of the revenue generated by third-party Products.[12]

Foreign Exchange Data

The commoditization of exchange trade data has no parallel in markets where there are significant barriers to entry for vendors. Reuters created the market for real-time foreign exchange data in 1973 when it frost put computer terminals on the desks of traders and convinced them to enter their rates into the system. Reuters charges subscribers a flat monthly fee but does not pay banks for contributing their quotes to the service. Reuters also launched the Monitor Dealing Service in 1981, allowing traders to negotiate transactions over their terminals instead of telephones. This system has been successful in part because of its built-in audit trail. In 1989, between 30 and 40 percent of the $640 billion traded each day in the interbank foreign exchange market took place on the Monitor Dealing Service.[13]

While Reuters is the best established in the foreign exchange market, Telerate is a competitive alternate service. Traders probably like having a backup quotation system, and also like the idea of competition for Reuters. It was nevertheless difficult for Telerate to gain a place in foreign exchange (“forex”) until Reuters agreed to permit its subscribers to install ‘‘binco boxes’ ‘—bank in-house computers—that let them simultaneously update their rates on Reuters and Telerate. Until then, Telerate’s forex market coverage was often slightly behind because dealers posted their rates on Reuters frost. Other reasons for Telerate’s success in penetrating this market are the availability of AP-Dow Jones foreign exchange news on Telerate, and traders’ need for U.S. interest rate data.

Telerate did not until recently offer dealers a transactional system such as Reuters’ Monitor Dealing Service. It has now launched a foreign exchange conversational (on-line) dealing system through a joint venture with AT&T. Known as The Trading Service, this service allows dealers to talk to several dealers at once, unlike the Monitor Dealing Service. Now Reuters in turn is taking another step forward with an enhanced version of the Monitor Dealing Service and a centralized order database facility. While the original Dealing Service facilitates one-on-one negotiation between two traders, Dealing 2000 will emulate an auction market where bids and offers from multiple parties are exposed. This is designed to replace ‘blind’ brokers, who act as middlemen in foreign exchange trading. The system will display the aggregate size of all bids and offers at each price, but will not disclose the identities of the dealers participating.

U.S. Government Bond Data

Telerate is currently the only vendor broadly distributing prices in the government securities market. Under an exclusive agreement scheduled to expire in 2005, Telerate disseminates bids, offers and last-sale prices from Cantor Fitzgerald Securities Corp., the only major inter-dealer broker serving both primary dealers and retail customers. Other brokers provide price information only among the primary dealers, those who are authorized to deal directly with the Federal Reserve Bank of New York.[14] In a 1987 study, the General Accounting

[12]Among companies successfully exploiting demand for third-party services is MMS International, which delivers analysis and commentary on Telerate, Bridge and Reuters. MMS was recently acquired by McGraw-Hill Inc. Another third-party provider is First Call, part of International Thomson’s InFiNet group, along with ILX Systems. Jointly owned by Thomson and a group of securities firms, First Call is a leading provider of on-line research produced by Wall Street analysts. Both Quotron and Reuters have tried to compete against First Call’s research distribution service, but Reuters recently discontinued its own service and signed an agreement to offer First Call to its subscribers.

[13]Speech by Robert Ethrington, international marketing manager for transaction products, Reuters Holdings, PLC, New York, NY, July 1988.

[14]Prices *from* one or more primary dealers are not as representative of current market conditions as are those from inter-dealer brokers, who receive quotes from all the dealers. One vender, Bloomberg (30 percent owned by Merrill Lynch), packages quotes entered by Merrill’s primary dealer operation with proprietary analytics that can help traders spot arbitrage opportunities. Bloomberg also delivers versions of this that include inter-dealer broker prices, but only to dealers authorized to see these quotes. If wider distribution of inter-dealer broker prices does come about, Telerate could be hurt financially. Under its agreement with Cantor Fitzgerald, it cannot carry quotes from any other inter-dealer broker. Telerate also distributes information provided by Market Data Corp.. It is possible Market Data Corp. could be used as the distributor of bids, offers, and last-sale prices from other dealers.

Office encouraged brokers to distribute quotations to non-primary dealers within 2 years.[15] In April 1989, major government bond dealers reportedly pressured a large government bond broker into abandoning a controversial effort to broaden access to bond-trading information by offering its electronic trading information screens to a wider group of customers.[16]

Reuters, Quotron, and Knight-Ridder have periodically held talks with individual brokers about disseminating their quotes, and three inter-dealer brokers have discussed distributing consolidated last-sale prices, but none of these efforts have reached fruition. When they do, 'commoditization' will probably also occur in the market for U.S. government securities prices. Vendors would have to compete by providing proprietary analytics or news, or by specializing in a particular area of the Treasury market.

Reuters and Quotron are likely to try to expand into the fixed-income information business. Since its acquisition by Citicorp, Quotron has been developing information and transactional services in both foreign exchange and fixed-income markets. However, Quotron faces the same obstacles here as do Reuters and Telerate in equities: lack of critical mass and a shortage of space for terminals on the already crowded desks of traders.

Competition and Technological Change

Since the financial information business is still growing, it continues to attract aggressive competitors. This may eventually bring down prices for information services, but some observers report that customers who complain about the high costs of the established vendors often ignore lower cost firms who lack track records. Several securities brokers have tried to use raw data directly from exchanges and process this information in-house using customized software. They were largely unsuccessful, having underestimated the time and expense of becoming self-suppliers.

Technological change is creating upheaval and uncertainty among financial information vendors. As recently as 5 years ago, an equities trader typically had one terminal on his desk—probably a Quotron-which carried Dow Jones News Service and gave the trader access to prices for U.S. securities only. In the freed-income department of the same firm, each trader would have a Telerate terminal. In the foreign exchange area, each desk would have a Reuters terminal, and perhaps one from Telerate. Because markets did not greatly affect one another, there was no need for most traders in one market to be watching other markets.[17]

The technology used by the vendors was essentially the same, a dumb terminal connected to a host computer by dedicated telephone circuits. But as a number of niche services sprung up, traders ended up with more and more dedicated terminals on their desks. The use of single dumb terminals declined sharply when the PC permitted local storage and manipulation of price information. Now, because of digital technology, the way vendors transmit the data is becoming less important than what data they transmit.

Several other technological advances in the early and mid- 1980s also irrevocably changed the delivery of financial information. The video switch, long used in the broadcast industry, reduced the clutter of terminals on traders' desks by allowing several screens to be controlled by a single keyboard. They became an important part of trading rooms, and were also responsible for the rapid rise of two companies that installed thousands of new trading room systems integrators worldwide. There were also rapid changes in the reamer in which stock quotations were transmitted from vendors to customers. In addition to delivering prices over dedicated telephone lines, vendors began exploring other alternatives, such as broadcasting data by FM sideband and satellite. Midwestern commodity market data vendors began in 1981 to use small, low cost, receive-only satellite dishes which were particularly effective for one-way broadcast communications such as financial quotations. They now distribute financial data for vendors such as ADP, Dow Jones, Knight-Ridder, PC Quote, Reuters, and Telerate. Although dedicated interactive networks remain the primary delivery mechanism of financial information vendors, financial data accounts for 63 percent of the

[15]U.S. General Accounting Office, U.S. *Government* Securities: *Expanding Access to Interdealer Brokers' Services* (Washington, DC:1987).

[16]Tom Herman, "Big Dealers Keep Monopoly on Bond Data," *Wall Street Journal,* Apr.11, *1989.*

[17]However, fixed-income traders always needed t. follow the foreign exchange markets since currency prices and interest rates are closely linked.

114,000 data broadcasting satellite receiving sites currently in operation.[18]

Digital Data Feeds

To satisfy the demand for analytical tools, vendors have begun to offer their data in digital as well as analog form. Digital data gives users more flexibility in viewing and using data, such as the ability to create customized composite pages. This has created a dilemma for financial information vendors and their customers because neither exchanges or vendors are sure how best to price digital information. The fees paid by customers have in the past been based on the number of terminals or display devices authorized to receive information. This created some inconsistencies; for instance, a workstation with four separate screens will be charged four exchange fees while a workstation with one screen and four windows will be charged one exchange fee. Many users will not tell vendors the number of screens on which their data are displayed. Several industry efforts are under way to address the issues raised by digital data: the Financial Information Services Division of the Information Industry Association has formed a subcommittee on digital data feeds and workstations, and the Financial Industry Standards Organization, a user group, is also doing analysis.

It is now often cheaper for securities firms to buy hardware off the shelf than it is for them to lease equipment from vendors. In addition, the securities firms want to be able to choose whether they get a dumb terminal, a PC, or a UNIX-based workstation, and they would like industry-standard hardware that can be integrated with the firms's other systems. In recognition of this, Reuters recently stopped manufacturing terminals and Quotron plans to sell off-the-shelf equipment. ADP is also moving to industry-standard hardware.

Diversification Into Transactional Services

With data treated as a commodity and a diminished role as systems providers, financial information vendors may move toward offering transactional services, using automated execution systems. Citicorp and McGraw-Hill failed with the GEMCO electronic commodity trading system a few years ago. In the futures market, the World Energy Exchange and the International Futures Exchange of Bermuda (INTEX) both failed to convert open outcry traders to screen-based trading. Security Pacific Corp. has not had much success in automating the front office. But these failed ventures in automated trading have not deterred Reuters, which owns Instinct Corp., a registered broker/dealer offering an electronic securities trading system. Instinct began in the 1970s, but was acquired by Reuters in 1987. The company is now executing an average of 13 million share-trades a day (including both over-the-counter and exchange-listed stock), a volume still dwarfed by the 150 million or more shares traded by NYSE on an average day, but Reuters hopes that exchanges will begin using Instinct during the hours when their trading floors are closed.

It remains to be seen whether the foreign exchange market will accept the automated trading Reuters is offering through Dealing 2000, but the technology used in that system was adapted for GLOBEX, an electronic 24-hour futures trading system jointly developed by Reuters and the Chicago Mercantile Exchange and the Chicago Board of Trade, and projected to be ready for use in 1990-91. MATIF, the French financial futures exchange, has already agreed to use GLOBEX for after-hours trading and other foreign futures exchanges may also participate.

The Chicago Board Options Exchange (CBOE) and the Cincinnati Stock Exchange have agreed to form a joint venture with Reuters and Instinct to create a worldwide system for entering, routing, and executing trades of options listed on the CBOE and equities traded by the Cincinnati Stock Exchange, the only fully automated securities exchange in the Intermarket Trading System.

Quotron has not moved as rapidly as Reuters, but reportedly has electronic execution facilities in development for both foreign exchange and fixed-income markets. It has been aggressively marketing Currency Trader, which allows corporate customers of Citicorp to execute automatically foreign exchange trades of $500,000 or less.

Telerate is licensing software from INTEX and they are working together to offer exchanges and exchange members automated order-routing and execution facilities. In the freed-income market, INTEX has licensed the rights to its order-matching

[18] Waters Information Services, *Data Broadcasting Marketplace (New* York, NY: 1989).

software to Security Pacific Corp., and ADP is collaborating with a municipal bond broker on an automated trading system.

If this kind of competition from vendors is not successful, Reuters may acquire a near-monopoly in automated execution systems as it did in the foreign exchange market. This would mean that the after-hours transactions, and possibly all transactions, of the Nation's futures and options (and perhaps later stock markets) would be processed by a single vendor, and that a foreign one. About 46 percent of Reuters' stock is held by Americans, and 25 percent of its employees are American, but by Reuters' charter it will remain a British company.

Reuters' emergence as the leader in providing exchanges with trading infrastructure is surprising because other vendors have closer relationships to exchanges. ADP and Quotron, through the latter's Securities Industry Software (SIS) subsidiary, have extensive networks that route orders from brokerage firm offices to exchanges. These networks were installed in the stock market following the paper crunch of 1968, but are only recently being adopted by futures exchanges. The Chicago Board of Trade (CBOT) has selected Bridge Brokerage Systems, a unit of Bridge Information Systems, to build its order processing network, while the Chicago Mercantile Exchange (CME) went to SIS for its order-routing network. Since the futures exchanges contend that automated execution during regular trading hours does not provide the same liquidity as pit trading, they do not see automatic execution as becoming integrated with order-routing.

ADP has been dominant in securities order-routing through its Data Network Services subsidiary and the BTSI unit that it acquired from Control Data Corp. There are also Tandem-based order-routing systems offered by SIS and Bridge Brokerage Systems. Many operating order-routing systems were overwhelmed during the 1987 stock market crash, although most have since been upgraded and enlarged. Several industry observers believe however that brokerage firms' back-office infrastructure is outmoded, in part because securities firms have concentrated during the 1980s on installing video switches and personal computers in their trading rooms. Because of lower volumes since the crash, those firms appear less concerned about capacity shortages and are reluctant to make large investments in order-routing and back-office systems.

REGULATION OF INFORMATION SERVICES

So far, the financial information vendors have not been subject to much Federal regulation. Under Federal law, the SEC has jurisdiction over companies that distribute and publish securities transaction data and quotations and over companies that collect, process or prepare this information for distribution or publication. To date, the SEC has registered only those organizations that process information on an exclusive basis for a securities exchange or association the Securities Industry Automation Corp., the National Association of Securities Dealers Automated Quotation System, and the Options Price Reporting Authority. But it has been keeping close watch over vendors since the stock market crash of 1987.[19]

Options markets are particularly sensitive now. Many quote vendors were overwhelmed by the proliferation of options series and strike prices. They were not prepared to handle the increased number of different strike prices when volume shot up on October 19 and 20, 1987. They could be further overwhelmed in the future with multiple-trading of options, introduction of automated trading systems, and 24-hour trading.

Most options are now traded exclusively on one exchange, but this is to change over the next 2 years (see ch. 5). The trading of options on several exchanges (''multiple-trading") will require an expansion of capacity by financial information vendors. The SEC has been working closely with options data vendors on their plans to handle this problem. The introduction of automated trading systems for after-hours trading by futures and options exchanges is expected to provide quote vendors with a glut of information to package and sell. Smaller vendors are also concerned about the potential for discrimination in favor of their large competitor, Reuters, who is helping exchanges to build the trading systems.[20]

[19] "SEC Expresses Concern About Vendor Capacity," *Trading Systems Technology,* Sept. 26, 1988, p. 6.

[20] After Reuters built a real-time price reporting service for the London Metal Exchange (LME), the exchange proposed a pricing structure that favored large vendors such as Reuters. Each vendor would have had to pay a sign-up fee of 50,000 pounds sterling regardless of how many users were taking that vendors' quotes. After protests by vendors with small subscriber bases, the LME withdrew the plan and is formulating a new one.

The transactions systems of securities information processors are not now subjected to SEC regulation as exchanges. The SEC has in the past issued no-action letters exempting proprietary trading systems from registering as exchanges. No-action letters have been issued for 11 proprietary trading systems to date, with the understanding that the operators of automated trading systems would keep the SEC informed of their progress. The agency is still using the no-action approach, but is working on a new rule after several sponsors ignored Commission requests for information; it wants to prevent possible abuses by foreign counterparties and ensure that access to the systems is fair and open.[21]

The agency recently proposed a rule requiring sponsors of proprietary trading systems to file a financial and operational plan with the Commission.[22] Proposed Rule 15c2-10 also gives the SEC authority to examine all books and records of both the sponsor and the trading system.

In January 1990 SEC again considered the question of what constitutes an exchange.[23] Delta Government Options Corp. had applied for registration as a clearing agency, to issue, clear, and settle options on Treasury securities, executed through an over-the-counter options trading system operated by RMJ Securities, Inc. This was granted temporarily in 1989, with a concurrent "no-action" letter saying that the system need not register as an exchange. CBOT and CME challenged in court the view that the trading system was not an exchange. The court returned the case to the SEC for reconsideration and the SEC reaffirmed its decision after hearing arguments from those opposed to requiring the system to register as an exchange, and those in favor.

Those opposed to registration argued that to constitute an exchange, there must be members with a proprietary interest and representation in the administration of the exchange, a trading floor to which orders are routed, listing of securities, an auction process, a limit order book, and execution of trades. They further argued that exchange registration of proprietary trading systems would serve no regulatory purpose and would deter development of innovative trading systems.

Those advocating a registration requirement (the CBOT, CME, and CBOE) argued that an exchange was any mechanism that affords to prospective buyers and sellers advantages in 'finding a market, obtainin g a price, and saving time"; establishes criteria for admission and discipline of members; sets margin requirements and trading and position limits; and has the discretion to terminate trading. Characteristics such as a system of specialists with market-maker obligations, a trading floor, and member ownership and representation, they argued, are historical rather than fundamental attributes of an exchange.

The SEC, in reaching its decision not to require exchange representation, said that the fundamental characteristic of an exchange is its centralization of trading and the fact that it provides quotations "on a regular or continuous basis so that those purchasers and sellers have a reasonable expectation that they can regularly execute their orders at those price quotations. The means employed to do this, the SEC acknowledged, might range from a physical floor or trading system to other means of intermediation such as a formal market-making system or a consolidated limit order book or single price auction. The bulletin board established by the RMJ System, the SEC said, does not meet this central characterization.

No clear definition of a "bulletin board" was offered, although it was incidently described as ''a mechanism whereby indications of interest may be displayed by participants" (a function **subject to regulation as part of the government securities brokerage function), and again as "for the episodic display, by broker-dealers and institutions, of buying and selling interest. " Such bulletin boards were not clearly distinguished** from either a NASDAQ-like system or a GLOBEX-like system, if such

[21] On July 19, 1985, the SEC issued a no-action letter to Security Pacific National Bank concerning their options on government securities on-line trading system. Concerned about competition, and customer protection and financial integrity in the unregulated system, The Chicago Mercantile Exchange brought their concerns to the attention of the Federal Reserve Board and Cong. John D. Dingell. Convinced that banking could be adversely effected by such an unregulated exchange, Mr. Dingell urged further consideration by the SEC. Security Pacific sold the system to RMJ.

[22] Proposed Rule 15c2-10 would apply to Reuters' Instinct subsidiary, but would not affect GLOBEX, since the CFTC, not the SEC, has jurisdiction over futures trading. The CFTC has already reviewed and approved GLOBEX.

[23] SEC Release No. 34-27611. Self-Regulatory Organizations: Delta Government Options Corp.; Order Granting Temporar Registration as a Clearing Agency, Jan. 12, 1990.

distinction was intended. The SEC said that an ''overinclusive' approach to its prerogative of determining what constitutes an exchange "would place those evolving systems within the 'strait jacket' of exchange regulation" or force it "into a regulatory scheme for which it is ill-suited. . ..'

As financial information vendors increase their presence in transactional services, they will have to deal with regulation for the first time. Even if they do not enter the transactional business, information providers may face growing government involvement in their markets because of technological changes occurring in the industry. If vendors, exchanges, and customers fail to come to terms on a pricing structure for digital data transmissions, customer use of data received from vendors, and proprietary rights to financial information, these issues may ultimately be resolved by a government agency or by the courts.[24]

U.S. BROKERAGE HOUSES

Brokerage houses use computers to assist in four major functions of the firm: data compilation and analysis, trading support, back-office functions, and surveillance activities.

Data Compilation and Analysis

Brokerage houses receive and monitor market information via electronic news wire services that provide the broker with market price information. In the retail branch offices of U.S. stock brokerage fins, 90 percent of information services are provided by Quotron and ADP;[25] but increasingly emerging as strong contenders are Reuters, Telerate, CMQ, Bridge Information Systems, Knight-Ridder Financial Information, Beta Systems, and Standard & Poor. Other vendors include Shark (Wang) and PC Quote. The annual expenditure for information services is forecast to increase to about $3 billion by 1991.[26]

A great deal of computing power is spent in analyzing and formatting raw data for decision support. Since all brokerage houses have access to basically the same information, the analytical software and graphics packages they apply to this data is thought to determine their competitive edge.[27] Individual brokers analyze and use the information differently, so the firm's computer facility must support many types of analytical software.

Trading Support

Brokerage houses were once called wire houses' because of their use of leased wire systems and their function as a collection point for orders to be wired to the floor of an exchange. Individual and institutional customers still telephone their broker, but today orders are then collected by computers and sent via dedicated lines to trading departments and exchange floors. Every major wire house has some type of electronic order entry and routing system. Program trading (buying and selling diversified portfolios or baskets of stock) uses computers to track market movements and enter simultaneous buy/sell orders according to an algorithm (see chs. 3 and 4).

There are thousands of commercial software packages available to brokers and traders that focus on tasks such as portfolio management and risk assessment.[28] Many of these packages are ' 'projective "[29] they use statistics to predict the price of a stock or derivative product in a certain time frame. There are also commercially available pocket-pagers, or 'electronic watchdogs," often offered by information services vendors, that offer a variety of services including alerting brokers to stock price movements, news events, or SEC filings.

Back-Office Functions

Since the back-office crisis of the 1960s, when brokerage houses were overwhelmed by paperwork, the back-offices have relied on computers. To aid in

[24]Potential regulation of financial information vendors will become a larger issue as digital data becomes the significant portion of information cost. The present trend is towards unbundled costs; one price for view only, another for cut and paste capabilities and another for data manipulation rights.

[25]Terry Landi, IBM Securities Application Systems, New York, NY, personal communication, February 1989.

[26]Henry Fersko-Weiss, "The Battle for the Broker's Desk,'' *High Technology Business,* September 1988, p. 30.

[27]''As Telerate and Reuters move toward elementized digital feeds, the way they displa the data will no longer be as important as what they display," says Robert Mark in Marine Midland Bank's capital markets sector, "because software is able to grab specific data elements and create customized pages.'

[28]Risk assessment encompasses the analysis of both market risk and credit risk. Credit risk is the risk that a counterparty will go bankrupt whereas market risk is the risk that market prices wilt move adversely (away from you).

[29]Grant J. Renier, ''The Electronic Investment System,'' *The Futurist*, vol. 16, April 1982.

clearing and settlement of accounts, brokerage houses batch-process massive amounts of data. Trade confirmation reports from the exchange floors and information from the clearinghouses must be reconciled to complete the transaction. Some brokerage houses process these in-house, some use service vendors. Much of this batch-processing goes on in the evening hours, or all night, and this will be a problem for 24-hour trading. In many cases, the computers used to support trading during trading hours are used as batch processors in the evening. This could be remedied with the purchase of additional machines, but most clearing programs are designed to run in a batch mode rather than on-line. The conversion into on-line processing will be costly, time-consuming, and technologically difficult, considering the massive databases which will have to be maintained and updated concurrently. Although 24-hour/global trading may be the strong impetus, on-line processing has other benefits. Risk could be greatly reduced by more timely and accurate characterization of investment positions.

Surveillance Activities

Brokerage houses monitor trading patterns and investor positions for indications of fraud, violations of firm policies or other improper activities by brokers servicing customer accounts and employees with "information sensitive" jobs (e.g., research analysts) who may be the source of information leaks. Compliance efforts also emphasize educating employees as a deterrent to illegal activity,[30] but surveillance and auditing activities are now among the more technologically advanced aspects of financial institutions' technology. Analysts often have the capability for on-line query or real-time market surveillance activity. But human analysts are still the crucial factor; computers merely indicate where further attention should be directed.

Customer Services

Many brokerage houses lease or sell personal computer investment systems to small investors. For example, a personal computer dial-up service lets people in their homes receive market information, conduct analysis, and enter buy and sell orders. One such service has no annual sign-up fee but can cost the user 27.5 to 44 cents per minute. A large discount broker serves over 26,000 customers through its computerized trading system.[31] With these systems individual investors feel "in control" and may feel able to compete with institutional investors. On the other hand, many argue that when telephone lines are jammed on a busy trading day, an investor is no more likely to get through to a broker on his computer than he is on his telephone.[32] Most systems are equipped with 'fail-safe' techniques to protect the investor, such as requiring second confirmations, or stopping them from selling stock they don't own or buying more than their margin limit. Virtually all mechanisms a firm uses for entering customer orders have a human review element to protect the firm from error, liability and loss.[33] Thus, regardless of the transmission details, there is still a "gatekeeper" that can become a bottleneck during heavy trading. The function of the gatekeeper could be an application for expert systems.

TECHNOLOGY FOR THE INDIVIDUAL INVESTOR

Of the *40* million individual investors in the United States, an estimated 2 million use PCs, and the securities industry claims that perhaps 100,000 are using them to manage portfolios.[34] In the near future, individual investors should have the technology available on home workstations to incorporate on-line trading, real-time quotes, graphics, portfolio management, on-line news, reports on investment activity, and historical data. Some of these services are now available, but not readily accessible; "windowing" software to split the screen and merge these services may be expensive and difficult to operate.

Largely within the last 5 or 6 years, individual investors have begun to use at-home trading systems based on a personal computer. Many of them have

[30] Ray Vass, "Detection of Illegal Trading; Systems and Realities in a Large Firm," presented at the Securities Industry Association Forum on the Prevention of Insider Trading in New York, NY, June 23, 1987.

[31] Earl Gottschalk, "Computerized Investment Systems Thrive as People Seek Control Over Portfolios," *Wall Street Journal*, Sept. 27, 1988.

[32] However, ISDN and *Broadband* ISDN via intelligent networks could provide network services to help surmount traditional telecommunications problems.

[33] T. Williams, Information Industry Association, discussion with OTA staff.

[34] Lee Siegfried, "Investing in the Year 2000," *Financial World*, Feb. 21, 1989, p. 56.

been quoted as saying that these systems give them a feeling of being "in control" (although none of the systems provides automated execution) and better equipped to compete with the institutional funds' professional investment managers. This perception is encouraged by the brokers who provide the systems, and who have been alarmed by the perceived "flight of the small investor. "[35] The industry estimates that 400,000 individual investors will be using home trading systems by 1992.[36] Such estimates sometimes display more enthusiasm than analysis, but it appears that the number of users could have tripled in the last 3 years.

The most widely used home trading system, provided by the largest discount broker, claims approximately 50,000 users. Several similar systems claim about 10,000 to 12,000 customers each.[37] These trading systems offer similar services. They allow the investor, at his computer, to:

- access research databases,
- receive real-time quotes,
- . place orders and receive confirmations,
- . track the progress of a portfolio, and
- . set up dummy portfolios and track their progress.

Trades ordered through one of these systems go to a broker who routes the order to an exchange.[38] The customer usually gets immediate conflation of a trade, or if there is to be a delay of a minute or longer a confirmation is left in a "mailbox' in the system. The advantages to the investor are access to information before the trade, greater ease in tracking the portfolio after the trade, the ability to place orders 24 hours a day (but they can only be executed when the exchange is open), and a slight reduction in transaction time, chiefly because there is no wait on the telephone for a broker. (Trades are said to take 15 to 20 seconds, in most cases.) The feeling of "greater control,' although it may exist, is not highly justified.

THE FUTURE: STRATEGIC TECHNOLOGIES AND THEMES

Expert Systems

An expert system is a computer program that attempts to replace a human decision process by using several primary components.[39] The first component is the experiential knowledge of an expert expressed as a set of rules and facts (if/then statements), more commonly referred to as the knowledge base. Second is the inference engine, or the computer program that sorts through the knowledge base and decides which rules apply. With the inference engine go the user interfaces, an explanation subsystem and a knowledge acquisition subsystem. Respectively, these "front end" components communicate with the user of the expert system, reconstruct the reasoning of the system for inspection, and allow the expert or knowledge engineer to add new or modified rules and facts. The potential long-range benefits of using expert systems include savings of professional time, cost savings, and improved quality and consistency of decisionmaking.

There were early high hopes for applying expert system (ES) technology to many brokerage house activities, even possibly replacing the trader, but users today generally have more conservative expectations.[40] ES applications for financial firms are made more difficult both because it is difficult to formulate real rules for investment decisions and because there is little agreement on who the experts are. Systems designed to make investment suggestions *are* controversial, but have sometimes been successful. Systems designed to make investment *decisions are* met with great resistance from traders, who trust their instincts to set them apart from other traders. Only a handful of companies are experimenting with expert systems to ''replace" traders.

Two areas in which ES technology is rapidly developing are data compilation and analysis and

[35]The ''small investors'' do 18.2 percent of the trading, down from 19.7 percent in 1987, according to a study by the Securities Industries Association. This has been deereasing for years.

[36]OTA discussion with various company representatives.

[37]The systems identified b, OTA are those of Charles Schwab, Inc., Fide@ Investments, and Quick & Reilly. There may be others with comparable level of use.

[38]The Fideliy Express Service says that trades are checked within the system without human intermediaries and go directly to the exchange floor.

[39]Paul Harmon and David King, *Expert Systems (New* York, NY: John Wiley & Sons, Inc., 1985).

[40]Jonathon Friedland, "The Expert Systems Revolution, " *Institutional Investor,* July 1988, p. 107.

market surveillance. A common example of the first is a ''news wire sifter. ' One security firm's new workstation will include an expert system that sorts through the news wire information to determine whether a user should be alerted to news of an event or impending event. The New York Stock Exchange has a similar expert system to sort and analyze news for market surveillance purposes.

Another application of ES is risk assessment, i.e., a rule-based system to analyze the risk of a firms position in rapidly changing markets. For example, one firm has a risk management system for corporate and municipal bond trading, running on a Compaq 386, that sorts through massive amounts of trading data and asks for additional information when necessary, to produce a statement of risk for managements review.

Brokerage house surveillance is beginning to use rule-based systems to identify trends and anomalies in trade information. One already in use, that runs on a PC, has a set of 25 rules; it analyzes trade data and may suggest that a study should be made of a particular firm, broker or customer.

Hardware

The strategic initiatives described above are pushing firms towards faster and better hardware. Computer industry experts expect that brokerage houses may buy supercomputers before exchanges do. Mini-supercomputers are popular but are already being challenged as having insufficient power to meet the expanding needs of brokerage houses. Until April 1989, when Control Data's ETA Systems division was closed, Wall Street firms could rent time on the ETA 10P, the first air-cooled supercomputer that was running portfolio analysis software and complex freed-income analytics.[41] An analysis of 150 stocks, each with 15 options, for 500 accounts that would normally take 6 hours on a 386 (20 mhz) computer would take only a few minutes on a supercomputer. However, not many firms utilized this service.

FURTHER TRENDS

Some industrywide trends are:

- *Firm-wide system integration—Firms are mov-* ing towards workstation integration with windowing, so that a user can reach many systems and information services through distributed processing. Relational databases are replacing hierarchical or flat file architectures.[42]
- ***More*** *end-user computing—This will* ease the burden of the central data processing department and makes system development for user needs more cost-efficient.
- *More automation of the back-office-The off-* floor support functions have the greatest percentage of labor which could be made more efficient by automation.
- *Flexibility to allow for multiple vendors—With UNIX* and 0S/2[43] becoming more nearly standard as operating systems, this task is becoming easier.
- New tools *for easier, faster program writing—* One example is Computer Aided Software Engineering, CASE. Although firms continue to buy information services and integration software, they are increasingly choosing to build rather than buy their trading room systems."
- *Emerging telecommunications capabilities—* ISDN and fiber optic networks are the keys in this area.[45]
- *Cross-training of technical and "business" side* staff—-This is increasing and has been found especially useful in systems development .[46]

[41] ''Frontline,'' *Wall Street Computer Review,* November 1988, p. 7.

[42] Saul Hansell, "The Moving Target, " *Institutional Investor,* January 1989, p. 79.

[43] A relational database is a data schema in which the data is stored in tables and the associations between the tables are represented within the data itself, as opposed to the schema defining the relationships as in hierarchical or flat file architectures. David M. Kroenke and Kathleen A. Dolan, *Database Processing, 3d cd.,* (Chicago, IL: Science Research Associates, Inc., 1988).

[44] The market penetration of OS/2 has been somewhat slow, and its probability for success is a continuing debate.

[45] Ivy Schmerken, "ToBuild or Buy?' *Wall Street ComputerReview,* January 1989, p. 33. Peter Penczer, "Wall Street Rolls Out CASE Technology," *Wall Street Computer Review,* February 1989, p. 55.

[46] Discussions with J.W. Palmer, AT&T Bell Laboratories, Holmdel, NJ. Ne, York Telephone recently announced that it will develop an independent fiber optic network for securities firms in the New York City area. As of October 1989,27firms had agreed to purchase voice and data services off of the network. In the future this network could serve as a platform for other developments such as trading, clearing and settlement processes. New York Telephones public network will serve as a backup to the private network.

- Increased obstacles—Technological advances in brokerage houses may be proceeding faster than at exchanges, but they will increasingly be hampered by an aging computer infrastructure that has grown difficult to manage.[47]

The strategic automation initiatives of today's brokerage house are being driven by four major forces: 1) customer demand for service and efficiency; 2) regulatory pressure to maintain a fair and orderly market; 3) domestic competition and the resurgence of program trading, which demands faster computers with more capacity; and 4) fear of Japanese competition.

There are two major differences in the approach to automation of the Japanese "Big Four' securities firms (Nomura, Daiwa, Nikko, and Yamaichi) and American firms.[48] The Japanese appear to take a more unified, standardized, long-term approach, probably because of comparatively loose Japanese antitrust laws and the influence of the Ministry of Finance. Japanese firms also appear to plan for 5 to 10 years, unlike the shorter term but more varied plans of American securities firms.[49]

For example, the Japanese have standardized home trading system software on the Nintendo Family Computer. The Big Four have also issued magnetic identification cards to customers that enable them to transfer funds from and to stock trading accounts at automated teller machines. They have agreed on protocol, architecture, and command standards for lap-top computers.[50]

Although the Japanese seem to be making faster technological progress with respect to customer service and hardware, they have lagged behind in software for analytics and investment strategies. However, this may not be true with the next generation of software.

THE MARKETS AND TECHNOLOGICAL PROGRESS

Technological progress in securities related organizations is subject to two opposing factors: the urge to use technology for competitive advantage and resistance from established, powerful market participants whose role is threatened. Brokerage houses, regional exchanges, and other organizations in which automation is a strategic necessity may be technologically progressive, because they have the benefit of strong trade-room and executive level Support.[51]

Research and development on leading-edge technologies in the financial industry are often behind the technical advances and enthusiasm of universities and other industry research laboratories. In July 1988, Coopers & Lybrand estimated that only 50 percent of the major financial services firms in the United States either used or were developing leading-edge technology, such as expert systems.[52]

For example, in 1988, Ford spent approximately $200 million on expert systems research and development, while the entire financial services industry spent only $50 million. Competitive secrecy is perhaps part of the reason that universities and electronics research and development facilities are not utilized for joint financial information projects. It may also be that the right financial incentives for, or vehicles to establish, cooperative efforts are lacking or not known to the financial industry. Many States have started technology transfer centers, which facilitate industry and university consortia. The long-run benefits of being on the leading edge of technology may make it worth efforts to utilizing them.

Standards for Automation

Standards are needed for securities industry automation in three categories: data, technology, and operational standards. Data standards apply to the definition, form, and transmission of data. Technol-

[47]Discussions with Joseph Rosen, RosenKupperman Associates, Riverdale, NY.

[48]Pavan &@@, "Automation at the 'Big Four' Securities Firms, ' *Wall Street Computer Review,* January 1989, p. 22. These Japanese firms are much larger than the biggest five U.S. firms combined.

[49]"The U.S. short-term focus is hurting our technological Prowess)" according to Robert Mark, Manufacturers Hanover.

[50]See Sahgal, Op. cit., footnote 48.

[51]The U.S. futures and options exchanges' recent technological progress with GLOBEX (MERC) and AURORA (CBOT) was reportedly resisted by floor brokers until competitive pressures forced the systems' acceptance for off-hours trading.

[52]According t. Fred Clowney, Drexel Burnham Lambert, Inc., New York, NY, personal communication, March 1989.

ogy standards apply to the hardware, software, and communications aspects of automation. Operational standards apply to the way inter-professional transactions are handled. Currently the sea of "standards" includes AT&T/Sun, IEEE (Institute of Electrical and Electronic Engineers), CCITT (Comite Consultatif Internationale de Telegraphique), POSIX (Portable Operating System Interface Specification), X/OPEN, and OSF.[53]

In general, standardization in the securities-related industry is driven by two pressures: normal attrition in the computer/electronics industry, which leaves the survivors as market leaders the "preferable' companies from which to buy, and the industry-wide need to integrate diverse systems. Attrition is a double-edged sword, as it intensifies competition in the computer industry, making standards resolution even more difficult. During the 1970s and 1980s, as volume increased, Wall Street firms used high profits to acquire systems of all makes and models with little concern that they might be incompatible, or would have a short economic life.

Although competition in the vendor community is still fierce, these two pressures toward standardization are prompting vendors of software, market information, hardware, and other systems to form strategic alliances to solve automation needs. Tighter Wall Street budgets are also forcing firms to look to integration rather than replacement. Those companies specializing in systems integration platforms are currently very important to the industry. However, this requires software vendors to expand their hardware compatibility and the hardware vendors to expose their proprietary architecture. Although more established standards may begin to appear, systems builders will still incorporate sufficient flexibility and variation in the systems to enable organizations to create their own competitive advantage.

It may be that market forces could produce data standards in a reasonable length of time. However, the road to technology standards is much longer, and, given the competitive computer industry, is less likely to be brought about by market forces. Proprietary (provider-controlled) technology standards setting could be bad not only for the U.S. computer/electronics industry, but also for the securities-related industry. Progress and innovation in technology are more likely to be fueled by a competitive environment.

On the other hand, "open' technology standards, which allow multiple suppliers to furnish systems elements and enhance their ability to work cooperatively, may promote this competition and improve system efficiency and productivity. Standardization will certainly be necessary for the United States to move further toward an integrated national market system. Such open standards could be developed by broad-based industry groups, standards organizaions, and/or government.

By comparison, data standards could be established more easily and would also increase productivity and U.S. competitiveness. Beyond the issue of U.S. data standards, is the issue of global standards. The array of considerations necessary when attempting to set such global standards range from language agreements to holiday s.% The development of securities-related industry data standards could, however, give the United States an early advantage in non-U.S. markets, such as Japan and 1992 Europe. As an example, the development, deployment, and acceptance of broadband, or even narrowband, Integrated Services Digital Network (ISDN) would increase productivity and efficiency by integrating voice with high-speed computer-to-computer communications and video for complex analysis graphics capabilities.

Currently, telecommunications domestically (Tl, ANSI, and IEEE) and internationally (CCITT and ISO) are progressing towards broadband ISDN standards.[55] However, to achieve real standards, a serious industry-wide effort must be made which targets coordination of U.S. with global standards. A standing committee with a charter and discipline might bean effective way to approach data standards-setting.[56] The committee members would have to be influential and committed to a long-term effort.

[53] Victor Kulkosky, "Strategic Alliances Buoy New Technology Boom," *Wall Street Computer Review, May 1989,* p. 19.

[54] Consider the scenario of the Oct. 19,1987 market break occurring 1 week earlier, on Columbus Day, when the exchanges were open but the banks were closed.

[55] The State Department, Communications and Information Policy/Technical Standards Development Bureau (CIP/TSD) has been active in coordinating the U.S. position on broadband ISDN and related work.

[56] Useful areas of inquiry could include standardizing order message and execution report formats and a symbol scheme for find-income and money market instruments (very complex).

Government oversight, perhaps including the State Department and National Institute of Standards and Technology, may be the most effective method of ensuring implementation of such an entity and charter. Another alternative would be an industry driven approach such as the Securities Industry Association (SIA) or the Futures Industry Association (FIA).

24-Hour Global Trading Systems

There are financial centers in Aukland, London, Paris, Frankfurt, Zurich, Hong Kong, Tokyo, Singapore, and Sydney, all of which now operate futures and options exchanges as well as stock exchanges. Because foreign exchanges began to offer their own versions of U.S. contracts, investment firms were able to offer products to customers without regard to trading hours in the United States. U.S. futures exchanges began to suffer volume losses. This trend originally drove the exchanges to consider accommodating 24-hour trading.[57] The first attempts to meet this need took the form of mutual offset agreements, such as the one between The Chicago Mercantile Exchange (CME) and the Singapore International Monetary Exchange (SIMEX) for Eurodollar and foreign currency contracts. Of the many offset agreements attempted by exchanges, SIMEX was for a time one of the most successful, although only marginally so.

In September of 1987, CME announced that it had developed, together with Reuters, the Post (Pre) Market Trade System, later renamed GLOBEX for "global exchange. " With the assurance that GLOBEX was strictly an off-hours system, and in exchange for receiving a portion of the revenues generated by GLOBEX, CME members accepted the idea.

In 1989 The Chicago Board of Trade (CBOT) unveiled plans for another off-hours global system, "AURORA." The GLOBEX system is an automatic order matching system, while AURORA attempted to emulate the traders in the pit with icons that offered the ability for traders to select the counterpart to their trade. However, there were complaints from the financial community about the necessity of installing two terminals, and in late May 1990, the CME and the CBOT announced they would merge GLOBEX and AURORA. In fact, the GLOBEX system was the victor. Despite the fact that Reuters is a British company, this is a strategic move for the preservation of the U.S. position in commodities and futures trading.[58]

There are many risks and barriers involved with implementing 24-hour global trading systems. Some foreign countries still restrict access to their markets. Involving the country's own securities exchange is in that case often seen as a good entry strategy .59 Clearinghouses in moving into 24-hour operation may incur large costs in changing operations and practices. However, clearing in a shorter time frame should reduce traders financial risk.[60] ''Fedwire' '[61] does not operate 24 hours a day; other methods of money transfer will need to be devised, some of which may not be as secure. Communications outages, in general, are an important factor. Line outage contingency plans, which must coordinate several countries, different languages, staggered time zones and varying numbers of telephone companies, are difficult to formulate.[62] Lastly, there is a management barrier: 24-hour operations require competent and experienced management at all levels around the clock.

Electronic 24-hour global trading, regardless of product, has several barriers yet to be conquered. The first pertains to basic global data standards, as addressed above. There is also the issue of international regulation. In order to control market and credit risk globally, there will have to be an international government/industry effort.[63] This is also true of coordinating post-trade practices, which could prove to be difficult, considering that some foreign exchanges presently remain with a 2-week or

[57]Karen Pierog, "How Technology Is Tackling 24-Hour Global Markets," *Futures*, June 1989, p. 68.

[58]William Crawford, Jr., ''MERC, CBOT Plan After-Hours Trade System," *Washington Post*, May 27, 1989, p. D1l.

[59]For example, the MERC-Osaka joint effort on the Nikkei index facilitated workings with the Japanese Ministry Of Finance.

[60]GLOBEX has a parallel "Guard" system, which monitors positions real-time and prevents participants from entering into certain unsafe transactions.

[61] For further information on Fedwire, see ch. 6.

[62]F.. example, to maintain a dedicated circuit from New York to Tokyo can involve from five to seven telecommunications companies.

[63]In the case of GLOBEX, the Commodity Futures Trading Commission (CFTC) asserting jurisdiction was a major enticement to Sydney and the MATIF to join. However, the CFTC alone may have limited jurisdiction over foreign participants in the instance of a crisis.

longer settlement cycle. It is not, in other words, technological capabilities that can hold back the movement toward 24-hour global trading, but policy problems such as data standards, regulation, and post-trade activities. Additionally, international competition is also a major force. These are all areas in which the private sector can do only so much and government participation may increasingly be crucial. These international issues are discussed in an OTA Background Paper, *Trading Around the Clock: Global Securities Markets and Information Technology.*

Chapter 8

Market Fraud and Its Victims

CONTENTS

	Page
ABUSES IN U.S. SECURITIES MARKETS	149
SEC Authorities	149
Insider Trading	150
Frontrunning	152
Other Violations	152
Penny Stock Fraud	153
Arbitration	156
International Securities Fraud	156
FRAUD IN FUTURES TRADING	159
Approaches To Reducing Fraud in Futures Markets	161

Box

Box	*Page*
8-A. Continued Need for Coordination of Federal, SRO, and State Actions	155

Table

Table	*Page*
8-1. Foreign Activity in U.S. Corporate Stock	157

Chapter 8
Market Fraud and Its Victims

Fraud in securities markets and fraud in futures markets stem from greed and corruption and, in some cases, naivete' on the part of the victims. They are similar in that detection and enforcement can be difficult. They differ in the details of the abusive practices. There is little consensus on whether the losses to public customers are greater in securities or futures markets, and there are no widely accepted figures for the magnitude of the losses in either market.[1]

Public attention has recently been drawn to a variety of abuses in financial markets, including insider trading, sales abuses and penny stock scams in securities markets, and fraud in futures trading pits. As a result, legal authorities and resources for enforcement are being bolstered. Coordination among regulators and law enforcement authorities is improving. International cooperation is also beginning to broaden.

There will always be opportunities for fraudulent or abusive behavior, but domestic actions in recent years by Congress, the Securities and Exchange Commission (SEC) and Commodities Futures Trading Commission (CFTC), self-regulatory organizations (SROs), and States show promise of reducing some types of abuses and, in some cases, have raised the penalties for convictions. Related actions concerning international fraud, including those involving foreign countries, should also narrow the scope of familiar opportunities for low-risk fraud and abuse. However, many of these actions are relatively new and still evolving, so it is too early to judge their long-term effectiveness.

Fraud and abuse are certain to continue in one form or another and increasingly will become international. Legislators in the world's major trading markets will have to judge where to target their limited resources. Recent domestic efforts to institutionalize the coordination of Federal, State, and SRO actions to deter abuse will have to become more coordinated internationally in order to be effective. Undoubtedly, there will be a need for continuing congressional attention as new opportunities emerge for fraudulent behavior in both domestic and international trading.

The further adoption of modern electronic systems both for floor and off-exchange trading can reduce opportunities for fraud in both securities and futures markets. Modern systems can eliminate many, although not all, kinds of abuses. Some types of abusive activities, both in securities and futures markets, will remain difficult to detect and prosecute.

ABUSES IN U.S. SECURITIES MARKETS

SEC Authorities

The SEC, which has primary responsibility for detection and deterrence of fraud in the securities markets, has responded to the increases in fraud not only with targeted enforcement initiatives (e.g., against penny stock fraud), but also by seeking and applying tougher enforcement remedies (e.g., civil penalties for insider traders). The SEC also works closely with SROs, other Federal agencies, and State and foreign authorities to coordinate investigations and share information for enforcement purposes.

The SEC has broad authority to enforce the Federal securities laws through the filing of civil actions in the Federal courts and through administrative proceedings. These enforcement actions are generally preceded by an investigation (or an inspection of regulated entities). The Federal securities laws authorize the SEC to initiate formal investigations, in order to issue subpoenas to compel testimony and the production of books and records.

In the Federal courts, the principal remedy available to the SEC is a civil injunction, which prohibits future violations of the securities laws. Noncompliance with an injunction is punishable as civil or criminal contempt, and may result in fines or imprisonment. In addition, the SEC often seeks other equitable relief such as forfeiture of ill-gotten gains or rescission. In SEC actions for insider

[1]The North American Securities Administrators Association estimates that fraud in penny stock securities alone, discussed later, amounted to about $2 billion in 1987 and 1988. *Survey of Penny Stock Fraud and Abuse,* a report by NASAA for the House of Representatives, Subcommittee on Telecommunications and Finance, submitted September 1989.

trading violations, civil penalties can be imposed of up to three times the profit gained or loss avoided as a result of such violations.

The SEC may institute several types of administrative proceedings. Most such proceedings are brought against regulated entities (e.g., brokers, dealers, investment companies, and others).[2] Sanctions that may be imposed upon regulated entities range from censure to a revocation of registration, while sanctions for "associated persons" range from censure to being barred from association with regulated entities. Administrative proceedings may also be instituted against persons who appear or practice before the SEC, such as attorneys and accountants. The SEC may suspend or bar them from appearance or practice before the agency.[3]

The SEC also is authorized to refer matters to the U.S. Attorney General for possible criminal action, and it exchanges information and assists in investigations into possible criminal violations of the securities laws.[4]

Recently, several bills have been introduced to further strengthen the SEC's enforcement capacity. The Securities Law Enforcement Remedies Act (Remedies Act), introduced as H.R. 975 and S.647, would strengthen Federal courts' and the SEC's authorities to levy penalties on violators of securities laws, require disgorgement, and issue cease-and-desist orders.[5] The Remedies Act also would amend the Federal Criminal Code to make it easier for Federal courts to issue orders permitting disclosure of grand jury information to the SEC for use in matters within the agency's jurisdiction. The International Securities Enforcement Cooperation Act, introduced as H.R. 1396 and S.646, would, among other things, permit the SEC and the SROs to deny registration to persons who have been sanctioned by foreign regulators, and would exempt confidential documents received from foreign authorities from disclosure under the Freedom of Information Act, thereby removing an impediment to the development of information from, and negotiation of memoranda of understanding with, foreign authorities.[6]

The SROs also play an active part in the detection and deterrence of unlawful conduct, under the oversight of the SEC. They monitor trade and transaction data to detect suspicious trading patterns, and may initiate their own investigations and disciplinary actions against their member firms and persons associated with the fins. The SROs are authorized to apply penalties that include frees, suspensions, and revocations of stock assignments to specialists. The SROs may refer certain matters to the SEC for possible enforcement action.[7]

The SROs formed the Intermarket Surveillance Group (ISG) in 1981 to facilitate the sharing of information and the coordination of inter-market surveillance activities. The ISG provides access by the SROs to a computerized database containing audit trail and clearing information on all transactions in each market in which a security or derivative contract is traded. When an SRO begins an inter-market trading investigation, the information is readily available from the ISG database.

Insider Trading

Insider trading refers to "the purchase or sale of securities in breach of a fiduciary duty or other

[2]See, e.g., sec. 15(b)(4) and (6) of the Securities Exchange Act.

[3]17 CFR 201.2, Rule 2(e) of the SEC'S Rules of Practice. Other administrative proceedings may be instituted to suspend the effectiveness of an issuer's registration statement containing false or misleading statements, or to order compliance with reporting, beneficial ownership, proxy, and tender offer provisions of the Exchange Act.

[4]Although criminal proceedings generally involve only the most egregious fraudulent conduct, criminal penalties are available for any willful violations of the federal securities laws. (See, e.g., sec. 32 of the Securities Exchange Act.) U.S. Attorneys may exercise prosecutorial discretion to charge violations of various provisions of the Federal Criminal Code (typically relying upon the mail and wire fraud statutes) in cases involving conduct that would constitute securities law violations. In addition, the Racketeer Influenced and Corrupt Organization Act (RICO) has been used, on occasion, in connection with indictments for securities law violations. Because RICO permits pre-trial seizure of assets as well as the imposition of treble damages after conviction, its use in white-collar crime contexts has been the subject of criticism.

[5]The Act would: 1) authorize the Federal courts to order the payment of civil money penalties fOr violations Of the Securities laws; 2) authorize the SEC to order disgorgement and impose civil penalties in certain administrative proceedings; 3) authorize the SEC to issue cease-and-desist orders; and 4) expressly affirm the authority of the Federal courts to issue orders that prohibit individuals who have committed egregious violations of the general antifraud provisions from serving as officers or directors of any reporting company.

[6]Other bills recently introduced include the Penny Stock Reform Act of 1990, H.R. 4497; the Corporate Integrity and Full Disclosure Act, S.1886; and the Investor Equality Act of 1989, S.1658.

[7]Because the SROs may exercise authority only over their members and persons associated with their members, cases requiring wider inquiry are generally referred to the SEC. As a practical matter, for example all insider trading cases are referred to the SEC.

relationship of trust or confidence, while in possession of material nonpublic information about an issuer or the trading market for an issuer's securities.' In other words, someone uses privileged information not available to the public to make, or to assist others to make, profitable trades. Federal securities laws prohibit such trading not only by corporate officers and directors and other persons having a relationship of trust and confidence with the issuer or its shareholders, but also by persons who misappropriate material nonpublic information from sources other than the issuer. "Tippees" of such persons may also be subject to the prohibition. Insider trading in the context of tender offers is specifically prohibited.[8]

Enforcement actions against insider trading are brought by the SEC under the general antifraud provisions of the securities laws.[9] The Insider Trading Sanctions Act of 1984 (ITSA) authorized the imposition of civil penalties in insider trading cases of up to three times the profit gained or the loss avoided by insider trading. The Insider Trading and Securities Fraud Enforcement Act of 1988 (ITSFEA) further amended the Federal securities laws.[10] ITSA and ITSFEA also contain provisions that increase the criminal penalties for violations of securities laws, including insider trading violations.[11]

Market vulnerability to insider trading increased in recent years because of the increased numbers of mergers and acquisitions.[12] Increases in stock prices just before the announcement of major corporate announcements may be an indicator of insider trading. The General Accounting Office (GAO) reported that for a 2-year period (1986-87), the records of the major exchanges showed 83,000 "business events or anomalous trading that warranted analysis. ' '[13] Of these, 468 were investigated and referred to the SEC, which then investigated 203, or 43 percent.[14]

Trades by insiders must be reported to the SEC, which publishes a record of these transactions in its *Official Summary of Security Transactions and Holdings.* A number of studies using such data have shown that, generally, stocks in which there has been heavy insider buying provide returns that are significantly above average,[15] thus rewarding the early inside trader.

The detection of insider trading on the regional exchanges is more difficult because data on transactions is collected and sorted by a manual process, rather than by automated systems. On all exchanges, much of the evidence on insider trading comes from cooperative witnesses. As much as one-third of such trading may be conducted through foreign bank

[8]The Federal securities laws do not contain a definition of insider trading, and the scope of the violation has therefore been a matter Of judicial determination. Congress has on occasion considered the possibility of adopting a definition, most recently in connection with S.1380, the Insider Trading Proscriptions Act of 1987, introduced on June 17, 1987.

The U.S. Court of Appeals for the Second Circuit in 1990 reversed the criminal conviction of Robert Chestman in a case involving the liability of a "remote tippee," i.e., one who does not have a fiduciary or other relationship of trust or confidence, but acts on insider information. One of the three opinions in the case suggested that the SEC's Rule 14e-3 is overly broad.

[9]Primarily Section 10(b) of the Exchange Act and Rule 10b-5.

[10]It: 1) expanded the scope of civil penalties to "controlling perSons" who fail to take appropriate measures to prevent insider trading by their employees; 2) gave the SEC the authority to award payments to persons who provide information regarding insider trading violations; 3) requires brokers, dealers and investment advisers to establish, maintain and enforce written policies designed to prevent misuse of material, nonpublicinformation; 4) increases the maximum jail term and fine for those convicted of criminal securities law violations; 5) codifies a private right of action for persons who trade at the same time as, and on the opposite side of the market from, insider traders; 6) enhances the SEC's authority to assist foreign governmental authorities in the investigation of international securities laws violations; and 7) authorized a study of the adequacy of present securities laws.

[11]With the ITSA and ITSFEA amendments, the Exchange Act now provides that individuals convicted of securities violations may be sentenced to a maximum term of 10 years imprisonment and freed up to $1 million. Securities firms, corporate issuers, and other defendants may be freed a maximum of $2.5 million. These penalties in criminal actions may be obtained in addition to remedial relief obtained in actions by the SEC.

[12]Recent studies indicate that insider trading has continued and possibl, increased, despite regulatory responses to such conduct, with large profits to its practitioners. See Nasser Arshadi and Thomas H. Eyssell (University of Missouri, St. Louis), "The Law and Finance of Corporate Insider Trading: The Effects of Regulation on the Volume and Incidence of Insider Trading Prior to Tender Offers," a paper presented at the European Conference on Financial Integration, June 28-30, 1989, University of Paris, Dauphine, France.

[13]U.S. General Accounting Office, *Securities Regulation: Efforts to Detect, Investigate, and Deter Insider Trading*, GAO/GGD-88-1 16, August 1988. The analysis covered the NYSE, AMEX, NASD and CBOE, together having 90 percent of trade volume.

[14]Instances of suspected insider trading are usually referred to the SEC which may invoke its subpoena power to compel production Ofdocuments and testimony.

[15]Norman G. Fosback, *Stock Market Logic: A SophisticatedApproach to Profits on Wall Street, May 1987,* pp. 235-239. The author is editor of 'The Insiders," an investment advisory service providing coverage of insider trading activities.

accounts, and many countries have legal barriers to providing evidence in such cases.

The investigation of insider trading cases is often more complex than other types of investigations, because the SEC must usually rely upon proof by circumstantial evidence or on informers. In addition, trading by or through foreign banks or brokers may make it more difficult to identify the persons who engage in insider trading.

During the 1980s, the SEC clearly seemed to change course by bolstering its enforcement actions against insider trading. The number of insider trading actions brought by the SEC has increased dramatically. From 1934 to 1979, there were only 53 such actions. From 1980 through 1983 there were 10 actions, and from 1984 through 1987, the SEC brought 61 cases, an average of 15 per year, with 21 cases filed in 1987 alone. In 1988 there were 27 cases, and in 1989 there were 42.

In spite of these prosecutions, however, insider trading still flourishes. A recent study indicated that, in the year from May 1986 (when inside traders Dennis Levine and Ivan Bees@ were arrested) to April 1987, while "inside-insider" trading sharply decreased, "outside-insider" trading did not.[16] The study suggested that this may be because court decisions have narrowed the coverage of inside trading laws to those having fiduciary duties to the firm issuing the stock or to others having related responsibilities (i.e., brokers) .17

Frontrunning

Frontrunnin g is the purchase or sale of securities by a person who possesses "material nonpublic information' regarding an imminent block transaction. The typical case involves a broker who trades in advance of a large order placed by one of its customers. The broker can profit by such trades if the block order is large enough to affect the price of the security in which the broker is trading.[18] Frontrunning can also occur in inter-market trading.[19]

Frontrunning is primarily regulated by the SROs. While none of the SROs has a specific rule in this area, their rules of just and equitable principles of trading have been uniformly interpreted as prohibiting frontrunning and written statements to this effect have been issued to the members of the self-regulatory organizations.[20]

''Self-fron trunning' involves the purchase of futures or options by a broker in advance of a large trade for its own account in the equities market. While such transactions are not prohibited by existing rules, some critics maintain that they may account for ''extraordinary volatility "[21] that others have more generally blamed on stock-index arbitrage, and argue that this intra- or inter-market frontrunning is ''increasingly manipulative and detrimental." [22] In late 1989, the New York Stock Exchange (NYSE) and two futures exchanges began a study of manipulative program trading that was suspected to have caused unusual price differences between stock-index futures and underlying stock.

Other Violations

While insider trading and penny stock fraud have dominated the headlines in recent years, other forms of fraud by broker-dealers also continue to cause losses to investors.

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[16] Arshadi and Eyssell, op. cit., footnote 9. ''Outside-insiders'' are, for example, a fro's lawyers.

[17] In May 1990, a New York Circuit Court of Appeals panel further reduced the SEC's ability to prosecute insider trading cases. The Court adopted a narrow interpretation of the conditions under which those who receive inside information, i.e., "remote tippees, " can be held liable under the SEC's Rule 10135. This decisions expected to make SEC prosecutions of remote tippees more difficult. The same Court's decision also narrowed the conditions under which the SEC may prosecute insider trading cases using Rule 14e-3. This rule prohibits anyone from knowingly trading on inside information in takeover situations.

[18] Frontrunning is not limited to transactions in the same security as the block order, and may involve, for example, transactions in options on those securities.

[19] A report of the NYSE's blue-ribbon panel included among its conclusions concern about the existence of widespread inter-market trading abuses involving the stock, options, and futures markets, and suggested that inter-market regulation and surveillance systems need to be improved "to prevent undetected wrongdoing in today's complex marketplace.' NYSE, *Market Volatility and Investor Confidence,* June 7, 1990.

[20] The written statements regarding frontrunning were amended in 1987 by the SROs to clarify that trading in index options by persons possessing material, nonpublic information concerning imminent transactions in the component stocks of an index may also constitute frontrunning in violation of the rules of just and equitable trading.

[21] Gerald Beirne, in a letter dated Dec. 6, 1988, to the SEC Secretary re SEC file SR-NYSE-88-34, which proposed a rule change re frontrunning.

[22] Testimony by John J. Morton in Hearings on the Stock Market Reform Act of 1989, before the Subcommittee on Telecommunications and Finance, Committee on Energy and Commerce, House of Representatives, July 27, 1989.

A survey conducted by the North American Securities Administrators Association (NASAA) following the 1987 crash noted that investors in options were the most likely to complain of abusive broker sales practices that preceded the crash.[23] Many investors who suffered major losses were not suitable candidates for placement in options markets by stockbrokers. For example, unsuitable investment strategies executed by brokers accounted for 40 percent of all options-related complaints, though only 9 percent of common stock-related complaints. Investors also overwhelmingly expressed a lack of understanding of margin agreements, mutual fund fees and procedures, and the existence of mandatory arbitration clauses in the written customer agreements filed with their brokers. NASAA concluded that half of the problems complained of by investors might have been prevented if brokers had observed proper sales practice rules, and suggested that much of the financial loss suffered by individual investors was unnecessary and avoidable.

These cases often involve stockbrokers who put their clients into unsuitable investments, such as "naked' call options (where the customer does not own the underlying securities, putting him at risk of unlimited obligations), churn customers' accounts to raise commissions,[24] and coax customers into signing agreements which give the stockbroker discretionary authority to make investment decisions without prior approval by the customer.

Those who were subject to abuse often were small investors who did not understand the risks incurred, because of relative lack of experience and training in financial markets, as indicated by income and education levels.

Stock market abuses tend to have colorful names. A few other commonly recognized ones include:

- *Parking-One* attempting a takeover gets others to buy stock with the commitment to sell it back to him later, allowing the takeover specialist to circumvent the requirement that anyone who owns 5 percent of a company's stock report this to the SEC.
- Soft *dollar abuses*—'Soft dollars" are rebates on broker commissions made to large institutional customers in the form of free research, computer services, or other trading-related services. Soft dollar arrangements are not per se illegal, but are subject to abuses such as offering investment managers research results-or even free vacations and expensive gifts—that do not benefit the customers who pay for them. Such practices raise concerns about conflicts of interest and the manager's fulfillment of fiduciary obligations to customers.
- *Wash sales-securities* transactions involving no real change of ownership, for example, a sale to one's spouse or simultaneous sale from one account and purchase to another account of the same person. Such transactions have been used as part of stock manipulations schemes, to create the appearance of active trading in a security.

Penny Stock Fraud

"Penny stocks" is a term used to refer to low-priced securities traded in the over-the-counter market. While the majority of these securities are quoted in the "Pink Sheets" published by the National Quotation Bureau, Inc., many are quoted through the National Association of Securities Dealers Automated Quotation (NASDAQ) system. Many penny stocks represent legitimate investment opportunities. However, many other penny stocks are used in fraudulent schemes. They usually involve "shell" companies with no operating history, few employees, few assets, no legitimate prospects for business success, and markets that are manipulated to the benefit of the promoters of the companies or the market professionals involved.

Penny stock scams generally involve high--pressure sales operations from "boiler rooms" where unsolicited, or cold, telephone calls are made to prospective clients whose names are obtained from telephone books or other readily available lists. Prospective clients, often unsophisticated in such investments, are promised large, rapid, and often "guaranteed' returns on their investments. Many of them end up with little to show for their investments and no way to recover their losses.

[23]NASAA conducted a telephone hot-line survey for about a year which received thousands of complaints from investors concerning abusive practices by brokerage fins. About half of the complaints reflected inadequacies in investor protection measures, or poor supervision of stockbrokers, e.g., unsuitability of investment, unauthorized trading, and false and misleading investments. The *NASAA Hot Line 1988 Survey,* October 1988.

[24]Churning involves excessive trading by a broker in a customer's account over which the broker exercises discretionary authority.

There is also a ''wholesale" side in which a network of traders in different firms might control trading among themselves ("boxing" the stock), perhaps including sales to the public, to manipulate the price of a stock. This type of operation typically involves thinly traded stock and may include buying and holding a large block of stock off the market (i.e., "parking" it, making manipulation easier). Customers are sold stock from inventory after its price rises significantly.[25] Customers who decide to sell may find that their holdings are illiquid and therefore either worthless or can only be sold at a significant loss.

There is no solid data on the number of investors in the United States who are bilked of their investments by penny stock operators, but they probably number at least in the tens of thousands each year. Heightened enforcement efforts by the SEC, NASD, and State agencies manage to uncover many such operations, but the same violators often quickly reappear in new scam operations, or as consultants in other operations, and can move rapidly from one State to another, or to off-shore locations. State regulators observe that gathering evidence on penny stock scams often requires inside informers or wiretaps, and that efforts to prosecute are often frustrated. These frustrations sometimes lead to criticisms of the SEC, whether justified or not. (See box 8-A.)

SEC officials note that their empirical data indicates that beginning in 1988 the increase in the number of SEC 'cause examinations' '[26] was largely attributable to penny stock fraud, but by mid-1990 there was a substantial decline in the number of penny stock broker-dealers. Yet, some experts in State enforcement functions are skeptical that these scams will ever be eradicated because they are lucrative for operators, and difficult to detect and prosecute, and the operators often don't get prosecuted.[27]

Although penny stock fraud remains a major problem, Federal and State enforcement agencies are continuing their efforts to stem abuses. For example, in October 1988, the SEC established the Penny Stock Task Force. The Task Force has focused on: 1) increased coordination and information sharing with other Federal, State and local regulators and prosecutors; 2) stepped-up enforcement activities; 3) targeted regulatory solutions to the problem of penny stock fraud; and 4) increased investor education. The SEC brought 68 enforcement actions during 1989, compared to 43 actions in 1988.

The SEC's new "cold call" rule[28] is designed to address the problem of high-pressure telephone solicitations by penny stock boiler room operators. It requires brokers and dealers to approve new customers' accounts for transactions in penny stocks by making and providing to the customer, before his frost purchase, a written determination that penny stocks are suitable for the customer. In addition, the broker or dealer must obtain the customer's written agreement to initiate penny stock purchases.[29]

In the last 3 years, the NASD brought some 250 enforcement cases of its own in the penny stock area, and now makes many surprise audits. The NASD now operates an investor information system to disclose brokers' disciplinary histories and has recently introduced an electronic bulletin board that captures and displays on a real-time basis, during market hours, firm and non-firm quotations, or unpriced indications of interest in eligible over-the-counter (OTC) securities. The bulletin board provides the frost computerized listings of penny stocks.

The Justice Department has brought numerous indictments involving activities by penny stock fins, including Blinder, Robinson & Co., F.D.

[25] In a recent court case involving a group involved with a now bankrupt fraudulent penny stock operation based in Florida, the manipulated prices of three stocks increased between 400 and 1,100 percent in a few weeks. Press release: "Two Principals of Florida-Based Penny Stock Securities Brokerage Plead Guilty Today in Connection With the Price Manipulation of Three Stocks," U.S. Attorney, District of New Jersey, May 24, 1990.

[26] Cause exruminations are initiated when there is an indication of wrongdoing serious enough to warrant further SEC inquiry.

[27] OTA interview with Richard Barry, New Jersey Bureau of Securities, July 11, 1990

[28] Rule 15c2-6, 17 C.F.R. 244).15 c2-6.

[29] The SEC has also proposed amendments to Rule 15c2-11 under the Exchange Act, which would increase the responsibilities of broker-dealers who make markets in penny stocks. Rule 15c2-11 governs the submission and publication of quotations by broker-dealers for certain over-the-counter securities that are not traded on the NASDAQ system. In general, the rule requires broker-dealers to obtain specified financial and other information about an issuer before initiating quotations. The proposed amendments would revise the rule by requiring a broker-dealer to review the information about the security specified in the rule and to have areasonable basis to believe that the information is true and accurate and obtained from reliable sources. The proposal would also require a broker-dealer tohave in its records a copy of any trading suspension order, or SEC release announcing a trading Suspension with respect to the issuer's securities during the preceding year.

Box 8-A-Continued Need for Coordination of Federal, SRO, and State Actions

OTA's exploration of penny stock fraud, including discussions with State securities regulators, revealed widely held misconceptions. One is that the Federal budget cuts during the early 1980s led to a blossoming of penny stock fraud because of a reduction in the SEC's screening of initial public offerings (IPOs) and other filings. However, during the 1980s, the SEC was not subjected to budget cuts and, in fact, continued to evaluate all securities IPOs and other sensitive applications. It established more cost-efficient methods of operating its screening process, but there was no reduction in the level of applications screened. Thus, the growth of penny stock seam operations probably sterns from other causes.

A second misconception concerns the basis for the criteria used by the SEC in screening IPOs, secondary public stock offerings, and proxy statements. The SEC is required by the Securities Exchange Act of 1933 to use "full disclosure" as its central criteria for deciding whether to register equity offerings. For decades, about 10 States relied on SEC registrations of initial and secondary public stock offerings to automatically grant State registration.[1] The growth of penny stock scams in Utah, Colorado,[2] and Florida, however, is evidence that SEC registration criteria alone will not protect investors against false statements by issuers. It is not clear that any criteria can provide such protection. However, a number of these States have now passed legislation requiring State evaluation of IPOs and secondary equity issues. The evaluation criteria in some States is based on merit (i.e., whether the offering is fair, just, and equitable to investors). In some States, the offering price must have some reasonable relationship to actual, or reasonable expectations of, earnings. Some States have a prohibition against 'cheap stock'—where shares of stock are given at no cost. Other States may disallow the sale of any issues if they appear deceptive or especially prone to fraud.

Some State regulators argue that SEC evaluations would serve the public better if they, too, were based on merit criteria in addition to the full disclosure criteria. Others argue that a well-informed public and State regulators are better able to decide which entrepreneurial ventures are worthy.[3] Others advocate the establishment of a national register listing brokers and agents who have been barred from securities practice or have been convicted of securities violations.

In spite of intensified enforcement efforts, rule making, legislation, and increased coordination among the SEC, U.S. Justice Department, the NASD, State regulators, and SROs, a goal of sharply reducing the currently significant presence of scams may require a greater commitment of resources at the Federal and State levels for educating the public, identifying abusers, and enforcement. The recent establishment within the SEC of a Penny Stock Task Force and an office of International Affairs, and the annual SEC-State relators' coordination meetings, are important steps in the right direction. In addition, the Penny Stock Reform Act of 1990 will strengthen the SEC's enforcement authorities.

Many State regulators are complimentary about the SEC's and NASD's recent efforts to fight penny stock scams. Yet some say that the SEC could be more effective if it devoted more of its resources to protecting small investors. Perceptions among some critics are that, compared to many States' actions, there are relatively few SEC enforcement actions against broker-dealers and their associated persons who directly abuse small investors. (SEC officials dispute this.) Critics argue that the SEC's major insider trading cases involving hundreds of millions of dollars (e.g., Michael Milken, Ivan Boesky, and Dennis Levine), have no apparent direct impact on the abuses suffered by many thousands of ordinary citizens who are often totally dependent on their savings, and who don't know where to turn for assistance.[4]

State regulators may never have sufficient resources to satisfactorily control the level of penny stock scam operations. A more specific plan of attack, jointly developed by the SEC, U.S. Justice Department, the NASD, and State regulators, may become even more important if scam operations continue to migrate to off-shore havens, and if, as some fear,[5] the current international efforts to harmonize investor protections among European countries[6] results in lowering U.S. standards of investor protection. OTA project staff, however, found little reason to expect a lowering of investor protections in the United States.

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[1]Other States have used their own evaluation processes, some of which are based on legislation dating from the turn of the century.

[2]Colorado, in the early 1980s, had no significant registration or enforcement authorities, which is seen as having opened the door to an influx of penny stock scam operators.

[3]The debate about the appropriate Federal role dates from before the creation of the SEC. The SEC has no legislated authority to use a merit criteria.

[4]These views were expressed most clearly by John Perkins, Missouri Securities Commissioner, and Richard Barry, New Jersey Bureau of Securities, in telephone interviews with OTA project staff, July 1990.

[5]Various speakers at the NASAA Conference on 'Global Markets: A World of Risk for Small Investors," Washington, DC, April 1990.

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

Roberts Securities, and Monarch Funding Corp. The prosecution in the latter case is seeking $20 million in forfeitures pursuant to the Racketeer Influenced and Corrupt Organization Act (RICO).

State regulators believe that 70 percent of all penny stock issues are "blank check offerings."[30] So far, some 36 States have passed or are considering regulations that ban such offerings, and Federal legislation has been proposed that would impose certain restrictions on registration statements filed by any issuer in connection with blank check offerings.[31] New Jersey, Florida, and Colorado are among the States that have been heavily hit by such scam operations, and each has taken law enforcement actions to reduce these abuses. New Jersey, for example has increased its investigators from 2 in 1986 to 20 in 1989. New Jersey obtained 30 penny stock convictions in 1989 and about 70 others during 1986-89. The Florida Penny Stock Task Force created a law enforcement group in 1988 that eliminated 30 scam brokers during 1988 and 1989 which collectively employed a sales force of 3,700.[32] Utah prosecutors obtained 17 indictments and convictions in 1989 as a result of sting operations.

Arbitration

Many cases of clients claiming to have been victimized are settled by arbitration. There are ten arbitration forums. Two of them, the NYSE and the NASD, handle 92 percent of all arbitration cases. Three-member panels sanctioned by stock exchanges usually conduct the arbitration. Arbitration panels typically include a securities executive and sometimes a second panelist with ties to Wall Street. They are therefore perceived as stacked against the small investor, although this is denied by the securities industry. Investors win about 60 percent of the cases brought before the independent American Arbitration Association and about 50 percent of the cases brought before the nine arbitration forums supported by the securities industry. Even when the customer wins the case, he often doesn't recover the full amount of the injury. Until recently, arbitrated cases were usually decided within 2 days. Some are settled by agreement, between the customer and broker firm, without formal arbitration procedures.

Brokerage firms have favored the arbitration process in the past, and many typically required all but their larger customers to sign an agreement to submit disputes to arbitration for settlement (i.e., to forego seeking relief through court settlement). However, new SEC rules allow pretrial conferences and discovery, and hearings now take 5 days or more. Most importantly, arbitration panels have begun to levy large punitive damage awards (in addition to compensatory, or actual, damage awards) under the RICO statute or the Federal Arbitration Act, which can be as much as triple damage.[33]

The caseload of arbitration has grown from under 1,000 in 1980 to over 6,000 in 1988, 65 percent of which were filed with the NASD and 27 percent of which were filed with the NYSE. SEC rules issued in 1989 have opened the arbitration process to public view, putting pressure on brokerage firms to avoid negative publicity, in addition to their continuing need to reduce costs. Securities firms settled 37 percent more customer disputes at the NASD since the new SEC rule took effect.

International Securities Fraud

Increasing internationalization of the securities markets will provide access to new sources of capital for U.S. corporations, Table 8-1 shows the rapid growth of foreign transactions in U.S. corporate stock. U.S. securities regulators are not as well equipped to tackle fraud from off-shore sources. The

[30]Blank check offerings are those in which stock issuers either disclose no specific business planer purpose, or state that the business plan is to merge with an unidenti.tied entity or to acquire unidentified assets, without identifying the business sought to be acquired or the managers responsible for operating the company after the merger. See *Investor Alert! How to Protect Your Money From Schemes, Scams, and Frauds, The Council* of Better Business Bureaus and the North American Securities Administrators Association, February 1988. There are also "blind pool" offerings, Blind pool offerings are those in which the business plan of the issuer is to seek mergers or acquisitions in an identified business line, but the specific organization or assets sought to be acquired are not identified.

[31]The Penny Stock Reform Act of 1990, H.R. 4497. For purposes of this legislation, this means any developmental-stage company that is issuing a penny stock (as defined by the bill), that has no specific business plan or purpose, or has indicated that its business plan is to merge with an unidentified company or companies.

[32]The Florida Penny Stock Task Force grew out of a meeting sponsored by the SEC's Miami BranchOffice, and includes the State of Florida, the NASD, U.S. Attorneys' Offices, the FBI, the IRS, and other Federal law enforcement authorities. The Florida Task Force serves as a model for ongoing State and Federal cooperation.

[33]Beginning in 1989, data on arbitration awards were made part of the public record. Since then, arbitration panels granted 21 punitive damage awards totaling $4.5 million to investors. During the prior year, 9 punitive damage awards were made, totaling $1.7 million.

Table 8-l—Foreign Activity in U.S. Corporate Stock[a]

	Purchases	Sales
1977	14,154	11,479
1983	69,770	64,360
1987	249,122	232,849
1989	213,778[b]	203,386[b]

[a]AmountS are in millionsofu.s. dollars.
[b]prefimina~ctatafromthe *TreasuryBulletin* March 1990.

SOURCE: U.S.Treasury Department.

total amount of fraud perpetrated from off-shore is -unknown, but is believed to be significant[34] and the fastest growing form of securities fraud.

Transactions in foreign stocks by U.S. investors grew from $15 billion to $220billion between 1982 and 1989, according to the Treasury Department.

Internationalization magnifies the need for international cooperation among securities regulators. International pressure for increased participation in, and easy access to, U.S. markets, will result in increased enforcement responsibilities.

In 1988, a House Subcommittee report questioned the ability of the SEC to police international securities fraud. This report, based on congressional hearings and a study of SEC records of investigations of suspicious trades originating from or through foreign countries,[35] focused on: 1) the extent to which possible violations of U.S. securities laws, such as insider trading and market manipulation, involve transactions that originate from foreign countries where SEC identification of traders can be difficult, if not impossible; 2) the process the SEC uses to pursue those foreign-originated trades where violations are suspected; and 3) the problems the SEC has encountered in investigating such suspicious trades.

One witness at the hearing noted that:

> . . . the globalization of the securities markets . . . have introduced greater rewards at. . . less risk for those who seek to take advantage and . . . conceal their wrongdoing behind the mantle of foreign nondisclosure laws. I believe that. . . insider trading has **been on the rise over the last two decades, with a significant amount of wrongful trading effected from abroad. These foreign cases challenge the [SEC'S] staff far more than even domestic investigations do.**[36]

Other witnesses testified that some U.S. and foreign investors avoid SEC scrutiny of their transactions in U.S. markets by executing their transactions through financial institutions in foreign countries that have bank secrecy and blocking statutes.[37] Former SEC Chairman David Ruder testified that:

> . . .[i]t is relatively easy for individuals and entities to open accounts with foreign banks or brokerages, which can then place trades on U.S. markets without revealing the identities of their clients [incorporated, for example, in Panama, Liechtenstein, Monaco, or Costa Rica] that issue bearer shares, making it more difficult to identify the beneficial owner. Accounts may be opened in fictitious names, or established as nominee accounts.

The Subcommittee also received testimony that identifying suspicious foreign traders who use off-shore accounts was becoming more difficult as schemes to hide a trader's identity increase in sophistication. Some investors open accounts in foreign banks and use shell corporations located in other countries to place trades though the banks .38 Such activity may involve two or more layers between the person who places the trade in the United States and the actual beneficial owner directing the trade. Detecting the identity of the investor becomes much more complicated if layers of nominees and agents, such as shell corporations,

[34]NASAA concludes, based on 87 major enforcement actions by 40 States during 1988 and 1989, that small investors lost an estimated $1.1 billion from international investment fraud of various types. These include both off-shore *investment scams* and those that falsely claim to operate from overseas. *NASAA 1990 Study of International Investment Fraud and Abuse,* NASAA, July 1990.

[35]"Problems With the SEC's Enforcement of U.S. Securities Laws in Cases Involving Suspicious Trades Originating From Abroad," Subcommittee on Commerce, Consumer, and Monetary Affairs of the House Committee on Government Operation H.R. Rep. No. 1065,100th Cong., 2d sess. (1988).

[36]Testimony of Harvey Pitt.

[37]Bank secrecy laws typically prohibit banks in the host countries from disclosing such information as the identities of customers and records of their transactions. These laws protect private, rather than public, interests and, thus, generally maybe waived provided that information concerning third parties is not disclosed. Blocking laws generally prohibit the disclosure, copying, inspection or removal of financial documents located in the host country andoftenprovide criminal penalties forviolations. Blocking laws are intended to protect the country's national interest and, thus, are not waivable by private parties.

[38]Dennis Levine used the relatively simple approach of trading from a number of accounts in a Bahamian bank. Nevertheless, he was able to make illegal trades in over 50 securities from 1980 to 1985 without being identified by name. His conviction resulted from an anonymous informant.

dummy organizations, foreign banks, and multiple accounts are used in a series of jurisdictions having secrecy or blocking laws.

Many off-shore havens with strong secrecy or blocking statutes means that enforcement actions against suspicious trading from these countries may be nonexistent, lax, or uncoordinated. In Costa Rica, the Bahamas, Panama, parts of Europe, Liberia, and South Africa, some violations maybe detected only at considerable expense and with some luck, but many will not be detected. Some of these foreign havens have no extradition agreements with the United States.

At a conference in April 1990, State experts in securities predicted that a major issue for the 1990s will be international securities fraud, much of it from off-shore havens.[39] SEC efforts to police the internationalized U.S. markets, and to overcome difficulties of the sort identified by the Subcommittee, have required the development of ways to obtain information from abroad.[40] For example, the SEC often finds it necessary to obtain evidence relating to foreign trading (insider trading and market manipulation cases) and accounting records of foreign subsidiaries of U.S. publicly held corporations.

The SEC's primary approach to curb foreign-initiated trading violations is via Memoranda of Understanding (MOUs) with foreign countries for obtaining cooperation in international enforcement matters and for all contacts with foreign securities agencies. In December 1989, the SEC created a new Office of International Affairs, reporting directly to the SEC's Chairman, that has primary responsibility for negotiating Memoranda of Understanding (MOU) between the SEC and foreign securities regulators and for coordinating related enforcement programs. The Office will have perhaps eight professional staff members in FY 1991, up from two in FY 1989.

As of July 1990, the SEC had MOUs with three Canadian provinces, the United Kingdom, Brazil, the Netherlands, and France, and treaties with Switzerland and other countries. It has ongoing negotiations with Mexico, Israel, W. Germany, Australia, and certain Nordic countries. These MOU arrangements represent a major improvement in bilateral cooperation among nations. Nevertheless, the development of MOUs is cumbersome, necessitated by disparate laws and regulations of different countries. Over time, these agreements are expected to become more uniform. Efforts by the SEC and other countries' regulators are needed to accelerate the harmonization process and facilitate law enforcement worldwide. Such a goal would be a worthy challenge for, e.g., the International Organization of Securities Commissioners (IOSCO).[41]

In 1989, the SEC received 150 requests for information sharing from foreign governments, and made 100 requests (up from about 60 in 1988) to foreign governments.[42] An increasing number of nations are more inclined toward bilateral and multinational cooperation as international linkages increase and abuses in all markets become increasingly similar. The SEC and the CFTC both participate in international forums that address multilateral issues, such as disclosure requirements for securities offerings and multilateral recognition of broker-dealer registration.[43]

Some key questions are: 1) whether efforts by U.S. and foreign regulators will adequately safeguard the public against violators, 2) what the costs

[39]Mark Maddox, Commissioner, Indiana Securities Division, and others at a panel on 'International Enforcement: Con Artists Cash In on the Rush to Global Investing," NASAA Conference on Global Markets: A World of Risk for Small Investors, Washington DC, Apr. 26, 1990.

[40]The SEC, as does the CFTC, requires SROS to enter into appropriate agreements regarding information sharing and surveillance before the SEC approves a trade link with a foreign exchange. Such agreements exist, for example, between the AMEX and the European options exchanges, and the CME and the Tokyo Stock Exchange.

[41]IOSCO is scheduled to issue a report in September 1990 on the elements of negotiating MOUs.

[42]Many of the requests to and from the SEC involved penny stock fraud.

[43]The SEC has considered certain other approaches to international enforcement problems. For example, the Subcommittee recommended that the SEC adopt a regulation modeled on the CFTC's Rule 21.03, which requires foreign brokers and traders, among others, to provide to the CFTC, upon a' 'special call, ' certain market information. This information concerns their options and futures trading, including trader identification. The CFTC may prohibit the foreign broker or trader from further trading on U.S. futures exchanges and with Futures Commission Merchants upon refusal to provide such information. The SEC found, however, that this would not capture all foreign trading activity, and that both U.S. and foreign commentors believed that the requirement would have a chilling effect on foreign investment in U.S. markets and drive legitimate business off-shore. Another concept was published by the SEC in 1984, referred to as "waiver by conduct." This concept would have established as a matter of law that persons who trade in U.S. markets from abroad waived all rights to which they may have been entitled under foreign law. The concept met with overwhelming criticism and was abandoned. Another approach, also rejected, would have required foreign banks that use omnibus accounts (one large account under the bank's name) in placing trades with U.S. brokers to identify the beneficial owners if suspicious trades aridentified.

will be, and 3) how international enforcement and mutual assistance practices can be expeditiously harmonized. The collective efforts of regulators will likely reduce the level of violations from some foreign countries, but U.S. investors and markets may continue to suffer losses from fraudulent conduct by persons who trade through foreign accounts, particularly in countries that do not have agreements with the U.S. for information sharing, surveillance, or extradition, or that have poor investigative and enforcement capabilities. Continued attention by Congress will be needed to assure that U.S. investors are adequately protected against both yesterday's types of fraud and abuse and those that will develop in global markets.

FRAUD IN FUTURES TRADING

The CFTC addresses fraud and abuse through direct surveillance of futures markets and market participants, oversight of futures trading SROs (including the exchanges and the National Futures Association), and referrals to the exchanges for investigative and disciplinary action. They also include enforcement actions brought before the CFTC's administrative judges and the Federal courts, and authority to conduct civil investigations and to impose administrative fines of up to $100,000 for rule violations.

As a result of recent Department of Justice investigations,[44] subpoenas were issued to dozens of brokers and traders at the Chicago Mercantile Exchange (CME) and Chicago Board of Trade (CBOT) during the first months of 1989. In August 1989, a Federal grand jury indicted 46 commodity traders, brokers, and a clerk on charges including cheating or defrauding customers, evading taxes, mail and wire fraud, and noncompetitive *execution* of customers' orders in hundreds of trades; two additional traders were indicted in November 1989.[45] Some of those indicted were charged with violating the RICO statute, among other charges. This was the fist attempt by the government to use this statute against commodities traders for allegedly engaging in efforts to defraud investors.[46] Sixteen Of those indicted had pleaded guilty as of June 1990.

The alleged illegal activities centered on the U.S. T-bond and soybean pits at the CBOT and the Japanese yen and Swiss franc currency pits at the CME. The magnitude of the alleged fraudulent activities raises suspicion that the abusive practices were widespread.[47] Yet, one of the FBI agents involved in the undercover operation was reported to have spent about 6 months in the CME's Standard& Poor (S&P) stock-index futures pits without having detected illegal trading practices.

The U.S. Attorney General's office has announced that the investigation is continuing. The frost of two scheduled trials was completed in July 1990 and a second and third trial are scheduled to begin in September 1990. Two of the accused were found guilty of some non-RICO charges and a third acquitted during their trial in June and July 1990. In July, the CFTC charged four New York Mercantile Exchange (NYME) traders with fraud in handling customer orders, including noncompetitive buy and sell transactions on crude oil futures trades for customers on the NYME floor and making fictitious trades. The case will be heard by CFTC administrative law judges.[48]

Illegal trading activity prohibited in futures markets includes:

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[44]CFTC staff prefer to describe this as the "joint investigation of the CFTC, FBI, and U.S. Attorney's office."

[45]The brokers allegedly directed accommodating locals t. accept losses that resulted from the brokers' errors, or outtrades, with the understanding that the locals would be repaid later through the manipulation of customer orders. Brokers are personally liable for their trading mistakes, therefore these repayment arrangements were used as a means to avoid paying their clearing firm or customers from their own funds. "Have Futures of Traders Hit the Pits?'' *The National Law Journal,* June 11, 1990, p. 8. Also see: "Traders Are Indicted for Running the Fits By Their Own Rules," *The Wall Street Journal,* Aug. 3, 1989, p. A 1. "Jury Indicts 46 in Futures Probe," *The Washington Post,* Aug. 3, 1989, p. A-1.

[46]*United States* v. *Martin J. Dempsey et al., Government's Santiago* Proffer, U.S. District Court, Jan. 5, 1990. The undercover FBI agent and cooperating defendants noted, and testified later during the first jury trial in June 1990, that they "routinely engaged in illegal prearranged trades with the defendants. Most of these illegal trades were designed to: 1) pay them back for assuming the loss from brokers' trading errors or outtrades; 2) build up a bank of money that could later be kicked back to the brokers' personal trading accounts; 3) disguise prearranged trading between other traders. . or, 4) permit the broker to take the other side of customer orders, filling them himself rather than through another trade," p. 15.

See also, *United States v. Robert D. Mosky* et al., Government's Santiago Proffer, U.S. District Court, Mar. 13, 1990. "The essence of the charged conspiracy and fraud scheme is that brokers regularly solicited. . local traders. . . to absorb losses caused by order-filling errors or outtrades and repaid such locals through the illegal manipulation of other customer orders. . .," p. 11.

[47]Those indicted represent about 20 percent of the yen pit trader population and 10 percent of the soybean trader population. "Traders Are Indicted For Running the Pits By Their Own Rules,' *The Wall Street Journal,* Aug. 3, 1989, p. 1.

[48]"Charges Are Filed Against 4 Traders at New York Merc, " *The Wall Street Journal,* July 25, 1990, p. C 1.

- *Noncompetitive execution of trades: Two brokers* may agree to fill a customer's order at a prearranged price-a higher than market price for a purchase, and lower for a sale-and divide the extra profit among themselves.
- *"Wash" trades: These give the* appearance of trading, but do not result in a change in market position.
- *Bucket trading:* A broker may take the opposite side of a customer's order directly, or through a "bagman,' outside of the competitive auction process.
- *Order crossing:* Brokers may cross, or match, customers' orders directly, without involvement in the open outcry market.
- *Cheating or defrauding customers:* This includes "tick shaving, " where customers are cheated of small amounts, perhaps $25 on a million dollar face value order, on many transactions. Customers probably will not notice the small amounts, but these can result in significant illegal gain to locals over the long term.
- *Fraudulent withholding of customers' orders:* Floor brokers may delay filling a customer's order, if it will affect the market price, in order to benefit another exchange member or market professional.

Since the FBI investigations, futures exchanges in Chicago and New York and the CFTC have undertaken special reviews and have proposed substantial changes in trading practices, rule enforcement, and market procedures.[49] The CME proposals advanced by a Special Committee were deemed particularly impressive, and in slightly altered form are being adopted by the Exchange and submitted to the CFTC for approval. In contrast with the CME's proposed limitations on dual trading, the CBOT internal investigation committee recommended that dual trading be continued in the interest of liquidity.[50] Both exchanges are improving trade monitoring systems and increasing penalties for trading abuses.[51]

The CFTC proposed, in August 1989, a number of regulatory enhancements. These include final CFTC rules which require more frequent collection of trading cards and stricter controls on the manner of their preparation (e.g., sequential numbering, prohibitions on the skipping of lines); a pilot program for increased on-floor surveillance, including inspection of trading cards and order tickets; and final CFTC rules establishing stricter criteria for exchange members to serve on governing boards and specific committees.[52] To improve their automated trade reconstruction, the CME and CBOT both now require a 15-minute, instead of a 30-minute, time bracket for traders and brokers to record the time of each trade. (See ch. 4.)

Inter-market frontrunning is a potential abuse involving both futures and securities markets, but the extent of the problem is unknown.[53] A brokerage firm that is about to buy or sell a large block or basket of stock for itself or for a customer, may first take a position in stock-index futures, hoping to profit if the stock transaction moves the price. This inter-market activity is a practice recognized as abusive for a decade.

One issue that surfaced during the 1989 CFTC Reauthorization hearings was whether futures exchanges have been lax in disciplining members, as has been charged by Thomas F. Eagleton, former U.S. Senator and former public member of the Board

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[49] *Report of the Chicago Mercantile Exchange Special Committee. . .*, Apr. 19,1989. The report contains two categories of recommendations: trading practices and rule enforcement reforms, including a partial ban on dual trading, and trade surveillance improvements. Other recommendations emphasized sterner disciplinary actions and more severe penalties. For a fuller description see testimony of Leo Melamed Chairman of the Executive Committee, Chicago Mercantile Exchange, before the Committee on Agriculture, Nutrition and Forestry, U.S. Senate, May 17, 1989.

[50] CBOT OKs Dual Trade Practice, Reportedly at Customers' Urging, *"Investors Daily, Feb. 9, 1989,* P. 3.

[51] Ibid.

[52] "CFTC Moves to Tighten Trading Rules, " *The Washington Post,* Aug. 30, 1989, p. Cl.

[53] According to the SEC,". . .we are not able to determine the extent to which such trading (frontrunning) occurs yet remains undetected (by the SROs) nor the impact on the markets or firm profitability. Based on the known instances of frontrunning which the SROS have uncovered and prosecuted, however, we do not believe that these practices are widespread nor their impact on markets and firm profitability significant." Memorandum from Richard G. Ketchum, Director, Division of Market Regulation, to SEC Chairman Ruder, June 30, 1989, p. 15. But the press continues to report that the problem is grow@ see "Is Program Trading the Target of a Witch-Hunt?" *Business Week, Nov. 13, 1989,* p. 122.

of Governors of the CME.[54] A recent GAO review said that GAO was ''unable to reach conclusions about the adequacy or effectiveness of exchange disciplinary action programs primarily because the universe of abuses is unknown. ''[55] However, GAO noted that the number and severity of penalties has increased since the investigations became public, which "appears to indicate an increased commitment by the exchanges. . . . The GAO report strongly recommended that the CFTC require the exchanges to develop and use means for 'independent, precise, and complete timing of trades' because presently there *is* limited ability to detect rule violations.

One organizational arrangement that may be conducive to trading abuses involves broker associations.[56] This involves organizations of brokers and traders who fill orders from the public, pooling their collective revenues and expenses. This arrangement is legal, can improve customer service, and, by reducing the traders' risk, makes possible reduced trading costs to customers. But it also may facilitate opportunities for unethical behavior within broker associations, such as concentration of trades within the group in order to maximize commission revenues; rewarding members of the group with favorable trades; and influencing the behavior of low-paid trainees to participate in questionable trading behavior.

Broker associations, the CFTC believes, may facilitate certain trading abuses, such as prearranged or noncompetitive trading with the aid of other association members.[57] As a result, the CFTC proposed rules to provide a common definition of broker associations and to require exchanges to register such associations in order to particularize and heighten review of their trading activity .58

Approaches To Reducing Fraud in Futures Markets

Trade practice abuses should be detected either through an SRO'S *internal sources*, such as audit trails and observations of trading, or through *external sources*, which include complaints from exchange members or customers. Detecting some types of trading abuses in the open outcry system are difficult, and may be impossible without undercover surveillance, because there may be several hundred active traders shouting and gesticulating. Exchanges are required to have audit trails. Efforts have been made to improve automated methods for surveillance, but the present systems still have serious shortcomings recognized by both the CFTC and the exchanges. For example, while the CFTC requires trade-reconstruction[59] times for the purpose of audit trails to be precise to the nearest minute, a single minute of active trading may include hundreds of trades, several of which could be made by a single floor participant at different prices.[60] Furthermore, these are imputed, not actually recorded times; reconstructed using trading cards that now are collected every 30 minutes, order ticket timestamps, and other data.[61] There are open questions about the effectiveness of any of these systems to deter certain types of abusive trading practices, especially given opportunities for collusion among floor brokers and

54. , .''When it comes to a choice between protecting an insider and preserving the integrity of the futures markets, there is no question where the exchange stands"

Eagleton also concluded that:

. . .As long as the existing system of ''open outcry,'' which consists of shouts, gestures, winks andotherphysical signals, remains there will be substantial cheating at the futures exchanges. They have to be brought into the 21st century with an electronic trading system that leaves verifiable audit trail. Thomas F. Eagleton, "Chicago's Markets: Corrupt to the Core," New *York Times, Nov 19, 1989,* p. *27.*

55U.S. General Accounting Office, *Futures Markets: Strengthening Trade Practice Oversight, GAO/GDD-89-120,* September 1989, PP. 2-3.

56Currently, four exchanges (Chicago Mercantile Exchange, New York Mercantile Exchange, Commodities Exchange, and the New York Futures Exchange) have rules explicitly clef@ associated or affiliated brokers. These include among affiliations: 1) employer and employee (employees of the same employer), and 2) partners. Various exchanges include some others, such as corporations and relationships among two or more brokers sharing brokerage expenses, e.g., a clerk's salary,officers, directors, and 10 percent shareholders of a member, and brokers who share a deck of orders. Most exchanges' rules do not include adefinition of broker associations and some do not require them to register as associations with the exchange.CFTC, Division of Trading and Markets, Memorandum toCommissioners, Broker Association Study, Jan. 4, 1990, p. 2.

57Ibid., p. 6.

58Ibid.

59Trade data are reconstructed on the CME, CBOT, and the Coffee, Sugar, and Cocoa Exchange.

60The CME, CBOT, and Coffee, Sugar, and Cocoa Exchange reconstruct trades to the nearest 10 seconds.

61U.S. General Accounting Office, Chicago *Futures* Market: *Initial Observations* on *Trading* Practice *Abuses,* GAO/GGD-89-58, March 1989, pp. 13-17. This GAO report studied the ''level, or intensity, of CFTC [and the CME and CBOT] exchange efforts to detect and penalize trading abuses" between 1984 and early 1989, and made "no recommendations."

traders-which are very difficult to detect, requiring abusive trading patterns to be identified. Undercover investigations greatly improve efforts to identify these activities.[62] And, as CFTC Chairman Gramm noted in a comprehensive review of the CFTC's and the SROs' compliance efforts, "computer-assisted (surveillance) programs generally are less effective in detecting abuses which are susceptible to being effected through alteration of documents, and fictitious trade submissions. . . prearranged trading or trading ahead of customer orders. ' '[63]

The exchanges have announced a determined effort to overcome these concerns and to make obsolete the present system of scribbling transactions on slips of paper which are passed by hand to clerks for computer entry. The CME and CBOT are committed to jointly developing abetter technological approach to establish precise and verifiable audit trails from the beginning-i.e., at the time of the transaction and not by reconstruction afterward. This system, called AUDIT (Automated Data Input Terminal), will use an electronic hand-held computer to record each transaction on the exchanges' floors at the time it is made and to transfer trade data to exchanges' computers. The system will support exchange operations, and surveillance and compliance monitoring. Prototype equipment are scheduled for testing in late 1990.[64] Research and experiments are also being conducted, or planned, on hand-held devices by the CBOE and COMEX.[65]

It is not clear yet whether the prototypes will be immediately accepted by floor traders and whether the new equipment will suit the specific needs of traders (ergonomically and fictionally, such as speed of trades). Their success may depend, in part, on whether traders find the devices beneficial, non-threatening to their unique skills and experience, and whether the devices impair liquidity.

The legislation which initiated public regulation of futures trading half a century ago said that regulation was necessary because "the transactions and prices of commodities are susceptible to speculation, manipulation, and control. . . ."[66] The recent revelations of abuses came not from the Exchanges, which as SROs have primary responsibility for market discipline, nor from the CFTC which oversees the SROs, but from the FBI with the cooperation of the CFTC.[67]

Questions have been raised about the determination of governors of futures exchanges to enforce fair trading practices, although recent actions suggest that substantial improvements are underway. Congress can therefore ask whether present supervisory and disciplinary procedures are adequate, or whether government must take a more active role in market discipline, and if so, what agency should exercise that responsibility. (See ch. 9.)

There is a view that because futures markets are used primarily by large, sophisticated institutions, abuses could easily be detected by the victims themselves and corrected by free market forces. The current large-scale indictments, admissions of guilt, and plea bargaining provide evidence to the contrary. Institutional investors in futures markets represent millions of Americans through pension, life insurance, and mutual funds; the ultimate victims in futures market fraud are these people. Moreover, trading abuses can create price distor-

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[62] According to former U.S. Attorney Anton Valukas, who headed the Justice Department probe into trading abuses in the Chicago exchanges, ". . . .experience suggests that some of the things we found could only have been discovered by having people actually in the pits." And, "The whole aspect of how audits are conducted and what type of audit trails are kept is something that should be reviewed." As quoted in "Paladin in the Pits," Barron's, Aug. 21, 1989, p. 6.

[63] Wendy L. Gramm, Chairman, CFTC, in attachment to letter to Sen. Patrick Leahy, Mar. 7,1989, p. 4. See also, Statement of Dr. Wendy Lee Gramm before the Senate Committee on Agriculture, Nutrition and Forestry, Mar. 9, 1989.
An alleged example of such practices was reported in the *Wall Street Journal* of Oct. 24, 1989, p. C1; an international money manager has sued a major securities firm on the grounds that the firm colluded with pit traders to hold back the international fund's large sell order until the market price plunged, then bought up the contracts, pushing the price up rapidly (one trader is alleged to have made $900,000 in 90 seconds). "Soros Is Accusing Shearson of Fraud After 1987 Crash."

[64] "CME, CBOT Select Vendors for Next Phase of AUDIT Selection Process," Joint CME-CBOT press release, Mar. 7, 1990. Units developed by NYNEX, as one example, were being tested in early 1990 by traders at the Commodity Exchange (COMEX) in New York.

[65] IBM study, of Clearing and Settlement for the U.S. Congress-OTA, Aug. 1, 1989, p. 74. Roger Rutz, Bored of Trade Clearing Corp. (BOTCC), is cited as observing tbat "so far the acceptance of on-line trade data input devices is high, but finding a good working devic has been largely unsuccessful." Officials at other exchanges, e.g., CBOE, made similar comments to OTA staff.

[66] 7 U.S.C. 5; CCH Rep. No. 1031, p. 1558.

[67] The FBI, but not the CFTC, has authority t. conduct undercover surveillance investigations. The illegal activities in the futures pits, including collusion, were not readily detectable through the routine surveillance of the SROs and the CFTC.

tions that affect prices in other markets. Thus, it is important that these markets be free of fraud.

Genuine fairness may be achievable in large-scale markets only with trading procedures that place **great** reliance on automated systems and ever-diminishing reliance on the trader. The trends already underway toward computerized trading have been given further stimulus by the investigations by the FBI, the CFTC, and SROs. If, indeed, the only certain way to reduce adequately some forms of abuse in the current trading environment requires oppressive costs, then computer-based systems may receive added impetus as a means of achieving fairness and efficient allocation of scarce resources. Such changes should recognize that adequate resources for regulators will also be required to police the exchanges. The level of fraud identified in futures markets suggests that the CFTC's current resources are less than adequate. The need for policing abuses in these markets won't disappear, but their form will change.

The Intermarket Surveillance Group, noted earlier, has as one of its major purposes to provide a check against intermarket frontrunning. The CME and the NYSE developed new circulars aimed at preventing inter-market frontrunning, which were approved by the CFTC in 1988 and the SEC in 1989. The CFTC has followed through on plans for a number of market reforms, including the placing of more staff monitors on the floor of the exchanges and the drafting of new rules on market procedures related to areas in which abuses have been cited by the FBI investigation. In July 1989 a bill was introduced in the House which would strengthen the CFTC's authority to prevent trading abuses and other objectives.[68] The Senate introduced its own bill in November 1989.[69]

[68]H.R. 2869, Commodity Futures Improvement Act of 1989. The bill would do this by: placing restrictions on dual trading in heavily traded contracts and on trading among members of brokers' groups; requiring improved and verifiable audit trail da@ strengthening the SRO disciplinary structure and increasing the penalties for certain rule violations; setting standards for participation on SRO governing boards; and making the wrongful use or disclosure of inside information by certain officials a felony offense. CFTC authority to assist foreign futures authorities in investigations would be expanded also.

6%.1729, Futures Trading Practices Act of 1989. This bill would: expand the CFTC's staff and legal powers; require exchanges to use tamper-proof, computerized audit trails and curb dual trading; increase penalties against abusive trading practices and permit victimized customers to sue for punitive civil damages; and tighten rules against exchange conflicts of interest.

Chapter 9

The Bifurcated Regulatory Structure

CONTENTS

Page

REGULATION OF SECURITIES MARKETS 168
REGULATION OF FUTURES MARKETS 169
TENSION BETWEEN THE AGENCIES 169
INNOVATION AND REGULATION 169
MARGIN REQUIREMENTS 172
REGULATORY RELATIONSHIPS 174
Clearer Definition of Jurisdictions 175
An Inter-Market Coordination Agency 176
Merging Agencies 177

Chapter 9
The Bifurcated Regulatory Structure

Two Federal agencies regulate the trading of securities and derivative instruments. The Securities and Exchange Commission (SEC) regulates securities, options on securities, and options on indexes of securities; and the Commodity Futures Trading Commission (CFTC) regulates futures and options on futures. (In addition, the Federal Reserve Board and the Department of Treasury have some regulatory responsibilities.) The SEC was created in 1934, the CFTC in 1974. They have roughly similar mandates, but there are also striking differences between them in the details of their legislative authority and operating procedures.[1]

The basic laws creating these two agencies were written 40 years apart, and both were written when some of today's most heavily traded products did not exist. Financial markets and financial institutions are much more interdependent than they were in the past. Derivative products such as stock-index futures and hedging and arbitrage techniques using those products, tie together the performance of securities, futures, and options markets. They are further linked by the interlocking memberships of securities firms active in all of these markets and their clearing organizations.[2]

Frequent recourse to courts for judicial interpretation of the Securities Exchange Act, the Commodities Exchange Act, and related securities laws may be inevitable because this body of law has major financial, economic, and social consequences. But segregated responsibilities for regulating securities, options, and futures give rise to additional legal issues and policy issues especially when they give markets and market participants an incentive to pit one set of regulators against another.

In 1990, there are before the Congress active proposals to change the existing regulatory structure radically-either by merging the two agencies, or by reallocating their jurisdictions and responsibilities.. Such proposals had been made repeatedly in Congress. In May 1990, the Administration recognized that ". . the time has come to reform the disjointed regulation of the markets governing stocks, stock options, and stock-index futures. '

The danger in a failure to act, an Administration spokesman said, is that "we are now more likely to see minor events trigger major market disruptions. . ..' This would risk "the entire financial system, especially through the clearance and settlement process. . .."

Relations between the two agencies, at the working level, appear to range from cordial cooperation to polite teeth-gritting. Recurring jurisdictional struggles over new exchange products highlight one serious problem in the current regulatory structure. A more critical weakness is the ad hoc nature-and thus the basic uncertainty-of the coordination of safeguards against dangerous volatility and stress, across financial markets that are increasingly linked by technology, products, and hedging and arbitrage strategies. The two regulatory agencies take different positions on the possible causes of market volatility, how much volatility is dangerous, and what measures are justifiable as preventatives. While the interactions of linked markets are probably not fully understood, the implications of this linkage have become highly controversial and highly politicized because they affect both extremely profitable activities in the private sector and the distribution of responsibility and power in the public sector. This makes it less likely that the agencies will always be able to act with dispassion, speed, and coordination in emergencies.

[1]The SEC is nearly four times as large as the CFTC. The SEC has approximately 2,200 people and a budget of $168.7 million for FY 1990, with a 1991 budget authority of $177 million (the President requested $192.4 million and 2,375 staff years). The CFTC has 1990 budget of $37.18 million and a staff of 529, with a presidential request for $44.96 million and 595 people in 1991, and projected congressional authority for $40 million.

[2]According to the CFTC, 12 firms are clearing members of both futures and stock clearing organizations; 20 firms are clearing members Of futures and securities options clearing organizations. These 32 firms with interlocking memberships are only 3 percent of all clearing firms (963), but are probably among the largest.

[3]Statement of the Honorable Robert R. Glauber, Under Secretary of the Treasury for Finance, before the U.S. Senate Committee On Agriculture, Nutrition, and Forestry, May 8, 1990.

REGULATION OF SECURITIES MARKETS

Until 1934 secondary securities markets were subject only to U.S. postal laws (as are all businesses) and to State civil and criminal laws. The Securities Exchange Act of 1934 (and the Commodities Exchange Act 2 years later) reflected public outrage over perceived causes of the 1929 market crash: excessive speculation and market manipulation. The Securities Exchange Act (SEA) emphasized congressional determination to prevent 'inequitable and unfair practices' in stock exchanges and the over-the-counter (OTC) market.

The Act created the Securities and Exchange Commission[4] as an independent regulatory agency. The new agency was to regulate the practices of dealers and brokers in both formal and OTC markets,[5] and to make sure that the public is given information about publicly traded securities. The law prohibited the use of corporate information and news by "insiders" for trading advantage. It also provided a framework for controlling the amount of speculative credit that may be extended to market participants, but this authority-to set minimum levels of "margin"—was given to the Federal Reserve Board rather than the SEC, since it was considered to affect broader policies of credit control.

Much of the basic regulatory responsibility was left to the exchanges, as self-regulatory organizations, or SROs. (The National Association of Securities Dealers, NASD, was created 5 years later as an SRO for the over-the-counter market.) Within limits defined by Federal and State statutes, SROs draw up their own rules and have the authority to censure, fine, suspend, or expel both their members and their employees. SROs also register securities account executives and investment brokers.[6]

There are significant costs involved in carrying out self-regulatory functions. The New York Stock Exchange (NYSE) says that 22 percent of its revenues and 29 percent of its staff are allocated to regulatory activities, including surveillance and enforcement.[7] The NASD says that in fiscal year 1990, 81 percent of its $111 million budget was allocated to regulatory functions.

States retained some securities regulatory powers. State commercial laws in conjunction with Federal securities laws and bankruptcy laws affect many aspects of securities transactions, especially clearing and settlement and the obligations of various market participants. Securities must be registered in every State in which they are sold, as well as with the SEC. (Some States now provide for "registration by coordination, " i.e., by proof of SEC registration.) There are differences among the States in the scope and details of securities regulation, but most States are actively concerned with protection of the individual investor against fraud and manipulation by retail brokers.

The 1934 Securities Exchange Act's consumer protection clauses tried to shield investors against dishonesty, but not incompetence, on the part of brokers. That was considered the responsibility of the SROs. For example, the NYSE and NASD could intervene in the affairs of their member firms to transfer customer accounts and positions to stronger members, to liquidate failing members, or to effect mergers with healthier firms.[8] In the 1960s, however, the growing volume of trading and the ''back-office' (paperwork) overload strained the financial capacity of many brokerage firms. Congress created the Securities Investors Protection Corp. (SIPC) in 1970, to protect customer accounts up to certain limits against failures of securities fins. The SIPC funds are provided by annual assessments of exchange-member firms.[9]

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[4]The SEC is governed by five commissioners, with no more than three from one party, appointed by the President with the consent of the Senate.

[5]Federal, State, and municipal bonds and some other kinds of securities are exempt from most provisions of the Act, but they are subject to the antifraud provisions, as are all securities.

[6]They now require a several month training program and examinations before registration.

[7]In 1989, NYSE regulatory expenses were $78.6 million. Revenues from operations and short-term investments were $349.3 million. There were 1,977 on staff, of which 579 were assigned to regulatory functions. Figures provided by the NYSE.

[8]Between 1968 and 1981 the NYSE had to expend $61 million from its Special Trust Fund to liquidate or merge troubled member firms. See Richard J. Teweles and Edward S. Bradley, *The Stock Market,* 5th ed. (New York, NY: John Wiley & Sons, 1987), pp. 317-320.

[9]SIPC also has emergency borrowing lines to the Federal Reserve giving it resources of over $1 billion, and most brokerage firms also have some commercial insurance. Nevertheless, it is not at all certain that SIPC could handle the failure of a major firm, which might have more than 250,000 accounts. The largest failure yet handled by SIPC involved fewer than 33,000 accounts. Many people in the securities industy appear to believe that the Federal government would "bail out" any major securities firm that failed, even though there was no bail out of Drexel Burnham Lambert in 1989.

REGULATION OF FUTURES MARKETS

Regulation of the futures market began with the Grain Futures Trading Act of 1922, with responsibility lodged in the U.S. Department of Agriculture until 1974 (see ch. 4). The present regime was established with the Commodity Futures Trading Commission Act of 1974 (88 Stat. 1389). The Act provides that a new Commodity Futures Trading Commission ". . . shall have exclusive jurisdiction with respect to . . transactions involving. . . contracts of sale (and options on such contracts) for future delivery . . .." It is to administer the basic provisions of the Commodity Exchange Act of 1936. The new 1974 Act defined "commodity" to include not only agricultural staples and other "physicals," but also "services, rights, and interests in which contracts for future delivery are presently or in the future dealt in. . .," thereby expanding the term to include many financial instruments. The CFTC was created under ''sunset legislation, ' a popular concept in the early 1970s, which provided that the agency would cease to exist unless re-authorized periodically. Congressional oversight of the CFTC continues to be exercised by the House and Senate Committees on Agriculture.

CFTC authority generally preempts that of States, although the Commodity Exchange Act (sec. 6D) permits States to prosecute commodities fraud. The SEC's authority is shared with States. The authority of the two agencies also differs in terms of investor protection. [10]

TENSION BETWEEN THE AGENCIES

In 1978, SEC asserted jurisdiction over securities-related activities, including the trading of futures and options contracts based on stocks or stock prices, and sought congressional codification. The congressional Agriculture Committees, however, wanted to keep jurisdiction over all futures trading in one agency.

The linkages between stock and futures markets were not so visible in 1974 and 1978 as they are now. The most direct link-stock-index futures-did not then exist. Nevertheless, some congressional members saw potential problems. The Futures Trading Act of 1982 reflected congressional concerns about the impact of trading in futures contracts on other financial markets. These concerns were stimulated by the Hunt silver scandal and the impending introduction of interest-rate futures. The 1982 Act directed the Federal Reserve Board of Governors (FRB), SEC, and CFTC to assess the effects of futures and options on capital formation, the liquidity of credit markets, the adequacy of customer protection, the effectiveness of regulatory tools and mechanisms, and the extent to which futures contracts could be used to manipulate markets and prices. The study concluded that futures and options did not have adverse effects on capital formation or stock and credit markets.

Over time most of the early congressional concerns about trading in futures contracts were allayed through this and other studies by Federal agencies and through a growing body of practical experience. This unease was roused again in 1987 and 1989 by the possibility that stock-index futures and related trading behavior contributed to-or caused-market breaks (see ch. 4). The bifurcated regulatory structure itself has become a focus of concern and controversy. It is particularly controversial in terms of: 1) the effects on innovative financial products, 2) the setting of margin requirements, and 3) decisions about measures to be taken when markets are stressed or collapsing.

INNOVATION AND REGULATION

The boundary between SEC and CFTC jurisdiction is, in broad terms, that between instruments for capital formation (securities) and instruments providing a means of hedging, speculation, and price discovery without the transfer of capital. Options are sometimes regarded as an investment, but more often as an instrument for hedging or speculation. The SEC has authority to regulate trading of options on securities. The CFTC regulates trading of futures contracts (including futures on stock indexes) and options on futures contracts. The CFTC has jurisdiction over options on foreign currencies-except

[10]For example, the CFTC performs direct market surveillance based on large trader reporting, which the SEC cannot yet require (a bill that would authorize the SEC to require large traders to report their transactions is now before Congress). As another example, the CEA requires futures commission merchants (the firms that handle purchase and sale of futures contracts for retail customers) to segregate customers funds. SEC Rule 15c3-3 requires segregation only of net total credits, but the Securities Investor Protection Act setup an insurance fund for further investor protection.

when the option is traded on a national securities exchange, in which case the SEC has jurisdiction. Thus the SEC regulates an option on the British pound traded by the Philadelphia Stock Exchange, and the CFTC regulates essentially the same option traded at the Chicago Mercantile Exchange.

Futures exchanges have been highly innovative in developing new products, and the CFTC has generally been responsive and flexible in approving those products (or in agreeing to exclude them from regulation). The SEC has until recently been more cautious in approving new exchange products.[11]

But the futures exchanges' innovative products have blurred the distinctions assumed in statutes, and thus the allocation of responsibility of the CFTC and SEC, particularly with the advent of products whose definition and price are derivative of products traded on a securities exchange. In drawing up the Securities Exchange Act of 1934 and the Commodity Exchange Act of 1936, legislators could not anticipate the new products and computerized trading strategies that would eventually confront regulators. As a result, the two agencies have frequently struggled with jurisdictional confusion, sometimes resolved by negotiation but sometimes finally resorting to courts to sort out jurisdictional disputes. In time, the related industries have come to use the threat of litigation to thwart competition and perhaps to thwart regulation as well.

A major source of difficulty is the "exclusive jurisdiction' phrase in the Commodity Futures Trading Commission Act. The Act says:

> . . the Commission [CFTC] shall have exclusive jurisdiction with respect to. . transactions involving . . .contracts of sale (and options on such contracts) for future delivery of a group or index of securities (or any interest therein or based on the value thereof) .12

Most new contracts, if they are not standard corporate stock or bonds, have some aspects of "future delivery," and the likelihood that they will be found by the courts to fall under the CFTC's jurisdiction may effectively discourage stock markets from product innovation.

Exchanges have formed separate subsidiary exchanges in order to avoid being regulated by both the CFTC and the SEC. The NYSE formed the New York Futures Exchange and the Philadelphia Stock Exchange formed the Philadelphia Board of Trade. Futures exchanges are particularly intent on avoiding regulation by the SEC, saying that it does not understand futures trading.

Serious disagreements erupted between exchanges seeking to innovate, and between the regulatory agencies, over products at the intersection of the agencies' jurisdictions.[13] In 1981, the chairmen of the SEC and the CFTC entered into an agreement clarifying the respective jurisdictional responsibilities of the two agencies, pending the enactment of clarifying amendments to the securities and commodities laws.[14] This Shad-Johnson agreement (named after the two chairmen) left the CFTC exclusive jurisdiction over futures contracts and options on futures contracts. It recognized SEC as sole Federal regulator of options on securities and on foreign currencies traded on national securities exchanges. The agreement specified certain criteria that the CFTC would use in approving futures contracts on a group or index of municipal and non-exempt securities.[15]

As part of the Futures Trading Act of 1982, Congress enacted the Shad-Johnson agreement into

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[11] Thomas Russo, who practices securities and commodities law as a partner in Cadwalader, WickerSham & Taft, told Congress: "AS a result of the recent-and in my view unfortunate—Seventh Circuit decision in the IPS case, the Commodity Exchange Act has become a major obstacle to product innovation. . . The IPS decision will work, in effect, to ban many new products with any element of futurity from the U.S. markets."

[12] 7 U.S.C. 2a(ii). See also 7 U.S.C. *Section* 2 . . . "the Commission shall have exclusive jurisdiction, except to the extent otherwise provided in sec. 2a of this title." U.S. Court of Appeals for the Seventh Circuit, *CME et al., v. SEC,* decided Aug. 18, 1989.

[13] For example, in early 1981, the SEC gave approval for the CBOE to trade options on Government National Mortgage Association securities. The CBOT (which had traded GNMA futures since 1975) objected. The U.S. Court of Appeals of the Seventh Circuit ruled that the SEC was without jurisdiction because of the exclusive jurisdiction clause in the CFTC statute. Board of Trade of City of Chicago v. SEC, 677 F,2nd 1137, 1142 n.8, 1156-1158 (7th Cir. 1982), *vacated as moot, 459* U.S. 1026 (1982). The Court said that GNMA options were not securities, despite a "right to . . . purchase" phrase in the securities laws.

[14] SEC and CFTC press release Dec. 7, 1981, 2982-82 Fed. Sec. L. Rep. (CCH) Par. 83,062.

[15] The Seventh Circuit Court later ruled that the SEC and CFTC could not alter their jurisdiction by mutual agreement. See 677 F.2d at 1142 n.8. The jurisdictional dispute between the CFTC and SEC was over options on GNMA certificates. An appeals court later found them to be "both securities and futures," and, therefore, "the CFTC's jurisdiction is exclusive in light of 7 U.S.C. Sections 2 and 2a. " U.S. Court of Appeals for the Seventh Circuit decision in *CME et al., v. SEC,* Aug. 18, 1989, pp. 11-12.

law. Congress added a provision that the SEC had the right to object to a futures contract on a stock index (or option on such a contract). After a hearing, SEC's objection could be taken to judicial review.[16]

In late 1983, the SEC objected to four stock-index futures contracts proposed by the Chicago Mercantile Exchange (CME) (based on indices of sectors of the securities markets such as energy corporation stocks or financial institution stocks). This led to a second agreement between the two agencies setting out detailed guidelines for joint CFTC/SEC approval for index futures contracts and options on index futures contracts. Subsequently, there was joint approval of 20 stock-index futures contracts, later withdrawn. In May 1988, in the wake of the crash, the SEC Commissioners again voted to propose the transfer to the SEC of CFTC jurisdiction over stock-index futures contracts and associated options.[17] This has been proposed anew in 1990.

In 1989, the continuing dispute focused on jurisdiction over a new financial instrument called Equity Index Participations (IPs), proposed for trading by three securities exchanges.[18] IPs were to represent "a present interest in the current value of a portfolio of stocks. ' The holder of an IP would be entitled to a proportionate share of an amount equal to any regular cash dividends paid on the stocks in the portfolio, without ever owning the stocks.[19]

Index participations were approved by the SEC as a way to let individual investors get some of the risk-reduction benefits that institutions get from program trading, and as a means to reduce market disruptions due to such high volume trading techniques. They were held by the SEC to be ' 'securities" because their economic function was equivalent to that of securities-a claim to dividends, freely transferable in exchange transactions, and able to appreciate in value. The Chicago Board of Trade (CBOT), the CME, and the CFTC challenged the SEC's approval, claiming that IPs were futures contracts because they represented a transaction that would be cashed out at a future date, at a price based on the difference between an initial price and an undetermined future price. The Court of Appeals for the Seventh Circuit noted that the IPs have some of the characteristics of a security and some of the characteristics of a future contract, but because of the exclusivity rule would have to be regulated by the CFTC.[20]

The dispute over regulatory jurisdiction for IPs highlights some useful insights about competing regulators and the stresses that some new innovative products place on the jurisdictional boundaries established by law. Exchanges may seek to protect their existing products against competition from a new financial product that would trade on other exchanges. Regulators must implement statutes as written (but also may seek to protector expand their jurisdiction). These disputes often delay or prevent the trading of new financial products that could be useful to investors.[21]

The dispute over regulatory jurisdiction of IPs also highlights the growing difficulty of categorizing some new financial instruments as either stock, options, or futures contracts and thus assigning their regulation to the SEC or the CFTC. The Appeals Court, unable to find a clear categorization of IPs, complained: ''We must decide whether tetrahedrons belong in square or round holes."[22] The court necessarily relied on interpretation of existing statutes and prior case law, and properly made no

[16]The Seventh Circuit decision concerning options o„GNMA securities (see footnote15) was mooted by this legislation (and was also vacated as moot by the Supreme Court).

[17]The vote was, however, 3-2, and Chairman Ruder, whoproposedthe change, admitted that there was little chance the proposal would succeed (David A. Vise, "Battling for Market Control: SEC, Led by Ruder, Votes To Ask Congress for Index Futures Role," *Washington Post*, May 27, 1988, D1).

[18]They were first designed b, the Philadelphia Stock Exchange, which in February 1988 applied to the SEC for permission to trade them. The AMEX and CBOE later submitted to the SEC their own proposals for variations of IPs.

[19]The IP was to be of indefinite duration. The holder could either exercise a ''cash-out'' privilege available daily or quarterly (this varied among the IPs) or could enter into an "offsetting" sale or purchase to close out his position. In that case, theholderwouldmake a profit (or limit his loss) by receiving or making payment of the difference between the prices of his opening and closing transactions. SEC Release 34-26709, Apr. 11, 1989.

[20]U.S. Court of Appeals for the Seventh Circuit decision in Chicago Mercantile Exchange, Board of Trade of the City of Chicago, and Investment Company Institute. Securities and Exchange Commission decided Aug. 18,1989. Also, "Court Rules SEC Erred in Decisions on Futures Markets," *Wall Street Journal*, Aug. 21, 1989, p. C9.

[21]According t. Thomas Russo, securities and commodities lawyer, the SEC initially rejected the first financial futures contract, which was then approved by the CFTC and traded on CBOT. The SEC also would not approve the first attempts to develop index products. RUSSO, Op. cit., footnote 11, p. 3.

[22]Ibid., p.2. [7th Cir. Court of Appeals, Aug. 18,1989.]

judgment as to which agency is better equipped to supervise trading in IPs. Nor did this court decision—or earlier judicial decisions, the Shad-Johnson Agreement, or the legislation based on it—resolve the fundamental issue of how to assign jurisdiction for new financial instruments which do not fall neatly within either the capital formation or the hedging categories.

MARGIN REQUIREMENTS

In stock markets, "margin" is the amount that, under FRB rules, brokers, dealers, and other lenders must require from customers as a down payment when they sell securities to customers on credit. Exchanges and the NASD also require additional "maintenance margin" deposits.[23] In futures markets, margin is defined as a performance bond that protects the clearinghouse against default by clearing members. Proposals have been made repeatedly to "harmonize' the levels of margins across markets—generally with the policy objective of raising futures margin requirements in order to constrain the pressure that might be transmitted from futures markets to stock markets. This issue is discussed in chapter 4. It is closely related to another policy issue: How and by whom should margin levels be set?

After the 1929 stock market crash, Congress concluded that low margins required for stock purchases had encouraged excessive speculation. Margin requirements were, at the time, set by stock exchanges without government intervention. The FRB was empowered by the 1934 Securities Exchange Act to specify required margin levels on securities.

The FRB changed stock market initial margin requirements 15 times from 1934 to 1959 and less frequently thereafter. Since 1974 it has left initial margin requirements at 50 percent of the market value of purchased stocks, and 150 percent of the value in ''short' transactions.[24] The stock exchanges and NASD'S additional maintenance margins require at least 25 percent of market value in long transactions.[25] Specialists and OTC market-makers pay much lower margins.

Futures margins are set by exchanges and are usually about 5 percent. Only in emergencies does the CFTC have authority to direct the exchanges to raise margins. Unlike stock margins, required levels for futures margins change frequently. For a time following the 1987 crash-possibly to ward off the numerous proposals that Congress take action to require higher futures margins[26]-exchanges did not drop this requirement below 15 percent for speculative long or short positions, but the requirement was soon halved. In early May 1989, the CME reduced the speculative margin for S&P 500 futures from $15,000 to $6,500. In October 1989, it varied from $9,000 to $12,000-FRB Chairman Alan Greenspan later said that he was shaken by the exchange's action in raising margin requirements during the market break, because it drained liquidity from the market when it was most needed. In May 1990 the margin requirement stood at $20,000.

The inability of empirical studies to answer decisively (at least to the satisfaction of all sides in this politicized argument) the question of whether initial margin requirements affect volatility is discussed in chapter 4. Regardless of empirical research, the regulatory agencies take strong-and conflicting-stands on this question. SEC's Division of Market Regulation 'continues to believe that low futures margins have contributed to the size and volatility of short-term market movements, ' '[27] and Richard Breeden, chairman of the Commission, has on several occasions in 1990 reiterated a demand for

[23]When an adverse market movement has reduced the margin account to a point where the cash or collateral loaned to the account holder by the broker is jeopardized, the exchanges require the customer to deposit additional equity, or "maintenance margin. " If a customer buys stock worth $100, he might put up $50 (initial margin) and borrow $50.Unless the stock value falls below $66.67, the customer would not need to deposit additional maintenance margin because the remaining value of the stock to the customer ($66.67 minus the $50 he put up) is $16.66, which is equal to the NYSE's maintenance margin requirement of 25 percent of $66.67. If the value continues to decline more maintenance margin will be demanded.

[24]In a short transaction, one is selling stock that one does not yet own, but has borrowed, expecting to be able to buy it subsequently at a lower price.

[25]In options trading the margin is a performance bond to cover the obligations incurred if the underlying stock generates a loss for the options writer. FRB has deferred the setting of both initial and maintenance margin to the options exchanges subject to SEC oversight. The way these are set was explained in ch. 5. That chapter also discusses the related issues of cross-margining and futures-style margins for options.

[26]The President's Task Force on Market Mechanisms, as one example, called for margins in the two market segments to reflect roughly equivalent risk and leverage.

[27]Richard G. Ketchum, Division Director, in a memorandum to SEC Director David S. Ruder, June 30, 1989, p. 22.

higher margins.[28] CFTC Chairman Wendy Gramm told Congress in March 1990, "There is no credible evidence to support the contention that low margins for stock-index futures cause stock price volatility. "2[9] Secretary of Treasury Brady has called for higher margins. Alan Greenspan, chairman of the FRB, says, "Although available statistical evidence on the relationship between margins and stock price volatility is mixed, the preponderance of the evidence is that neither margins in the cash markets nor in the futures markets have affected volatility in any measurable reamer. '

After the 1987 crash, there were many proposals to change the locus of responsibility for setting margin requirements. (The assumption is that the SEC, and possibly but not surely the FRB, would be likely to raise futures margin requirements, the CFTC-as now constituted-would not.) The President's Working Group on Financial Markets could not reach consensus on who should set margin levels (reflecting the diverse institutional representation in the Group) .30 Representatives of the SEC, FRB, and Treasury Department argued that the government should set (or disapprove) margin levels for all products. The CFTC, possibly unwilling to be put in a potentially adversarial position vis-a-vis the futures industries, maintains that exchanges are in the best position to assess market volatility and determine appropriate margin levels, with the CFTC having authority to act only in emergency. The SEC in July 1988 proposed to Congress a restructuring of margin regulation. The CFTC would be required to review futures margins to assure that they are ''prudential' and SEC would have the same responsibility vis-a'-vis securities margin requirements. The FRB would have residual authority to review margin requirements for all products. At one time the FRB asserted that it has power to set margins on stock-index futures, but the FRB has recently shown no interest in exercising this untested claim.[31] It has not changed securities margins at all since 1974, which can be interpreted to mean that it has seen no useful economic purpose served by margin regulation.

In part, this disagreement turns on the question of the purpose of margins. The futures industry (and the CFTC) say that margins are to protect the clearing organization and the futures markets against default of a clearing member. Because of the practice of marking-to-market daily, and daily or intra-daily margin calls, relatively low initial margins afford fully adequate protection for the clearinghouse. The argument for government responsibility, on the other hand, makes two points. First, the links between markets now allow participants with great leverage in the futures market to make great demands on the liquidity of securities markets. This creates the opportunity for a financial "tragedy of the commons. " Secondly, participants in futures markets also are participants in securities and options markets; the collapse of their financial integrity would threaten far more than other clearinghouse members and could imperil basic U.S. financial mechanisms. The question of whether margin requirements are "adequate" must turn on whether ''adequate' refers to protection of the clearing organization against the potential insolvency of a clearing member, or to the integrity of the clearing and settlement system, or to the robustness of the national payment system.

The SEC and the CFTC continue to make significantly different judgments about the effects of margin levels and about how they should be set. Neither now has the statutory authority to determine margin levels in either market. The CFTC can act in an emergency, but since it holds that margin levels do not affect volatility it would presumably not do so in the context of a market break. The FRB has delegated authority to approve margins on equity options to the SEC.

The unease about the possible affects of low margins for stock-index futures, which increase the leverage that futures market speculators can exert on stock prices, contributes to the controversial propos-

[28] In February 1988, the SEC had suggested that the futures markets should increase initial margins for stock-index futures to a level Of 20-25 percent. "Black Monday-the Stock Market Crash of Oct. 19, 1987," Hearings before the Senate Committee on Banking, Housing, and Urban Affairs, 100th Cong., 2d sess., 1988,547. Feb. 2,3,4,5, 1988.

[29] Statement of Dr. Wendy L.Gramm before the Senate Committee on Banking, Housing, and Urbar Affairs, Mar. 29, 1990.

[30] It was composed of George D. Gould, Department of Treasury Under Secretary for Finance; Alan Greenspan, Chairma nof the FRB; Wendy Gramm, Chairman of the CFTC; David S. Ruder, Chairman of the SEC.

[31] Markham and Stephanz, ''The Stock Market Crash of 1987—The United States Looks at New Recommendations, " Georgetown *Law Journal*, vol. 76, 1980, pp. 1993,3037, and n.280.

als to transfer jurisdiction over stock-index futures trading to the SEC. In that case, their margin requirements would presumably fall under the jurisdiction of the FRB. The FRB's responsibility is the financial system as a whole, while there is no reason to believe that any single exchange has the motivation or the ability to fully consider the impacts of its actions on other exchanges and clearance systems or on the economy as a whole.

REGULATORY RELATIONSHIPS

A proposed bi11[32] partially addresses concerns about lack of coordination in market regulation. It has four parts: 1) emergency powers for the SEC at times of great marketstress;332) reporting of trades by large traders to allow better investigation of insider trading and better analysis of the effects of institutionalization and program trading; 3) risk assessment;[34] and 4) coordinated clearing mechanisms. In Hearings on this bill held in May 1989, Senator Christopher Dodd listed other congressional concerns: whether margin levels in derivative products markets are high enough to control speculation whether margin harmonization across markets is desirable; inter-market coordination; and "what should we be doing now to prepare for the markets of the future?"[35]

From the time of the 1987 crash until late 1989, staff of both the SEC and the CFTC publicly said that relationships between the two organizations were good, 'that satisfactory ways of sharing information and discussing interagency problems are well worked out, and that the two staff groups continually communicate, both formally and informally. However, the CFTC said that during the 1987 crash ''interindustry coordination could have been better," as to whether trading in individual stocks would be halted or whether (as rumored at one time) the NYSE would close. Since the crash, arrangements for coordinated circuit breakers have been put in place.

The SEC and CFTC reach significantly different conclusions in analyzing the causes and contributing factors in recent market breaks. This was evident in their reports on the 1987 market crash, as discussed in chapters 3 and 4. It was evident again in their analyses of market events on October 13 to 16, 1989, both released in May 1990.[36]

In spite of close communications, there is room for disquiet about the effectiveness of coordination in times of emergency because of the differences in approach apparent in these reports. Many of the findings about events, and about similarities and differences compared to events in 1987, are basically the same, but their interpretation and the action implications are quite different.

After exhaustive analysis of trading data from October 13 and October 16, the SEC said that its findings confirmed that "while activities in the index futures market do not, in themselves, cause the sharp market downturns or price rises . . . these trading strategies, in particular index arbitrage, can markedly accelerate price movements already underway." The CFTC found that "Neither program trading nor futures sales by those with large positions, explain the observed price movements on those days." The CFTC did find that stock-index futures markets "initially reacted faster than their underlying stock indices when market-wide volatility increased' but there was no evidence of causation.

The SEC noted that the partial circuit breakers that took effect in futures markets coincided with a sharp drop-off in program selling and a reduction in the rate of price decline in stocks. The SEC said that "while a direct causal relationship is difficult to establish," at a minimum its findings indicate "an absence of harm' from the imposition of price limits. The CFTC also said it was "difficult to draw conclusions from limited observations" but found that ''shock absorbers do not appear to have

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[32]''Market Reform Act of 1989'' (S.648), and "Stock Market Reform Act of 1989" (H. R.1609), later H.R. 3657.

[33]The original proposed Act would expand SEC emergency powers to call a halt to securities trading under certain conditions; a later proposed version requires Presidential approval before closing markets. The CFTC already has such emergency powers over futures trading. Hearings on S.648, The Market Reform Act of 1989, May 18, 1989.

[34]The Market Reform Act also would allow the SEC to gather data to assess the financial soundness of holding companies that own broker-dealer firms (''risk assessment"). The NYSE, supporting this proposal, remarked that "As financial institutions enter non-traditional businesses not subject to self-regulatory oversight, they have the potential to create systemic risks domestically and internationally."

[35]Senator Dodd's opening statement, Hearing on S. 648, The Market Reform Act of 1989, May 18, 1989.

[36]Commodity Futures Trading Commission, Division of Economic Analyis, *Report on Stock Index Futures and Cash Market Activity During October 1989, May 1990. Securities* and Exchange Commission Division of Market Regulation *Trading Analysis of October 13 and 16, 1989, May* 1990.

moderated intraday market volatility,' and that "instead, there is some evidence that a binding circuit breaker in one market is associated with increased volatility in other unconstrained markets.' The CFTC model predicted that stock market volatility would have been higher if the futures price limit had remained in effect longer.

With the present informal arrangement for cooperation between these two agencies, there is always a risk-even a probability-that new areas of conflict will arise. Further conflict is likely to arise for the same reasons as past conflict, through continued disputes about jurisdiction over new instruments, disagreements over different margin levels, and finger-pointing when there is another sharp market decline. These disputes raise the question of whether a different regulatory structure is now needed, to avoid a continuation of tensions between regulators.

Three approaches to permanently resolving the jurisdictional issue are possible: 1) provide clearer jurisdictional separation for each agency; 2) create an inter-market coordinating committee or agency; and 3) merge the SEC and CFTC to create a new agency.

Clearer Definition of Jurisdictions

Earlier efforts toward redefinition of jurisdictions have not proved effective. It is almost impossible to foresee just what attributes tomorrow's financial products will have because "new instruments can appear at any border. ' '[37]

One approach is to assign jurisdiction on the basis of the primary function of each financial instrument (i.e., capital formation instruments v. risk shifting, hedging, or speculation instruments). Regulatory jurisdiction over options could be transferred from the SEC to the CFTC. Instruments that provide both capital formation and risk shifting functions (to different investors) would still pose problems.

Alternatively, jurisdictional responsibility might be assigned according to whether the purchaser owns or does not own the assets underlying the instrument. This would make the CFTC responsible for all options and all futures, the SEC would have jurisdiction over capital raising instruments—stocks, bonds, and also commodity pools.[38]

It would almost certainly be necessary to increase the size of the CFTC with either of these approaches. Neither would solve the problems of assigning responsibility for subsequent new products, of determining appropriate futures margin levels, or of coordination in emergencies.

A third approach would place all products whose price is directly derived from stock prices-such as stock-index futures and stock-index options-under SEC. This would leave a mixed bag of financial futures contracts to be regulated by the CFTC. Alternatively, all financial futures could be shifted, so that the CFTC retains only futures contracts based on agricultural products, industrial materials, metals, etc., i.e., non-financial contracts. Under this approach the jurisdictional assignments would cut across market institutions, trading location and exchange responsibility, trading techniques, margining systems, and retail distribution systems. This could be the source of much complication and confusion.

The possible effects of reassigning stock-index futures to SEC responsibility are uncertain. Whether the exchanges would continue trading these contracts, whether they would be used by the same market participants and in what ways, whether they would be traded overseas, and other such questions have not been thoroughly assessed by those on either side of the controversy. Several gains in efficiency might be achieved if this jurisdiction is transferred to the SEC. For example, the current relationship requires much duplication of effort in joint approval of new products.

Transferring stock-index futures and options on stock-index futures from the CFTC to the SEC would require amendment of Federal securities laws and the Commodity Exchange Act. Existing securities legislation is highly complex, with at least six laws applying to securities markets. Thomas Russo, who practices securities and commodities law and has been a member of the staffs of both the CFTC

[37]U.S. Court of Appeals, op. cit., footnote 12, p. 13.

[38]Ownership of a commodity pool is much like ownership of a mutual fund in that investors have an interest in the resets of the pool, rather than direct ownership of its assets. These pools acquire various types of futures, e.g., futures on stock indexes, wheat, or gold. The SEC does not now have this regulatory responsibility.

and the SEC, recently told a congressional committee:[39]

> (N)either the commodities nor the securities laws. . . reflect today's markets. When we talk about what we should do with the commodities and securities regulatory structures, we must keep open the possibility that both structures should change. It may well be that neither particularly suits the world in which we live.

A compromise proposal, also in discussion in Congress (in July 1990) would allow the CFTC to retain its authority over stock-index futures and give the SEC authority to regulate any new instruments that "share the qualities of both a future and a stock. " This would not solve the current problems of jurisdictional confusion, margin levels, or control of short term volatility, and it would almost surely give rise to new disputes over subsequent product innovations.

An Inter-Market Coordination Agency

The Brady Commission, in its most controversial proposal, urged that one agency be given the authority to coordinate ''a few but critical" inter-market regulatory issues such as clearing and credit mechanisms, margin requirements, and circuit breakers, leaving intra-market issues with either the SEC or the CFTC.[40] Later, the experts behind the Brady report effectively retreated from this suggestion for a two-tier structure.[41] A bipartisan group of Senators proposed an inter-market coordinating committee consisting of the heads of the FRB, the SEC, and the CFTC, but the proposal did not bear fruit.[42]

Placing the authority for jurisdictional decisions in the hands of a multiagency panel could reduce the present reliance on judicial decisionmaking, provided the panel were given clear and binding decisionmaking authority rather than being charged merely with making recommendations. The panel might, for example, be composed of representatives of the SEC, the CFTC, the Treasury Department, and the Federal Reserve Board, with or without representation for SROs; or it might be made up of neutral experts in finance and securities law. The former alternative already exists, in the form of the President's Working Group on Markets. The weakness of this proposal is that on such a panel—which is not an independent, staffed agency—agency representatives vote their agency position, derived from broader agency concerns not always directly focused on the issue at hand. They predictably vote to buttress the authority of their agency, so that most decisions would depend solely on the vote of the third member. If SROs were included they would vote their competitive interests, so that nothing approaching an objective consensus could be expected.

The alternative, an expert extra-governmental panel, would be in a better position to take into account product design and function, the best interests of investors, the efficiency of markets, and other national interests. In practice, however, it would be difficult to find truly neutral experts. The relatively few people with great knowledge and understanding of securities and derivative product markets usually have been affiliated in the past with one set of markets or the other, but not both, as an exchange member or officer, a regulator, or a long-time consultant.

Inter-market coordination primarily involves three tasks: 1) assuring the willingness and ability of the banking system to make credit available to stock brokers, futures commission merchants, and clearing corporations when markets are under stress; 2) margin harmonization; and 3) coordination on issues such as circuit breakers, information sharing, market surveillance and enforcement, and contingency planning. The frost task is already vested in the FRB and was exercised appropriately in October 1987. The

[39]Thomas A. Russo, **Testimony** before the Subcommittee on Telecommunications **and Finance, House Committee on Energy and Commerce, May 3, 1990. Mr. Russo is a partner at Cadwalader, Wickersham & Taft.**

[40]*The Presidential Task Force on Market Mechanisms*, (Brady Report, January 1988, p. 59).

[41]**The Brady Report also suggested that the Federal Reserve Board was best qualified to be the inter-market regulatory** agency. **A month later FRB Chairman Greenspan objected, on the grounds that: a) this would lead to a presumption that the Federal safety net had been extended to the markets (so that no securities firm or clearing corporation would be allowed to fail), and b) the FRB lacked the necessary specialized expertise. Soon after, the authors of the Brady Report said that debate over the proposal bad drawn attention from "more critical issues' and "what is most crucial is not who oversees the [inter-market] issues" but that "we get to work on them." Statement of the Presidential Task Force on Market Mechanisms, 1987-1988 Fed. Sec. L. Rep. (CCH), Par. 84,237, May 1988.**

[42]**Inter-market Coordination Act of 1988, Hearings before Senate Committee on Banking, Housing, and Urban Affairs, 100th Cong., 2d sess.,** On *S. 255610-14,77 (1988). The bill* **was** not enacted. There is at present **an Inter-market** surveillance **Group** (initiated **by SEC) made Up of stock and stock option exchanges plus the Chicago Mercantile Exchange, that coordinates efforts to eliminate trading abuses.**

second and third tasks could be handled with more organizational simplicity either by transferring CFTC jurisdiction of stock-index futures and options on stock-index futures to the SEC, which has already been discussed, or by merging the existing agencies rather than adding a third layer.

Merging Agencies

Merging the SEC and the CFTC has the merits of containing and resolving disputes within one agency, rather than requiring court decisions. This approach also would tend to encourage the use of less parochial criteria in decisionmaking and intermarket coordination. No serious problem of inexpertise should arise, since, the staffs of both agencies would be combined.

The case for consolidation has been stated succinctly by Judge Stanley Sporkin of the U.S. District Court, Washington, D. C., former Director of SEC's Division of Enforcement:[43]

> Our securities markets are too symbiotic to have the kind of separate regulation that now exists between the CFTC and the SEC. . . . An objective analysis of the problem stripped from its political realities would seem to suggest that a single agency should be reposed with the responsibility for overseeing all securities related activities.

Another argument for integration is that having to deal with two hotly competitive industries might help to prevent the regulatory agency from becoming too closely identified with, or captive of, either of these industries.

Many participants in futures industries are convinced that the two regulatory agencies have different perceptions of and attitudes toward the markets they regulate, and that their industry would be disadvantaged if the CFTC is merged with the larger SEC. This perception is reflected in the observation that: "The SEC's world is net long, while the CFTC's world is a zero-sum game."[44] It was said less cryptically by the CFTC chairman Windy Gramm, who told a congressional committee that there is "a conflict of interest" between the SEC goals of stable or higher prices for the benefit of investors, and the duties of a futures regulator, who ''must be insulated from any such price bias in order to maintain price neutrality.' '[45] This implies that the SEC is generally happy to see market prices increase, benefiting the capital formation process and investors; the CFTC is "price neutral,' since in futures markets, for every winner there is a loser.

Some critics of consolidation argue that there is benefit to having competition among regulatory agencies,[46] specially specially, that this stimulates healthy cross-fertilization. To these critics, the many strong disagreements between the SEC and the CFTC are a positive benefit, because they reflect the fact that certainty about many of these issues is not possible. Merging the two agencies, according to this view, "would give the impression of a single view and would stifle responsible discussion of important issues."[47]

But competition between regulatory agencies can also lead to a situation in which the regulated industries tailor their behavior or their products to choose their regulator, thereby setting one agency against another in order to paralyze government response.[48] At present, innovation in products is hampered or completely stymied because the products "fall between the stools" and are likely to involve the exchanges in protracted wrangling between agencies or in lengthy judicial proceedings to determine the proper jurisdiction. If it is the case that the SEC and CFTC have different regulatory philosophies, this may encourage the industry to exploit the bifurcated regulatory regime. In any case, the difference in approach could change at any time with appointment of new Commissioners (or could be influenced by Congress through oversight, budg-

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[43]The Honorable Stanley Sporkin, "U.S. Financial and Securities Markets Under Stress, " Address to the Fourth Annual Colloquium on Corporate Law and Social Policy, University of Ohio College of Law, Mar. 6, 1989.

[44]A remark often made by SEC Commissioner Edward Fleischman in speeches during 1988 and 1989. See his speech to tie National Security Traders Association, New York City, July 21, 1988, as reported in *The Market Chronicle,* Sept. *22, 1988,* pp. 8, 10.

[45]Gramm, op. cit., footnote 28.

[46]Edward J. Kane, ''Regulatory Structure in Futures Markets: Jurisdictional Competition Between the SEC, the CFTC, and Other Agencies," *The Journal of Futures Markets,* vol. *4, No. 3, 1984,* pp. 367-384.

[47]Professor Hans Stoll, Director of the Financial Markets Research Center, Owen Graduate School of Management, Vanderbilt University, in correspondence to OTA, July 13, 1990.

[48]See Sirico, "Agencies in Conflict: Overlapping Agencies and the Legitimacy of the Administrative Process, " *VanderbiltL.uwReview,* vol. *33,1980,* p. 101.

etary action, and refusal of conflation of Commissioners). Short-term characterizations of the agencies are not an appropriate basis for making long-term decisions about jurisdictions.

Another objection that has been raised to consolidation is that neither agency has the expertise in or understanding to take over the others' responsibilities. This problem, if it exists, could be handled by transferring or merging staff and by altering the management structure of the consolidated agency. It could be beneficial to disrupt any feelings of identification of regulatory staff with the industries they regulate. Consolidation of two independent agencies would however require careful attention to writing a new organic law. There are sufficient differences in the legislatively mandated structure, scope of responsibility, and authority of the two agencies—as well as in their ethos and cultures as they have evolved during their institutional lifetimes-that merely joining the two agencies, each bringing along its own charter, would probably create a dysfimctional organizational monster.

The most practical barrier to consolidation of jurisdiction is perhaps that different congressional committees now have oversight over the two agencies, and may not be willing or able to agree to consolidation of jurisdiction. One approach could be to create a new single committee in each House with oversight over regulation of the trading of stocks, stock options, and stock futures, or over the trading of all securities (including commodity futures, bonds, etc.). These two committees could then give attentive consideration to the advantages and disadvantages of jurisdictional consolidation, possibly extending to complete consolidation of the two regulatory agencies.

Appendix

Appendix

Clearing and Settlement in the United States

Three clearinghouses and three depositories serve the Nation's seven stock exchanges, National Association of Securities Dealers Automated Quotations System (NASDAQ), and other over-the-counter (OTC) dealers. Nine clearinghouses serve the 14 futures exchanges, and one clearinghouse serves all the equities options markets.[1] The major clearing members, who also clear for non-clearing members of a clearinghouse, tend to be highly automated for lower costs and greater operating efficiency. For safety purposes, U.S. clearinghouses also tend to be financially structured such that a failing clearing member can be isolated quickly and its problems resolved without a ripple effect.

While arrangements between clearinghouses and their clearing firms vary, the general goal is that the clearinghouse maintain adequate resources and commitments to assure settlement if a clearing firm defaults. These protective arrangements include capital requirements for members, claims on items in process, if any, and claims on the defaulting member's remaining assets on deposit with the clearinghouse (e.g., cash, letters of credit, Treasuries, or securities posted as collateral for margin). The clearinghouse also has claims on other assets of the failed clearing member. The clearinghouse's guarantee fund is another resource. Certain major clearinghouses, (e.g., the Chicago Mercantile Exchange and Board of Trade Clearing Corp.), also require the parent entities of their clearing members to guarantee all proprietary trading on the books of the clearing members. Finally, the clearinghouse can make assessments against other clearing member fins. This succession of fallbacks is a buffer against shocks ranging from sudden large price movements to defaults by members. As a result, there have been few cases of a failure of a clearing member in the United States, and no instances of a failure of a clearinghouse.[2]

Equities Clearing Organizations

National Securities Clearing Corp. (NSCC)[3]

NSCC processes 95 percent of all equities trades in the United States. It is jointly owned by the principal equities markets: the New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and National Association of Securities Dealers (NASD). It serves 1,800 brokers, dealers, banks, and other financial institutions, through about 1,100 direct participants.

NSCC'S clearance and settlement process normally requires 5 business days. Trade information is received either in the form of locked-in trades already matched by the computer systems of the exchange or market; or, as buy and sell data reported by market participants. The latter still must be compared and buy and sell orders matched. Locked-in trades are entered directly in the NSCC computer system on the same day as the trade. This sharply reduces the need for the matching of buy and sell orders at the clearinghouse level. On a typical day, about 76 percent of the trades on the NYSE are locked-in (a smaller proportion by dollar value).[4] Figures A-1 and A-2 illustrate the steps in the NSCC's clearing and settlement of retail and institutional customers' trades, respectively.

Securities which are held for NSCC members by The Depository Trust Co. (DTC), and whose ownership can therefore be transferred within DTC via its

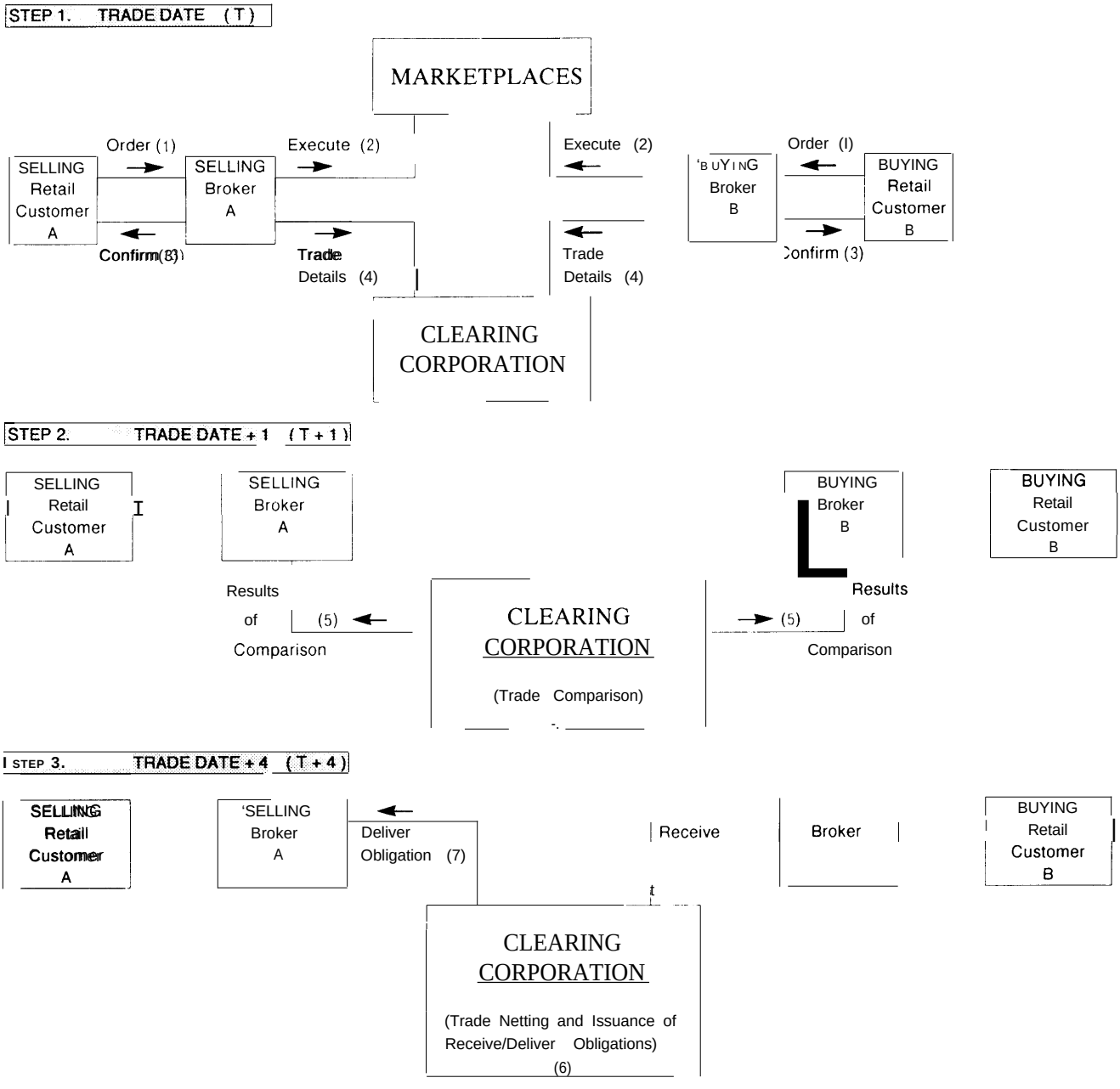
[1]In preparing this appendix, OTA has relied heavily on a contractor report by Bankers Trust Co., "Study of International Clearing and Settlement" vols. I-V, prepared for the Office of Technology Assessment, October 1989, to which many dozens of institutions and individuals around the world contributed expert papers and/or served on the Bankers Trust advisory panel. Hereafter called Bankers Trust report. OTA has also used the discussions of an expert workshop held at OTA on Aug. 22, 1989. For information on the clearing and settlement of U.S. Treasury and government agency securities, mortgage-backed securities, and municipal securities, see Bankers Trust Report.

[2]One expert notes that the only situation he can envision in which the National Securities Clearing Corp. (which clears the vast majority of equities trades in the United States) could fail, would require a major external triggering event, such as the collapse of one or more major U.S. banks causing the failure of one or more NSCC clearing banks or major clearing members. (Robert Woldow, NSCC, at a meeting of experts on clearing and settlement, OTA, Aug. 22, 1989.) The events of October 1987 in the United States-when the payment system began to become clogged-were perceived as potentially disastrous.

[3]Robert J. Woldow, *Clearance and Settlement in th U.S. Securities* Markets *An Overview of the Role of the National Securities Clearing Corp. in Equities Trading,* revised July 1990. Hereafter referred to as NSCC report.

[4]In August 1989, the NSCC began comparing trades that are not locked-in during the early morning hems of T+1. Locked-in trades also include 56 percent of the American Stock Exchange's daily trades, and over 18 percent of OTC trades. Ibid., NSCC report, p. 2.

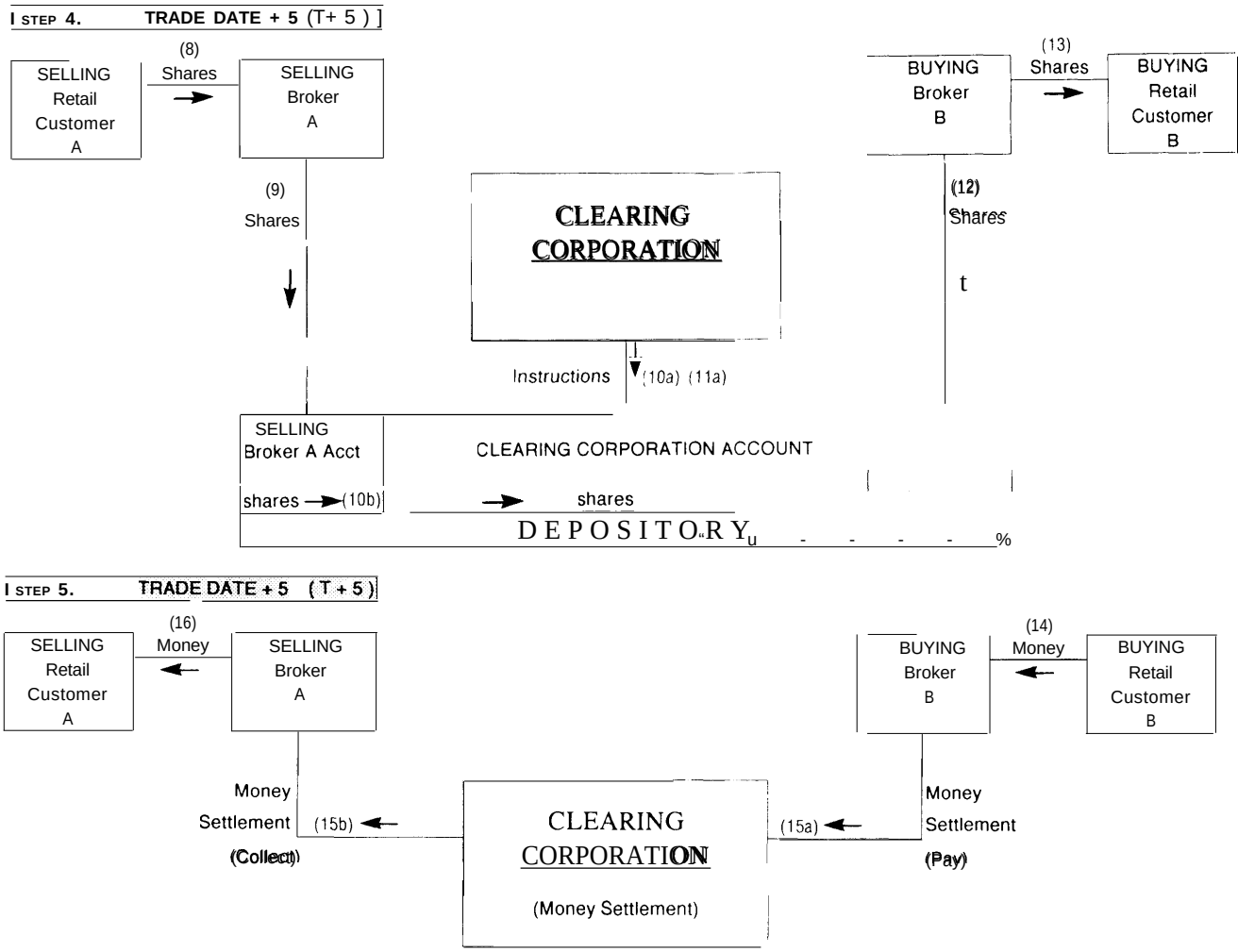
Figure A-l-Clearance and Settlement of Retail Customer Trades



(1) Retail Customers give orders to buy and sell stock to their respective Brokers
(2) Brokers execute Retail Customers orders in the Marketplaces.
(3) Brokers confirm back to their respective Retail Customers that the trades were executed.
(4) Brokers submit details of trades executed in the Marketplaces to the Clearing Corporation.
(5) Clearing Corporation generates reports back to the Brokers indicating the results of comparison
(6) Clearing Corporation nets the trades.
(7) Clearing Corporation issues projection reports indicatlng net receive/deliver obligations to the buying and selling Brokers.

SOURCE: NSCC, 1990.

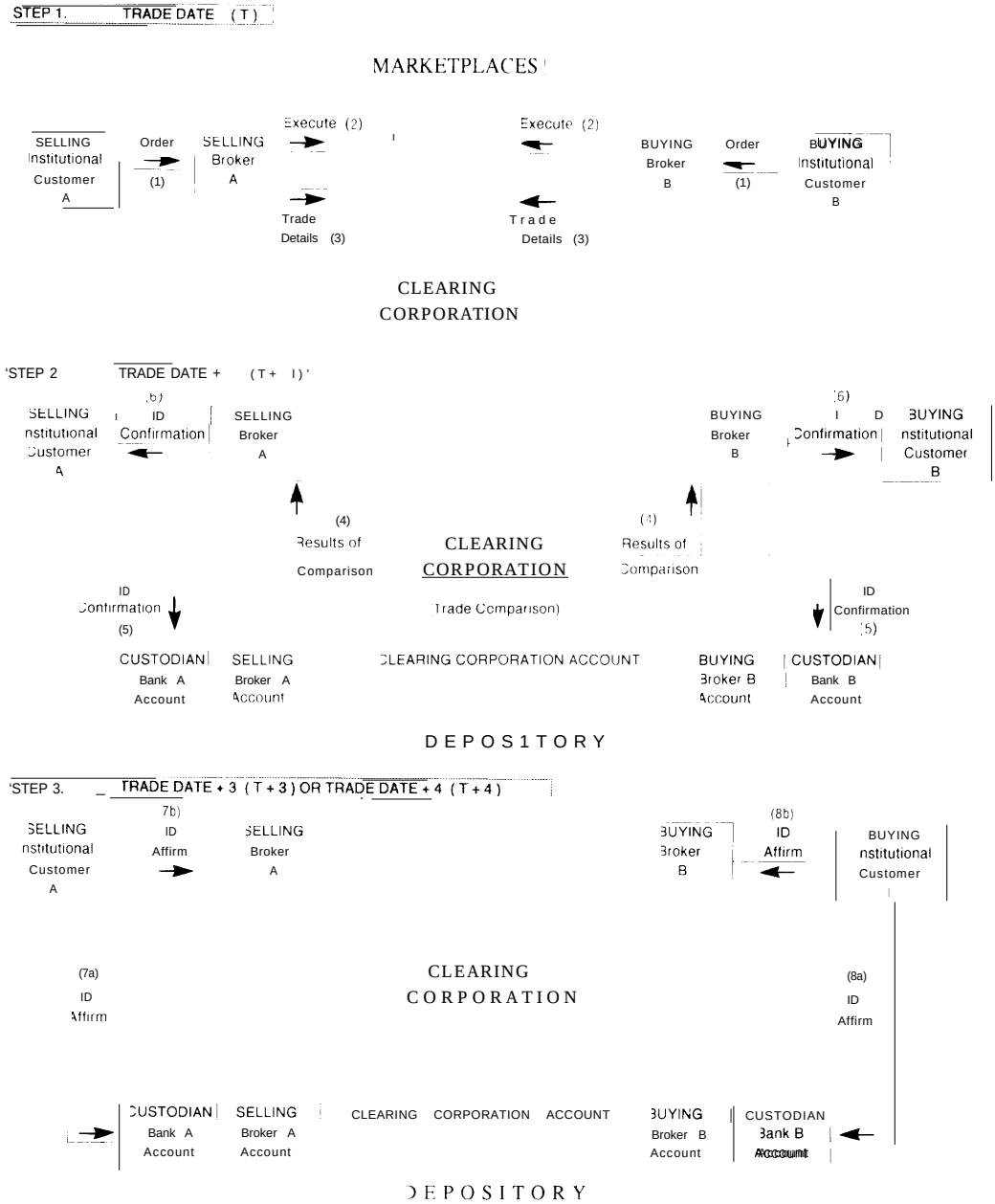
Figure A-l--Clearance and Settlement of Retail Customer Trades-Continued



(8) Selling Retail Customer A gives shares to selling Broker A to satisfy delivery obligation.
(9) Selling Broker A deposits selling Customer A's shares in its account at the Depository
(l0a) Clearing **Corporation instructs Depository to debit selling Broker A's account and credit Clearing Corporation's account with the shares;**
(lob) Depository debits selling Broker A's account with the shares and credits Clearing Corporation's account.
(1 la) Clearing Corporation instructs Depository to debit Clearing Corporation's account and credit buying Broker B's account with the shares;
(11 b) Depository debits the Clearing Corporation's account with the shares and credits buying Broker B's account.
(12) Buying Broker B requests withdrawal of shares from its account at the Depository in order to deliver to Retail Customer B.
(13) Buying Broker B delivers the shares to its buying Retail Customer B.
(14) Buying Retail Customer B pays buying Broker B for shares received.
(15a) Clearing Corporation advises buying Broker B of net pay amount for shares received;
Buying Broker B delivers a check to Clearing Corporation for the requested amount
(15b) **Clearing Corporation advises** selling Broker A of net collect amount for shares delivered;
Clearing Corporation issues check to selling Broker A for the specified amount.
(16) Selling Broker A pays selling Retail Customer A for shares delivered.

SOURCE: NSCC, 1990.

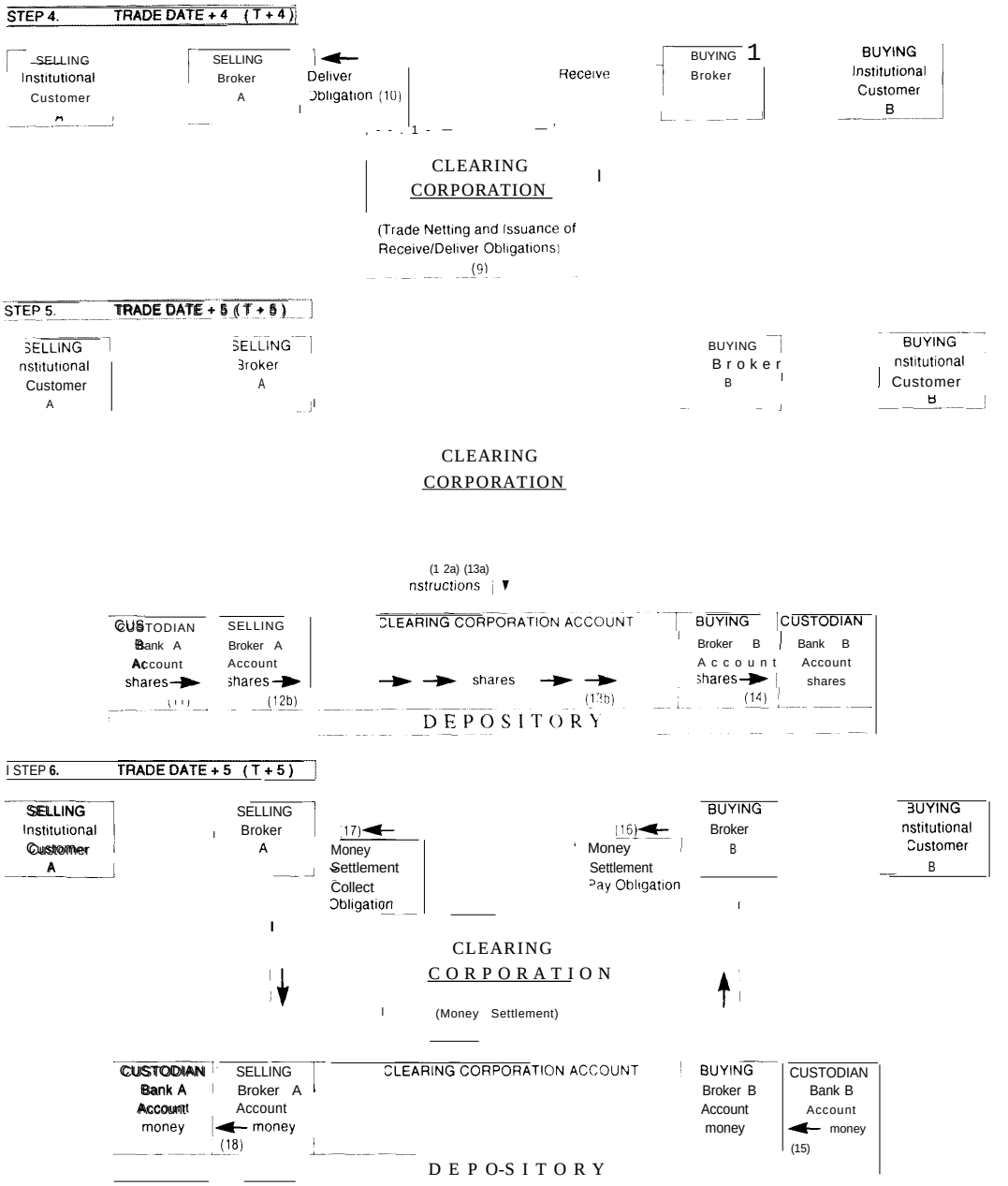
Figure A-2-Clearance and Settlement of Institutional Customer Trades



(1) Institutional Customers give orders to buy and sell stock to their respective Brokers.
(2) Brokers execute Institutional Customers orders in the Marketplaces.
(3) Brokers submit details of trades executed in the Marketplaces to the Clearing Corporation.
(4) Clearing Corporation generates reports back to the Brokers indicating the results of comparison.
(5) Brokers send ID confirmation to the Custodian Banks of their Customers.
(6) Brokers send ID confirmation to their respective Institutional Customers.
(7a) Selling Institutional Customer A sends ID affirmation to Custodian Bank A to deliver securities on settlement day (T+5) to its' Broker (A)
(7b) Selling Institutional Customer A sends ID affirmation to selling Broker A indacating that Custodian Bank A Will deliver the securities to it on settlement day
(8a) Buying Institutional Customer B sends ID affirmation to Custodian Bank B notifying to receive securities on settlement dav from its' Broker (B)
(8b) Buying Institutional Customer B sends ID affirmation to Broker B, Instructing it to deliver securities to its Custodian Bank (B) on settlement day

SOURCE: NSCC, 1990.

Figure A-2-Clearance and Settlement of Institutional Customer Trades-Continued



(9) Clearing Corporation nets the trades
(10) Clearing Corporation Issues projection reports Indicating net receive/delwer obligations to the buying and selling Brokers
(11) Custodian Bank A Instructs Depository to transfer shares from its account to selling Broker A's account
Depository debris Custodian Bank A's account and credits selling Broker A s account with the shares
(12a) Clearing Corporation instructs Depository to debit selling Broker A's account and credit it's account
(12b) Depository debris selling Broker A's account and credits Clearing Corporation s account with the shares
(13a) clearing Corporation instructs Depository to debit shares from its account and credit shares to buying Broker B S account.
(13b) **Depository debits clearing corporation's account with** the shares and credits buying Broker B's account
(14) Buying Broker B instructs Depository to transfer shares from its account to Custodian Bank B S account
Depository debits Broker B's account and credits Custodian Bank B's account with the shares.
(15) Custodian Bank B pays buying Broker B for shares received
(16) Moines from Custodian Bank B to Broker B are used by Broker B to meet its settlement obligation to the Clearing Corporation
(17) Clearing Corporation receives monies from Broker B and pays to Broker A
(18) Monies from Clearing Corporation to Broker A are used by Broker A to meet its payment obligation to Custodian Bank A

SOURCE: NSCC, 1990.

computer book-entry system, are also eligible for settlement through the Continuous Net Settlement (CNS) computer system. This includes the preponderance of trades settled through the NSCC. NSCC becomes the counterpart to each trade; it guarantees that the settlement obligations of the trade will be met—both the obligation to deliver securities and the obligation to make payment. For locked-in trades, NSCC'S guarantee takes effect at midnight on the day (T+l) that the counterparties to the trade have been notified that the trades matched.

Trades that do not match begin a reconciliation process that is being shortened and by the end of 1990 will occur on the day following the trade (T+l). Those that remain unmatched by T+3 are returned to their originating marketplace for face-to-face negotiation. With the increasing number of trades locked-in at the marketplaces, and with the availability of on-line reconciliation systems at these marketplaces, the need for this process is being eliminated.

Using the CNS system, the NSCC calculates each day a net long or short securities position for each CNS-eligible security that was traded by the clearing member on that day. The number of settlement transactions and the gross amount of the clearing member's obligation either to deliver securities or to make payment is adjusted by the amount of any securities or payments that it would receive as a result of other trades of the same security. This type of calculation process is known as netting. It reduces the total number of securities to be delivered or received, and the number and size of aggregate cash payments. As a result of this process of offsetting obligations, the NSCC estimates that movement of almost 90 percent of the total daily transactional volume of owed securities and cash payments otherwise required on the settlement date is eliminated. Netting may indirectly increase market liquidity by reducing the gross amount of finds necessary to meet settlement obligations. After netting through CNS, the NSCC then informs the DTC of the net amount that each counterpart owes in securities on the settlement date, T+5. The DTC, using its book entry system, records the transfer of ownership[5] by debiting the securities account of the delivering counterpart and crediting the account of the receiving counterparty.[6] Payment on the settlement date is in the form of a certified check, payable to the NSCC. When settlement cannot be made on the settlement date-e. g., when the securities are not available in the participant's DTC account-these obligations remain in the CNS system and are carried forward and netted with the next day's obligations.

Securities that are not eligible for the CNS system may be settled either through balance order accounting or on a trade-for-trade basis. These other forms of settlement comprise a very small percentage of trades settled through NSCC.

In 1989, the fail rate-the percentage of trades which do not settle on the settlement date—in trades cleared through CNS was 8.13 percent of the total net dollar value of cash and securities due on the settlement date. Since the NSCC takes the counterpart position and guarantees the settlement of all CNS-matched trades, NSCC is exposed to various credit, market, and non-market risks.[7]

NSCC protects against credit risk, first of all, by retaining a lien over securities for which the receiving participant has not paid. For trades not settled by T+5, NSCC uses a mark-to-market procedure to limit its market risk until settlement does occur. Market risk is kept to 1 day's market movement by adjusting members' settlement obligations to current market prices. Members pay or are paid at settlement based on the current value of their open positions (positions for which T+5 has past), rather than the value when they made the trade. In the interim, until the open position settles, members pay or receive the net difference in market price movement. NSCC'S guarantee fund for CNS takes account of potentially adverse movements on trades which have not settled before T+5. It is based on the total size of all positions open. These include those

[5]This description discusses inter-dealer (street-side) and institutional settlement only. Concerning depository functions, a broker can make settlement with his institutional customer throughDTC's ID program. A description of customer (retail) settlement is provided by the Securities and Exchange Commission in vol.II of the Bankers Trust report, op. cit., footnote 1.

[6]Stock held by DTC is in nominee name and appears on the books of the transfer agent of the issuing company. In a typical transaction, the transfer agent would not be involved in the change of ownership. The change in ownership between the parties to the transaction would occur solely on the books of DTC. If, however, a broker or his customer wishes to have the shares registered in his own name, he instructs DTC to send the appropriate quantities of stock, currently in street name, to the transfer agent, who would then send the reregistered shares directly to the broker.

[7]Credit risk refers t. the possibility that a participant @@t not pay for delivered securities. Market risk refers to the price changes of the security. Non-market risks include loss of data, human error, systems failure, or any breakdown caused by any factor other than credit or market factors.

pending (before settlement); trades settling on T+5; and trades for which T+5 has passed and settlement has not occurred. In addition, to mitigate the risk that a member may fail to pay for securities when they are delivered to his account, a percentage of their market value is included to the member's clearing fund requirement. In order to protect the NSCC, the required clearing fund amounts must be deposited with it. The calculation, which sets the total clearing fired requirement, is done daily for all members and can be collected more frequently than the monthly norm. All NSCC clearing members are required to contribute to the guarantee fired. NSCC's total finds on deposit, not including NSCC's own lines of credit, totaled over $400 million in 1989 and 1990.

The NSCC also maintains a full compliance-monitoring system to ensure its continuing ability to judge the creditworthiness of its participants.[8] It shares risk information with other SEC-registered clearinghouses, both through the SEC's Monitoring Coordination Group and the Securities Clearing Group. NSCC and a number of futures clearing-houses are now discussing proposals for increasing the sharing of risk information; e.g., data on market participants' holdings on various exchanges.

The NSCC is linked to its clearing members by means of the Securities Industry Automation Corp. (SIAC), which operates NSCC's technology base. Most participants now have direct computer links; only about 1 percent of the Ml-service members continue to report trades via computer tape.

All payments to NSCC are on a net basis; i.e., the NSCC calculates each clearing member's total credit and debit positions and nets to a single figure that is either owed to NSCC or is owed by NSCC. Payment to NSCC is by certified check. Funds are concentrated in one central clearing bank. If a certified check is not received on the settlement date, then payment via Fedwire is required the next morning. NSCC pays selling members with regular bank checks, but intends to move towards the increased use of electronic payments as one way to improve the settlement process.

The International Securities Clearing Corp.

ISCC is a subsidiary of the NSCC and is an SEC-registered clearinghouse. It was founded in 1985 to assist in clearing and settlement and for providing custody services for securities traded among American brokers and banks and their counterparties across national borders. It has links with clearinghouses and depositories in foreign markets,[9] including:

- the International Stock Exchange (ISE), in London;
- the Centrale de Livraison de Valeurs Mobilieres (CEDEL), in Luxembourg;
- 20 depositories and custodians in Europe and Asia, indirectly linked by means of a conduit provided by CEDEL;
- the Japan Securities Clearing Corp. (JSCC), the Tokyo Stock Exchange's clearing and custody organization;
- the Central Depository subsidiary of the Stock Exchange of Singapore; and
- the Canadian Depository for Securities (CDS), in Toronto, linked through NSCC.

ISCC also serves as the clearing system for the NASD's PORTAL market for foreign private placements exempt from SEC Rule 144A registration.

Futures Clearing Organizations[10]

The Board of Trade Clearing Corp.

The Chicago Board of Trade (CBOT), which handles the greatest volume of futures contracts trades in the United States, has its own separately incorporated clearinghouse, the Board of Trade Clearing Corp. (BOTCC). With approximately 139 clearing members, the BOTCC is by far the largest clearing organization serving the futures markets.

The Chicago Mercantile Exchange (CME) is the largest U.S. futures exchange when measured by another yardstick, the average total value of open futures and options on futures contracts. CME has a Clearinghouse Division. This system and other U.S.

[8]NSCC's STARS system monitors projected settlement exposures from the time trades are matched until they are ultimately settled. NSCC also employs a series of exception reporting mechanisms to detect security concentration, settlement pattern changes, and security price changes.

[9]The ISCC is also discussing the possibility of setting up other links with the Societe Interprofessionnelle pour la Compensation des Valeurs Mobilieres (SICOVAM), the French central depository, and with Societe des Bourses Francais, the broker clearing system at the Paris Bourse.

[10]Much of the information in this section is based on Roger D. Rutz, "Clearance, Payment, and Settlement Systems, in the Futures, Options, and Stock Markets," Feb. 24, 1989, a contributed paper in the Bankers Trust report, op. cit., footnote 1.

futures clearinghouses, are similar (although not identical) to that at the BOTCC.[11]

BOTCC has an on-line trade entry/trade capture system that allows it to receive over 75 percent of its trade information through on-line terminals (with the user keying in data). The remaining 25 percent of trade information is reported by means of computer-to-computer transmissions. In addition, members of the BOTCC that are also members of the CME may use the BOTCC's on-line trade entry/trade capture technology to send trade information to the CME, and CME members may similarly send trade submission data to BOTCC via the CME's on-line trade entry/trade capture technology. About 20 percent of the CME's trade information arrives at the CME clearinghouse through the BOTCC trade entry/trade capture technology.

Once a trade has been captured, BOTCC employs a two-sided matching system in which both the buy and sell sides of a trade are submitted to the trade comparison system for matching. This capability provides the benefits of comparisons on the day of the trade, and a match by broker and by counter-broker as well as a match within the clearinghouse. This is the standard for futures markets in the United States.[12]

BOTCC's guarantee to clearing members that the settlement obligations of the trade will be met begins at the moment a trade has been matched and registered. At that time, typically about 1 hour after the final trade submission, the clearinghouse becomes counterpart and guarantor to every trade.

In all U.S. futures markets, both buyer and seller make a good faith deposit to the clearing member firm; this is "original margin."[13] The amount required per contract is determined by the exchange, and is due from both parties to the trade on the morning of the day after the trade (T+l). Most clearing members maintain substantial excess original margin deposits in their clearing account at the BOTCC. The amount of margin a clearing member owes is calculated by the clearinghouse based on the value of his open contracts and an assessment of the amount of risk those contracts involve. The BOTCC uses its risk assessment computer system SAFE (Simulated Analysis of Financial Exposure) to evaluate clearing member firms' credit, and uses the CME's SPAN (Standard Portfolio Analysis of Risk) to determine the amount of margin owed.[14]

There are two methods of calculating original margin: gross margining and net margining. Gross margining requires a clearing member to post original margin on all the long and short positions in these accounts; they cannot be used to offset each other in case of a deficiency. By contrast, with net margining the margin owed by each clearing member is calculated on the difference between all the long and short positions, calculated separately for proprietary accounts and customer accounts. The BOTCC figures original margin on a net basis, as do most U.S. futures clearinghouses.[15]

The BOTCC's trade-matching process, from the time it guarantees settlement obligations to the posting of original margin by clearing members, may be 7 hours.[16] During this timelag, the BOTCC carries the full risk. Clearing members demand that trades become guaranteed as quickly as possible, since this is the point at which counterpart risk should be eliminated.

Besides original margin, futures clearinghouses also calculate and collect variation margin.[17] The amount reflects the changes in the value of a clearing member's open contracts. Variation margin may be collected daily, or more often. The BOTCC routinely issues one morning call and supplemental

[11] For details on the clearing and settlement processes at the other U.S. futures clearinghouses, see Bankers Trust report, Op. cit., footnote 1.

[12] The exception is the New York Mercantile Exchange (NYMEX), which uses a one-sided trade matching system, in which "sell" information is put into the system and the clearing member with the "buy" information must confirm the data at a later time.

[13] This original margin deposit is a performance bond to protect the financial integrity of the clearinghouse in the event that the clearing firm is unable to meet a margin call or to make or take delivery. Original margin refers to deposit of funds in the form of cash, government securities, or letters of credit. There are two levels of margin: the first is from the customer to the firm; the second is from the firm to the clearinghouse.

[14] The CME has its own risk management computer system—SPAN (Standard Portfolio Analysis of Risk)—for determining the amount of margin. The futures industry (with the exception of the Intermarket Clearing Corp. (ICC), which uses the system known as TIMS) is moving towards adopting SPAN as the standard for calculating margin.

[15] The exceptions are the CME Clearinghouse Division and NYMEX, which figure original margin on a gross basis.

[16] Payment of margin must be in same-day funds—e.g., those provided by the Federal Reserve's Fedwire electronic payment system.

[17] Variation margins are the cash flow required to mark positions to market. They flow through the clearing organization to the clearing member On the other side of the trade.

intra-day variation margin calls (usually around 2 p.m. c.s.t.).[18] The major purpose of routine intra-day variation margin calls (and payments to clearing members with profitable trades) is to remove same-day price risk while the banking system is open. It also reduces the magnitude of the following morning margin call, which is always made by the CME and BOTCC at 6:40 a.m. c.s.t. on the day following the trade date (T+l). As a result of this system, the BOTCC typically collects (and pays out) by about 2:30 p.m. c.s.t. on the date of the trade between 60 and 95 percent of the final settlement calls that would otherwise have been made at 6:40 a.m. c.s.t. on the following day. This reduces the clearinghouse's risk because the shorter the period of time between trade execution and settlement, the more certain it is that a clearing member will be able to meet its obligations. In general, the more frequently a clearinghouse settles (marks-to-market) trades each day, and requires its clearing members to post margin, the greater is the financial integrity of the clearing system.

Lines of Defense

In the futures markets, the maximum potential default liability represents at most only one business day's market movement. Along with monitoring clearing members' positions, this is the frost line of defense for the clearinghouse. The BOTCC segregates and nets proprietary and customer open positions of each clearing member across commodity futures and options contracts to calculate the amount of both the original and variation margin of each clearing member. The BOTCC's SAFE system calculates each clearing fro's potential exposure to an adverse move in prices.

Margin deposits are the second most important line of defense in protecting the clearinghouse from a default by a clearing firm which could affect other clearing members. The Commodity Futures Trading Commission (CFTC) requires that all clearing members maintain two bank accounts for settlement and two safekeeping accounts for original margin. One set of bank and safekeeping accounts is for original and variation margin for customer positions, while the other set is for original and variation margin for proprietary and non-customer (affiliated firm) positions.[19]

Another line of defense for the clearinghouse is its net capital requirements for clearing members. In addition, all U.S. futures clearinghouses share certain types of "risk information''-data on amounts paid and collected by clearing members in the form of both original and variation margin, reflecting their overall exposure, and amounts paid by clearinghouses to clearing members, representing reductions in the amount of risk faced by a clearing member.

Still another line of defense in protecting the clearinghouse from default by a clearing firm is its authority to issue a ''super' margin call if the clearinghouse determines that a customer or proprietary position represents a clear and immediate danger (i.e., a particular market condition could cause a substantial amount of a clearing fro's capital to be depleted because of customer defaults). The clearing member would then be required to deposit the additional super margin (in the form of cash, U.S. Treasury securities, or letters of credit) within 1 hour of receiving the call. Finally, the segregation of customer funds, clearing member net capital requirements, and ongoing financial surveillance, each contribute to bolstering the integrity of these markets.

If, despite margin calls, a clearing member nevertheless defaults on the settlement obligations of the trade, the clearinghouse has several protections against liability for the default. The clearinghouse may liquidate the clearing member's positions and original margin, sell his exchange membership, use his contributions to the clearinghouse guarantee fund, use the clearinghouse guarantee fired and its committed lines of credit, assess all clearing members, where permissible, and finally, use the clearinghouse's capital.

All U.S. futures clearinghouses have finds available to protect themselves against default by their members; these are primarily made up of mandatory

[18]The CME Clearinghouse Division, the COMEX Clearing Association, and the Coffee, Sugar and Cocoa Clearing Corp. also issue routine daily intra-day variation margin calls. The others have the capability of doing so on an as-needed basis; e.g., in times of severe market volatility.

[19]The segregation of customer and proprietary funds is a requirement of the Commodity Exchange Act, Section 4d(2).

contributions from clearing members .20 They fluctuate in size. Most U.S. futures clearinghouses, but not the BOTCC[21] and Kansas City Board of Trade Clearing Corp., also have the power to assess their members, if the amount of a clearing member default cannot be covered by capital finds and the guarantee fired.

The BOTCC uses four settlement banks, all based in Chicago. The BOTCC's morning payment process (6:40 a.m. c.s.t.) precedes the opening of the Fedwire system and hence requires the settlement bank to extend credit on behalf of some clearing members. At times, this credit extension may not be fully collateralized, and thus is a risk for those settlement banks.

Clearing members must maintain accounts at settlement banks for the payment of original and variation margin, including final settlement payment. When the clearinghouse determines the amount of margin owed, the clearinghouse notifies the clearing member's bank of this amount. The bank then examines the clearing member's assets (cash, government securities, lines of credit), gathers incoming payments from the clearing member (via Fedwire, if it is available at the time the bank is making the decision), and makes a commitment to the clearinghouse as to whether it will honor the margin call by forwarding the funds to the clearinghouse.

If the clearing member does not have sufficient assets to meet its margin obligations, the bank's decision is whether to extend credit to the clearing member. When a settlement bank decides that it cannot meet the financial obligations of a market participant, the participant will ask his credit banks for credit. This process generally works well, but it depends on two assumptions: first, that the market participant will be able to reach the account officers at the credit banks within the permitted time; and second, that the credit banks (which do not always coordinate a market participant's various lines of credit) will not extend more credit than a clearing member is worth. Generally, these assumptions are sound, as firms usually have a predetermined credit line. But, if a firm is having difficulty and the fro's needs come during a period of market stress, a settlement bank may decide not to honor a margin call. The clearinghouse would frost attempt to transfer the customer's positions to another clearing member.[22] **Any customer position** not transferred would be subject to liquidation.

Clearinghouses, in respect to intra-day margin payments batch process trades rather than processing each trade as it is executed. Thus, a clearinghouse may not be able to eliminate its risk instantaneously by shifting it to clearing members. One reason the clearinghouses are forced to do batch processing is that the banking system moves too slowly to accommodate any other method. For instance, Chicago banks generally use paper-based processes to move money among clearing members.

The working interface between the clearinghouses and the banks survived with difficulty under immense strain in October 1987.[23] In further improving this interface, there are cost-benefit tradeoffs. The existence of a Clearing Organization and Banking Roundtable that provides settlement bankers, clearing organizations, and regulators with a forum for regular discussion of these tradeoff issues, is some evidence that the system is moving towards a more secure, less volatile, but still competitive, state.

Options Clearing Organizations

The Options Clearing Corp.

OCC is the common entity serving all securities options exchanges in the United States[24] The OCC clears and settles options trades for the Chicago Board Options Exchange (CBOE); the American

[20]The BOTCC does not have a guarantee, or clearing fund, but does require clearing members to purchase its capital stock when they are admitted to membership, which is similar to a guarantee or clearing fund. The relative number of shares of stock that a BOTCC clearing member must purchase is adjusted semi-annually to reflect its open positions and trading volume. Other futures clearinghouses have guarantee funds based on capital, trading volume, or open positions. Rutz, op. cit., footnote 10, pp. 23-27.

[21]In mid-1989, the BOTCC estimated as $325 million the total value of its available trust fund lines of credit, and clearinghouse capital.

[22]For additional information, see Andrea M. Corcoran and Susan C. Ervin, "Maintenance of Market Strategies in Futures Broker Insolvencies: Futures Position Transfers From Troubled Firms," *Washington and Lee Law Review* 44:849, *1987,* pp. 849-915.

[23]There is disagreement among participants themselves as to whether these systems "survived with difficulty," "barely managed," or performed otherwise. Nevertheless, many improvements have been, and are, being implemented to strengthen the clearing and settlement process.

[24]The OCC clears all exchange-traded securities options. For details on clearing and settlement of options on futures contracts, see Bankers Trust report, op. cit., footnote 1.

Stock Exchange (AMEX); the Philadelphia Stock Exchange (PHLX); the New York Stock Exchange (NYSE); the Pacific Stock Exchange (PSE); and the National Association of Securities Dealers (NASD).

Unlike the clearinghouses already discussed, the OCC does not do trade comparison, since it receives locked-in data on compared trades from each of the exchanges. The exchanges have chosen to keep their own trade-matching systems as a means of competitive differentiation. The data on matched trades is sent to the OCC by computer on the day of the trade. The OCC then must calculate the amounts of money that are owed and due the next day (T+l) by the buyer and the seller. In the case of the buyer, the entire amount of money owed to the OCC is called the "premium obligation," or "premium," and is paid in cash. The premium, while paid to the OCC, is passed onto the writer of the option. To the buyer of the option, the premium is the amount he pays to lock in the possibility of an advantageous movement in the price of the underlying security. To the writer of the option, the premium is the maximum amount of profit he can expect. If the market moves against the writer, the premium might, at best, offset only a small portion of the option writer's losses.

Customer margin is set by the exchanges, subject to review by the SEC and regulation by the Federal Reserve Board (FRB). Clearinghouse margin is set by the OCC and is subject to review by the SEC and oversight by the FRB, as with customer margin.

The writer of the option always owes margin to the OCC, each day that the option contract is in effect but has not been exercised by the holder. This margin[25] to the margin owed by the buyer or seller of a futures contract, essentially "good faith" money which serves as an assurance to the OCC that the writer of the option has the financial ability to meet the potential obligations of the option that he has sold. The amount of margin owed reflects changes in the market price of the option as well as a portion of the total amount that he would have to pay if the option were exercised.

On the day after the trade (T+l), the OCC notifies the buyer of the amount of cash premium which is owed; at the same time, the writer of the option is notified by the OCC of the amount of margin that is owed. Both amounts are due on T+l. On the next day (T+2), and each day thereafter until expiration, exercise, or closeout[26] of the option contract, the OCC calculates and then collects margin from the option writer.

Margin on long option positions thus reflects the adjusted daily value of the option writer's open positions (the total amount of money which he could be forced to pay if the options he sold were to be exercised by the holders). The OCC marks-to-market (determines the adjusted value and liability of each member's open positions) at the end of each trading session. If the options contract loses value, the OCC reduces the amount of margin required. When the holder of an option contract decides to exercise it and actually buy or sell the underlying product of the option, the person who originally sold the option is not necessarily the same person that OCC will require to fulfill its terms. Instead, the OCC randomly assigns a clearing member to honor the delivery or purchase obligations of the option, from the pool of all clearing members who sold options with identical contract terms.

For example, when an IBM option is exercised, the OCC assigns a clearing member with a short position and then sends delivery instructions to an equities clearinghouse such as the NSCC, which incorporates instructions to deliver or receive into its Continuous Net Settlement (CNS) system. Any obligations not netted out through normal CNS procedures are settled by instructions to a depository (e.g., the DTC). Delivery of the IBM stock is then made by transferring it from the seller's account into the buyer's account at the depository, subject to the CNS system.[27]

When a foreign currency option is exercised, the foreign currency underlying the option contract is delivered to the OCC's cash account at a designated overseas bank, and then transferred to the account of the market participant who is buying the foreign

[25]For margin payments, the OCC accepts cash and collateral including: bank letters of credit, U.S. Treasury obligations, the actual equities underlying particular option contracts, and various other stocks. Additionally, margin obligations can be reduced through corresponding long positions in other options which have the effect of reducing net exposure.

[26]The "closeout" is when a writer or holder of an option contract enters into another option contract, creating an offsetting position.

[27]When NSCC incorporates delivery instructions into its CNS system, NSCC rather than OCC assumes responsibility for, and guarantees, deliveries and payments.

currency. The designated foreign exchange delivery bank may be any bank designated by the parties involved in the transaction, not necessarily one of the OCC's settlement banks.

The OCC provides its clearing members with a guarantee on the morning of the day following the trade (T+l), after the buyer of the option has paid the premium obligation.[28] The OCC guarantee protects the holder of an option against the possibility that the option writer might default on the payment or delivery obligations of the option.

Lines of Defense

The OCC's first line of defense against the potential for clearing member default is its continuing monitoring of the creditworthiness of its clearing members. The OCC, exchanges,[29] and the Securities and Exchange Commission (SEC), also monitor market participants in respect to capital adequacy and other financial requirements. The OCC is apart of the information-sharing arrangement among all seven SEC-registered clearing entities, as well as a participant in the pay-collect risk information system operated by BOTCC.[30] The OCC uses a monitoring system to quantify the potential risk of each clearing member under different market scenarios, including large price movements. The system evaluates the risk in participant's stock, options, and futures positions.

The OCC's second line of defense against clearing member default is the margin that the clearing members have on deposit. If this is insufficient to cover the default, the OCC can turn to its guarantee fund, made up of cash and government securities.[31] In the event of a default by a clearing member, after closing out the defaulting clearing member's positions, the OCC follows five steps to cover any residual liability from a default:

- First, any margin that the defaulting clearing member has on deposit with the OCC is applied towards the liability of the default.
- Second, if that amount is insufficient, the OCC takes the defaulting clearing member's contribution to the guarantee fund and applies it toward the liability of the default.
- Third, if that amount is still insufficient, the OCC may use its guarantee fired to cover whatever portion of the liability is outstanding.[32]
- Fourth, if that still isn't enough to cover the full liability, the OCC has the right to assess its members for the remaining amount of the liability.[33]
- Finally, the OCC, like the NSCC and futures clearing organizations, may also take legal action as a creditor to recover any sums that are owed by the defaulting clearing member. The amount that can be recovered in this way is limited by bankruptcy law.

At the end of each trading day, the OCC has an overnight processing cycle during which it calculates the net amount which each member either owes or is owed. The net figure reflects, among other things: a) the cash premium obligation due on each new long position; and b) the margin due for each new short position. The OCC then sends payment instructions to the settlement bank. The netting is done on a multilateral basis; i.e., the status of all of a clearing member's holdings in the options market is taken into consideration in arriving at the daily net payment obligation to the OCC.

The OCC has two different methods for calculating margin-one for options on equities and another for all other types of options (foreign currency, government securities, or stock indexes). In both cases, the margin required from the writer of an

[28]OCC has filed a rule change with the SEC, currently pending approval, which would provide OCC clearing members with an unconditional guarantee on the morning of T+1.

[29]The options exchanges have limits on the aggregate amount of open positions that any one market participant may carry at any one time. These are net limits—i.e., the market participant's short positions are offset by his long positions. The clearing members' positions are monitored daily by the exchanges in respect to these position limits.

[30]Robert Woldow, "Clearance and Settlement in the U.S. Securities Markets," February 1989, expert paper contributed to Bankers Trust report, op. cit., footnote 1,

[31]The total amount required in the guaranteed fund is recalculated monthly. As of December 1989, the guarantee, or clearing fund, plus a 100 percent minimal additional assessment for which OCC clearing members are unconditionally liable, was about $450 million. The amount of the fund varies in proportion to the amount of clearing members' liability. It is always equal to 7 percent of the average daily aggregate margin requirements of all clearing members in the previous month. Each clearing member must contribute an amount equal to his pro-rata share of outstanding contracts in the previous month.

[32]The OCC has recently amended its rules to include using its own retained earnings at the discretion of its Board of Directors.

[33]Not all U.S. clearinghouses, however, have these assessment powers. See Bankers Trust report, op. cit., footnote 1, vol. 1, p, 137.

option is equal to the current market price of the option, plus a cushion to cover the risk of a change in the current market price. But for all non-equity options, as well as all options and futures contracts cleared by the Intermarket Clearing Corp., the OCC uses the Theoretical Intermarket Margin System (TIMS). TIMS evaluates each clearing member's overall risk profile and then sets the total margin owed. The OCC was the first clearing organization in derivative markets to change from a fixed or flat rate of margining (per contract) to sophisticated computational methods. Rules have been submitted to the SEC to expand the use of TIMS to include setting the margin on equity options.

The CFTC and the SEC have approved applications from the OCC and the CME to allow cross-margining of stock index options, futures, and options on futures for proprietary trading accounts of clearing members. Cross-margining between the CME and OCC started in October 1989.[34] OCC also offers cross-margining through an agreement with its affiliate, the Intermarket Clearing Corp. (ICC). The ICC clears trades for the New York Futures Exchange, the Philadelphia Board of Trade, Amex Commodities Corp., and the Pacific Futures Exchange; therefore, OCC members can use their holdings on those exchanges to offset the status of their open positions at the OCC.

The extent to which OCC and ICC offer cross-margining is however limited. The CFTC, concerned about safety, market stability, and liquidity, has not approved expansion of cross-margining beyond proprietary accounts of market-makers.[35]

The OCC has approximately 190 clearing members. The clearing member brokerage firms transact business for their proprietary accounts, other brokers who are not clearing members, and institutional and retail customers. The link between OCC and its clearing members is automated: OCC requires that all members submit post-trade information through OCC's on-line Clearing Management and Control System (C/MACS).[36]

The OCC allows its members to choose from a selection of designated settlement banks. There are currently 16, but the OCC is flexible and may designate a member's primary banking institution (concentration bank) as an approved settlement bank. The OCC maintains accounts at each of these settlement banks, and instructs the banks on each trading day as to the debits and credits that are to be made to the OCC's accounts and those of the clearing members.

[34]See John Watt and James M. Kustusch, "Clearance and Settlement of Derivative Financial Instruments," April 1989; and John P. Behof, "Issue Summary: Inter-market Cross-Margins for Futures and Options," The Federal Reserve Bank of Chicago, May 1989. Both are expert papers included in the Bankers Trust report, op. cit., footnote 1.

[35]Based on interview by OTA staff with senior CFTC officials, October 1989.

[36]Hiatt and Kustusch, op. cit., footnote 34.

Acronyms and Glossary

Acronyms

ADP —Automatic Data Processing, Inc.
ADR —American Depository Receipt
AMEX —American Stock Exchange
BOTCC —Board of Trade Clearing Corp.
BSE —Boston Stock Exchange
CATS —Computer-Assisted Trading System (Toronto Stock Exchange)
CBOE -Chicago Board Options Exchange
CBOT —Chicago Board of Trade
CFTC —Commodity Futures Trading Commission (U.S.)
CME —Chicago Mercantile Exchange
CSE —Cincinnati Stock Exchange
DTC —Depository Trust Corp.
ERISA —Employee Retirement Income Security Act
FCM —Futures commission merchant
Forex —Foreign exchange
FRB —Federal Reserve Board
GAO -General Accounting Office (U. S.)
ICC —Intermarket Clearing Corp.
ITS —Interrnarket Trading System
LBO —Leveraged buyout
MOU —Memorandum of Understanding
MSE —Midwest Stock Exchange
NASAA —North American Securities Administrators Association
NASD —National Association of Securities Dealers
NASDAQ —National Association of Securities Dealers Automated Quotation System
NMS —National Market System
NSCC —National Securities Clearing Corporation
NYSE —New York Stock Exchange
OCC -Options Clearing Corp.
OTC -Over-the-counter
P/E —Price/earnings ratio
PHLX —Philadelphia Stock Exchange
PSE —Pacific Stock Exchange
RICO —Racketeer Influenced and Corrupt Organization Act
S&P500 —Standard & Poor 500 Stock Index
SEC —Securities and Exchange Commission (U. S.)
SIAC —Securities Industry Automation Corp.
SIPC —Securities Investor Protection Corp.
SRO —Self-Regulatory Organization
UMS —Universal message system

Glossary

Acquisition: One company taking over controlling interest in another company, often by paying more than the market price for the shares needed to acquire it.

Affirmative obligation: The duty of stock market specialists to maintain a fair and orderly market and assure liquidity or immediacy, by selling from their own inventories or buying for their own inventories when there are no other buyers/sellers at or near the market price. See Liquidity.

American Depository Receipts (ADRs): A receipt for shares of a foreign-based corporation, held by a U.S. bank; the receipts are listed and traded on U.S. stock exchanges in lieu of the shares.

Arbitrage: Profiting from fleeting differences in price in the same or related assets or instruments in two markets; e.g., buying gold in New York and selling gold at a higher price in Chicago, which tends to raise the New York price and lower the Chicago price. Index *arbitrage* is profiting in this way from temporary disparities between the average price of stocks represented in the Standard& Poor 500 Index and the price of the S&P 500 index futures contract.

Auction market: The system of trading on stock exchanges, in which prices are determined by competitive bidding between brokers (acting as agents for buyers and sellers) and with intermediation by a specialist when necessary; this is distinguished from the over-the-counter market, where prices are established by negotiation between customer and dealer. The exchange system is a "double auction" as opposed to a conventional auction with one auctioneer and many potential buyers. Futures markets are also double auction markets.

Audit trail: A record of transactions, identifying the participants, the terms of the trade, the time of the trade, and the firm responsible for clearing the trade. Audit trails are most useful for monitoring and surveillance when generated automatically, and in real time.

AURORA: An electronic trading system that was being developed by the Chicago Board of Trade for 24-hour, remote site trading; as of June 1990, there are plans to combine its development with that of GLOBEX, possibly to make AURORA an alternative user interface to GLOBEX.

Basket trade: The simultaneous sale, or purchase, of a diversified portfolio of stock such as the basket of stock represented in a stock index.

Bear market: A prolonged period of falling stock prices. See Bull market.

Best execution: Timely completion of a trade at the best price available in any market or from any dealer.

Bid: Indication of readiness to buy at a specified price. "The bid" is the highest price any potential buyer will pay at the moment. See Offer.

Big Board: Slang term for the New York Stock Exchange.

Block (or block trade): A large quantity of stock included in one trade; usually 10,000 shares or more.

Block positioner: A dealer (member of the exchange) who handles large block transactions "upstairs" (i.e., in the dealer's trading room, off the exchange floor) by finding buyers for sellers and vice-versa, usually themselves participating in the purchase or sale; the block positioner must be so registered with the exchange and must bring the negotiated transaction to the specialist on the floor for execution.

Bond: A security representing a loan by the buyer to the corporation or government issuing the bond; it may either pay interest, or it may be discounted in price from the value at maturity. Also called a debt security or a *freed-income security* (because traditionally, the interest rate was fixed, "although now it is sometimes variable).

Book (the): Record kept by a specialist of buy and sell limit orders in a given security. Once a notebook, now a computer file.

Broker: One who acts as an agent for a customer, usually charging a commission.

Bull market: A prolonged period of rising stock prices. See Bear market.

Bulletin Board (the): An electronic system operated by the National Association of Securities Dealers for displaying dealer quotations or expressions of interest in making markets in over-the-counter stock not listed on NASDAQ.

Buyout: Purchase of a company's stock (or a controlling percentage of it) in order to take over that company's operation, or its assets. *A leveraged buyout occurs* when the purchaser(s)often the management of the company—borrow the money to buy the shares, usually putting up the company's assets as collateral and intending to repay the loans with the company's revenues or by selling off some of its facilities or other assets.

Call, or **call option:** See Option.

Capital markets: Markets where debt and equity securities are bought and sold; includes primary placement and private placement of issues, as well as secondary markets (exchanges and over-the-counter trading).

Cash markets: Markets where a transaction can be completed and ownership transferred immediately, e.g., stock markets-as compared to futures markets, where contracts are to be satisfied at some later date. Cash markets are also called spot markets.

Churning: Excessive or injudicious trading that allows a broker controlling an account to earn commissions while disregarding the **best** interests of the customer.

Circuit breaker: A rule or procedure by which a market is closed down, or trading is halted, when price movement exceeds a specified limit. A circuit breaker is designed to prevent-or at least to slow down-a market crash.

Clearing and settlement: In securities markets: comparing the details of the transaction between buyer and seller (or their brokers) and exchange of securities for cash payment. In futures markets, satisfaction of the terms of the contract; both buyer and seller make a good faith deposit (initial margin) to a clearing house or clearing member firm.

Clearinghouse: An organization (or division) setup to handle the clearing and settlement of all transactions within a market or on an exchange. Its *clearing members* (usually large securities firms) deal directly with the clearinghouse but also act as intermediaries for other securities firms in clearing their trades.

Commercial paper: Short-term loans (maturities ranging from 2 to 270 days) made to banks, corporations, or other borrowers.

Commodity: Bulk goods such as grains, metals, and foodstuffs, for which the price is generally determined by competitive bids and offers; now includes standardized financial instruments.

Commodity Futures Trading Commission (CFTC): The U.S. agency responsible for regulating the trading of all futures contracts and options on futures contracts.

Common stock: Units of ownership of a corporation; owners typically are entitled to receive dividends on their holdings and to vote on the selection of corporate directors and on some other corporate decisions.

Continuous net settlement: A method sometimes used in securities clearing and settlement in which traders end each day with one "receive" or "deliver" position to be satisfied, rather than delivering or receiving stock and receiving or making payment separately for each transaction.

Covered option: A call option contract backed by ownership of the shares underlying the option; the option writer has the shares to deliver if the buyer of the option decides to exercise it. This contrasts with a naked option, for which the writer does not own the underlying shares. See *Option.*

Cross: A securities transaction in which the same broker acts for customers on both sides of the trade; illegal unless the broker first offers the securities publicly at a better price.

Cross-margining: A proposed form of margin netting (for options trading) in which the clearinghouse would recognize the hedging effects of positions in several markets, and accordingly reduce the margin required from participants with multiple positions.

Crossed orders: A situation in which the current bid is higher than the current offer, which may occur during

periods of extreme volatility.

Custodian: A bank or other financial institution that keeps stocks (or other assets) for individual or corporate customers, or for a mutual fund.

Dealer: A person or firm acting as principal in a securities transaction, trading for a proprietary account rather than on behalf of a customer. Dealers may make markets by buying and selling to customers.

Debt security: Tradable evidence of borrowing that must be repaid, stating the amount, a specific maturity date or dates, and usually a specific rate of interest (or discount+. g., a bond, bill, note, or commercial paper.

Delivery v. payment: A term used in clearing and settlement, meaning cash on delivery.

Derivative product: A contract (e.g., future, option) whose price depends on the price of the underlying asset (e.g., a commodity, a stock or an index of stocks).

Discount broker: A brokerage firm that executes orders to buy and sell but does not provide full services (e.g., advice, research), and charges commissions lower than those of a full service broker.

Downtick: Sale of a security at a price below that of the just preceding sale.

Dual trading: One firm or person acting as broker (agent) in some transactions and dealer (principal) in other transactions, on the same day in the same market.

Efficiency: The direct and rapid reflection in market price of all relevant information, including supply and demand. A desirable market characteristic.

Efficient market theory: Theory that market prices reflect the knowledge and expectations of all investors (there is no way to beat the market); theory that market prices should only reflect the knowledge and judgment of all investors, and should be 'distorted" as little as possible by transaction costs, including regulatory costs and taxes.

Employee Retirement Income Security Act, 1974 (ERISA): Law governing operation of corporate pension plans, and setting up the Pension Benefit Guaranty Corporation; partly responsible for the growth of the largest category of institutional investors—corporate pension funds.

Equity: Stock; the ownership interest possessed by shareholders in a corporation.

Eurobond: Bond denominated in one currency (e.g., U.S. dollars) and sold to investors outside that country; usually issued by large underwriting consortia composed of financial institutions from many countries.

Eurodollars: U.S. currency held in banks outside the United States, commonly used for settling international transactions; some securities are issued in Eurodollars (interest is paid in dollars deposited in foreign bank accounts).

Exchange: An organized market with transactions concentrated in a physical facility (a "floor"), with participants entering two-sided quotations (bids and offers) on a continuing basis. Compare: over-the-counter market.

Exchange Stock Portfolio (ESP): Anew product offered by the New York Stock Exchange, representing a diversified basket of stock but settled in cash rather than delivery of stocks.

Exclusivity clause: The clause in the Commodity Futures Trading Act [7 U.S.C. 2a(ii)] that gives the Commodity Futures Trading Commission exclusive jurisdiction over contracts of sale "for future delivery. "

Fairness: The qualities in a market of: 1) offering equal treatment to investors (orders filled in order by price-i. e., highest bid, lowest offer-and by time received); and 2) absence of fraud, manipulation, and customer abuse.

Fiduciary responsibility: The legal obligations of a person, corporation, or association investing for or holding assets in trust for another person or institution.

Financial future (contract): A future contract based on a financial instrument such as a Treasury bill, foreign currency, certificate of deposit, or index of stocks. (There are no futures on individual stocks.)

Financial institution: A company that collects finds from the public and places them in financial assets—includes banks, credit unions, insurance companies, pension plans, etc.

Fixed-income security: See Bond.

Floor broker: An employee of an exchange member firm, who acts as an agent for clients by executing orders on the floor of the exchange (or in the pit, in a futures exchange).

Floor trader: Member of a stock or commodity/futures exchange who trades on the floor for his or her own account. In commodity/futures exchanges, a floor trader is also called a "local."

Foreign exchange (forex): Instruments used in making payments between countries; includes currency, notes, checks, bills of exchange, and electronic transfer records.

Forward contract: Purchase or sale of a specific commodity or other asset at the current (spot) price but for delivery and settlement at a specified later date.

Fourth market: The direct trading of blocks of securities between institutional investors (often through proprietary electronic trading systems) without intermediation by brokers or dealers. See Third market.

Frontrunning: An abusive practice in which a broker with advance knowledge of a block transaction and holding a customer order trades for himself ahead of the customer, to take advantage of possible price changes as a result of the execution of the customer trade.

Futures commission merchant: A firm that buys or sells futures contracts and accepts payment from or extends credit to those whose orders it accepts.

Futures contract: A contractual agreement to buy or sell a specific amount of a commodity or financial instrument at a specified price for later delivery.

Gapping market: The price movement of a stock or commodity when one day's trading range does not overlap the previous day's, causing a gap in which no trade has occurred. This can also happen during a precipitous intraday price decline; price jumps maybe so large that some limit orders do not get executed.

G1ass-Steagall Act (1933): Law prohibiting commercial banks from owning brokerage firms and engaging in most underwriting activity; designed to insulate bank depositors from market risks.

GLOBEX: An electronic trading system being developed by the Chicago Mercantile Exchange and Reuters (now with participation by the Chicago Board of Trade) for 24-hour remote-site futures trading.

Hedge: To offset or balance investment risk by another investment or a transaction in another market. For example, one can hedge one's investment in 100 shares of stock X ($100 per share) by buying a put option giving one the right to sell those shares at $100 per share over the next 3 months.

Immediacy: Sufficient liquidity in a market to allow trades to be made immediately at a market price-e. g., a balance of potential buyers and sellers.

Index: A statistical construct used to measure market behavior. A popular index is the Standard& Poor 500 (S&P 500), which is the weighted average of the prices of 500 frequently traded New York Stock Exchange stocks.

Index arbitrage: Trading in order to profit by temporary differences between the value of stocks in an index and the price of the derivative index future contract.

Index future or stock-index future: A futures contract that covers the price of a diversified stock portfolio matching a designated stock index. See Index. The index future is settled in cash, not in delivery of stocks.

Index option or stock-index option: An option that covers the price of a diversified stock portfolio matching a designated stock-index. See Index.

Indexed fund: An institutional investment portfolio that matches that of an index such as the S&P 500. See Index. Many pension funds are indexed.

Information services vendors: See Vendors.

Insider trading: Illegal trading by a corporate officer or retainer (e.g., counsel) to take advantage of privileged information about impending events that will affect market price.

Instinct: A proprietary electronic system (Reuters) for "fourth market" trading. See Fourth market. Instinct is handling about 13 million trades daily in 1990.

Institutional investor: An organization such as a pension plan, a mutual fund, an insurance company, or a union, that holds and trades large numbers of securities on behalf of members.

Intermarket Trading System: A video-computer system that links specialists' posts at the New York American, and regional stock exchanges; a broker at one exchange can send an order on to another exchange with a better price.

Junk bond: A debt security of less than investment grade rating, paying a high rate of interest; often issued in the course of leveraged buyouts.

"Lean against the market": The action of a specialist carrying out his affirmative obligation by buying for his own inventory in an attempt to stop or slow a sharp market decline.

Leverage: Increasing return or value without increasing investment; e.g., buying stocks on margin uses borrowed money for leverage, buying a stock-index future rather than a portfolio of stock gives greater leverage because futures margins are lower than stock margins.

Leveraged buyout: See Buyout.

Limit order: An order (to buy or sell at a specified price) placed on a specialist's book, to be executed when and if the market price reaches that price, or limit.

Liquidity: The capability of a securities market to handle a large transaction without moving the price; usually requires the availability of many potential buyers or sellers.

Listed security: One that meets exchange criteria and has been accepted for trading by an exchange.

Local: A floor trader in the futures pits, who trades as a principal or speculator.

Locked orders or locked market: The situation where bids and offers are identical. See Crossed orders.

Locked-in trades: Trades that have been matched (usually by computer, at an exchange) before reaching a clearinghouse for settlement.

Long position: Ownership of securities or instruments, contrasted with a short position. See Short.

Making a market: Maintaining firm bid and offer prices for a security and standing ready to buy and sell the security at those prices. In a U.S. stock exchange, only the specialist acts as *market-maker for* a given security, but in the over-the-counter market there may be competing market-makers for a security.

Margin: In securities markets, the deposit a customer makes with a broker in buying securities (the broker extends credit for the rest of the price). In futures markets, a good-faith deposit or performance bond, placed with a futures commission merchant by a customer, or with a futures clearinghouse by its members, to ensure that the depositor will meet financial obligations.

Mark to market: Adjust the valuation of a futures position **to** reflect current market prices, in order to

adjust margin accounts; the gain or loss in each market participant's position as a result of trading is calculated daily or several times a day depending on market volatility.

Market-maker: See Making a Market.

Multiple-trading (of options): The trading of the same option by more than one exchange; the SEC has ruled that by 1992 all options can be multiple traded.

Mutual fund: A fund, operated by an investment company, that raises money by selling shares to the public and invests that money in stocks, bonds, commodities, or other securities or financial instruments.

Naked option: An option for which the writer (seller) does not hold the underlying security. Naked options involve large risks and large potential profits. See Covered option.

National Association of Securities Dealers (NASD): The Self-Regulatory Organization of over-the-counter securities dealers, and the operator of *NASDAQ, their* automated quotation display system.

National Market System: 1) The objective of the 1975 Securities Exchange Act Amendments-an integrated nation-wide system for competitively trading securities. 2) A category of actively traded over-the-counter stocks on NASDAQ.

National Securities Clearing Corporation (NSCC): The clearing organization for almost all U.S. stocks, formed in 1977.

Odd lot: Less than 100 shares (a round lot). Odd lot transactions can be executed through most retail brokers; the specialist assembles these into round lot trades. The investor pays a higher commission.

Offer: Indication of readiness to sell at a specified price. ''The offer" is the lowest price that any potential seller is prepared to accept at the moment. See Bid.

Off-board trade: A trade of exchange-listed stocks that occurs away from the exchange, in the third or fourth market.

Off-setting: 1) Liquidating a purchase of futures contracts through the sale of an equal number of futures contracts of the same delivery month, thus closing out a position. 2) Hedging by balancing one transaction with another-e. g., a short sale of stock.

Open outcry: The method of trading on futures exchanges: public double auction in the pits, accomplished by shouting bids and offers.

Opening: 1) The price at which a security, commodity, or futures contract begins the trading day. 2) The period at the beginning of the securities trading day when the opening price is determined by the specialist after inspecting opening bids and offers.

Option: A unilateral contract conferring the right to buy (a *call option)* or the right to sell *{a put option)* a stock commodity, or financial instrument at a predetermined price within a specified time period.

Option writer: A person or firm that sells options, thereby earning a *premium* paid by the buyer.

Out-of-the-money: Having no intrinsic value at the moment; for example, a call option to buy Stock X at $30 a share when Stock X is selling at $25 a share is out-of-the-money by $5.

Over-the-counter: A market in which securities transactions are negotiated and executed through competing dealers, operating by telephone and computer networks, rather than on an exchange.

Penny stock: Historically, stock that sold for $1 a share or less, now generally applied to stock that costs $5 or under. Most penny stocks are sold over-the-counter.

Pink Sheets: Daily publication of the National Quotation Bureau that lists bid and asked prices for over-the-counter stocks not listed on NASDAQ, with market-makers for each stock

Pit: The tiered trading floor of commodities exchanges, on which futures contracts are traded by open outcry.

Portfolio: The combined holdings of an investor, including stocks, bonds, commodities, and other tradable assets and instruments.

Portfolio insurance: A trading strategy aimed at substantially reducing the market risk of a portfolio, especially a strategy that uses stock-index futures to hedge a stock portfolio. Popular computer models or programs used for directing portfolio insurance strategies, which called for selling stock-index futures in a declining market or buying them in a rising market, were widely blamed for contributing to the 1987 market crash.

Premium: 1) The amount that the buyer of an option pays the seller, or writer, of the option. 2) A better price, as in ''The future on Currency X is at a premium to the spot price. "

Price **discovery:** Determination of the price by competitive bidding; this process is assumed to "discover" or reveal the real value of an asset or instrument by integrating the knowledge and expectations of all potential investors.

Price/earnings ratio: The price of a stock divided by its earnings per share; indicating how much earnings growth can be expected; low P/E stocks tend to be low-growth, mature industries with stable earnings.

Price priority: The rule whereby market orders with the highest bid, or the lowest offer, are filled first, ahead of lower bids and higher offers even if those orders are larger or arrived earlier.

Primary market: The market for newly issued stocks, in which proceeds of the sale go to the issuer. *Compare* Secondary market.

Private placement: Sale of securities directly to an institutional investor, not offered to the public and not intended for resale; privately placed issues do not have to be registered with the SEC.

Program trading: The simultaneous or synchronized purchase or sale of a large number of stocks, possibly

several hundred, often but not always involving related sale or purchase of stock-index futures. Program trading usually is computer-assisted but can be done manually.

Put or put option: See Option.

Quotation: The highest bid and lowest offer currently available on a round lot transaction (100 shares) or a stated larger quantity.

Racketeer Influenced and Corrupt Organization Act (RICO): Law under which some alleged perpetrators of fraud in securities and futures markets have been indicted.

Regulation T: The Federal Reserve Board regulation covering credit extended to customers by securities brokers and dealers, and establishing initial margin requirements for stock transactions.

Round lot: The generally accepted unit of trading in securities markets: 100 shares of stock or $1,000 or $5,000 par value for bonds. See Odd lot.

Rule 10a-1: SEC rule prohibiting short sale of securities below the price of the last regular trade, and at that trade unless it was higher than the preceding price. The Short Sale Rule, also called Uptick Rule.

Rule 15c-2-6: SEC rule requiring penny stockbrokers to give certain explanations to customers and to record customer affirmations that these explanations have been given. See Penny stock.

Rule 15c-2-10: SEC proposed rule requiring sponsors of electronic proprietary trading systems to file financial and operational plans with the SEC.

Rule 19c-3: SEC rule permitting securities listed on an exchange after April 26, 1979, to be traded 'upstairs,' or off-floor, by member firms; an exception to Rule 390.

Rule 19c-5: SEC rule allowing any option to be traded on all five equity-options exchanges, beginning in 1992.

Rule 144a: SEC rule allowing unregistered securities to be traded by institutions in the fourth market.

Rule 390: NYSE rule forbidding exchange members to make markets in exchange-listed stock in over-the-counter markets (i.e., in competition with NYSE specialists).

Seat: Membership on an exchange; may be bought and sold.

Secondary market: Exchanges and over-the-counter markets where securities are resold and bought after their issuance and primary placement.

Securities Acts Amendments of 1975: Amendments of the 1934 Securities Exchange Act and related legislation, directing the SEC to work with the securities industry to establish a National Market System, and setting out public policy objectives related to U.S. securities markets.

Securities and Exchange Commission (SEC): The U.S. agency responsible for regulating the trading of equity securities and options.

Security: An instrument that represents 1) a share of ownership in a corporation stock 2) a loan to a corporation, government, or governmental body-a bond; or 3) conditional rights to ownership-e. g., an option.

Self-Regulatory Organizations (SRO): Industry organizations or associations responsible for enforcement of fair and efficient practices in markets. SROs, including exchanges and dealer associations, make and enforce rules binding on their members.

Sell short: To sell a security that one does not own, anticipating that one can subsequently buy the security at a lower price for delivery. *Selling short against the box is* to sell stock owned but kept in safekeeping with ownership not disclosed, usually so that the short seller could defer a long-term capital gain into another tax year.

Settlement: Completion of a transaction, by delivery of securities to the buyer and payment to the seller or (for futures and options) carrying out the terms of the contract or off-setting it.

Share: The unit of equity ownership in a corporation, represented by one stock certificate.

Short, or short position: Shares that a trader owes, i.e., has sold without owning, expecting to buy them later at a lower price.

Side-by-side trading: The trading, on the same exchange floor, of a stock and the option on that stock.

Single price auction: A procedure in which all orders are queued according to the bid or offer and an "auctioneer' (probably a computer) determines the price that will come closest to clearing the market. Orders with bids/offers as good as or better than that price will be executed.

Soft dollars: Rebates on brokerage commissions, sometimes made to large institutional customers, in the form of free research, computer services, etc., rather than in cash.

Specialist: Stock exchange member who is the designated and sole market-maker for a stock on one exchange. The specialist executes limit orders, brought to him by other exchange members on behalf of customers, and buys for or sells from his own inventory when necessary to counter order imbalances, provide liquidity, and prevent wide swings in stock prices.

Speculator: A person who trades in futures pits for his or her own account, in order to profit by successfully anticipating price movements, thereby assuming risks that hedgers wish to hand off.

Spot markets: See Cash markets.

Spread: The difference between the bid and offer price for securities. The spread narrows or widens according to supply and demand, i.e., competition between dealers or among potential buyers and sellers narrows the spread.

Stock: Ownership of a corporation; a claim on a corporation's earnings and assets; issued by a corporation to raise capital.

Stock index: See Index.

Stock-index future: See Index future.

Stop order or a stop-loss order: An order to buy or sell at the market price once the security has traded at a specified price called the stop price. A stop order to sell (at a price below the current price) is designed to protect a profit, or to limit the loss on a stock bought at a higher price. A stop order to buy (at a price above the current price) is designed to protect a profit or to limit a loss on a short sale.

Strike **price: The** designated price for exercise of an option.

Takeover: A change in the control of a corporation by buying up shares. A *hostile takeover aims* at replacing the existing managers.

Third market: The trading of exchange-listed securities in the over-the-counter market. Exchange-member firms cannot participate in the third market as market-makers because of Rule 390.

Ticker tape: Device that displays price and volume for stock transactions, as they occur, to investors around the world. Once a printed paper tape, it is now a running display on computer screens. A consolidated tape covers trades on the New York American, and regional stock exchanges.

Time priority: In stock exchanges, a rule that orders with identical bids (or offers) are filled in the order at which they reach the specialist's post.

Trade reconstruction: On futures exchanges there are no automatically generated records of the time/price/principals in a trade (i.e., no audit trail). Exchanges are required to be able to 'reconstruct such a record from available data, assigning a time accurate within 15 minutes of the actual trade.

Triple witching hour: The last trading hour of the quarter, i.e., on the third Friday of March, June, September, and December, when options and futures on stock indexes expire, causing a high volume of trading (and often high price volatility) of the options, futures, and underlying stock.

Two-dollar broker: On stock exchanges, a floor broker who executes trades for other brokers, too busy to do it themselves, for a fee (once $2 per round lot).

Underwriting: Buying an issue of stock from the issuing corporation (or governmental entity) and reselling it to the public. Underwriting is an activity of investment bankers, but is now often done by a consortium of them.

Universal message switch: A hypothetical, or proposed, system that would automatically route customer orders from a broker's office to the exchange or dealer with the best quotation at that moment, in order to achieve maximum competition among markets and dealers.

Upstairs trade: A transaction completed within a broker-dealer's firm (in an exchange member's upstairs trading room rather than on the floor), without using the exchange. Such trades must occur at prices no less favorable to the customer than that prevailing in the public market.

Vendor: One who supplies commercial goods or services; in this report, companies that supply market data (trades, prices, volume, quotes); information services vendors, such as Reuters.

Volatility: Rapid declines or rises in price, especially if the changes reverse directions several times in a short period, or if the price changes are unanticipated or are seemingly without full explanation.

Wash sales: A fictitious trade, made without taking a position; giving a false impression that purchases and sales have been made.

Wire house: An old term for a brokerage or futures commission merchant, connected to its branch offices by telephone, telegraph, or cable.

Index

Index

ADP, Inc. 133, 135, 137, 139
American Stock Exchange (AMEX). 7,10,11,13,41,45, 47,49,50,51,52,60,64, 65,93,94,95,96,97,99, 100, 130, 181, 190
Arbitrage. See Index Arbitrage.
Arbitration. 153, 156
Audit trails. 3, 12, 14, 15,62,73-74,75, 89,96, 134
AURORA. 88, 145
Auto-quote device. 17,99
Banks. 4, 10, 18, 26, 27, 28, 35, 44, 102, 103, 108, 111-117, 112, 119-125, 129, 131, 134, 151, 152, 157, 158, 168, 176, 181, 187, 190, 192, 193
Basket trades. 4, 8,55,57,60,78, 80, 85, 160
Block trades. 4,6,8,9, 19,27,46,49,50,51,53, 55,56, 60,62,72,74.152, 154, 160
Board of Trade Clearing Corporation. 108,114,187,188, 189, 190
Bond markets. 6, 13,25, 26, 30, 32,42, 62, 69,70,77, 107, 116, 133, 159, 170, 175, 178
Boston Stock Exchange (BSE). 41,49
Brady Commission. See President's Task Force on Market Mechanisms.
Brady, Nicholas. 86, 115, 122, 173
Breeden, Richard. 115, 122, 172
Bridge Brokerage Systems. 134, 137
Brokers. 3,7,11,14,15,19,28,32, 34-37,41,42,44,45, 46,47-48,49,50,51,52, 53,57,60,62,65,74,76, 78,94,95,97,98,99,109, 115-119,121,124,129, 131, 134-142, 150, 152, 153, 154, 155, 156, 157, 158,159,160,161,162, 181,187,188,193
Bulletin boards (electronic). 45-46, 138, 154

Capital formation. 6,20,26,42,71, 169, 172, 175, 177
Chicago Board of Trade (CBOT). 14,69,70,74,78, 84, 88, 137, 138, 145, 171, 187
Chicago Board Options Exchange (CBOE). 13, 63, 65, 93,94,96,97,99, 100, 101, 136, 138, 162, 190
Chicago Mercantile Exchange (CME). 14,58,70,73,74, 75,77,78,80,81,84,88, 94,99,101,102,103,111, 116, 137, 138, 145, 161, 162, 163, 170, 171, 172, 187, 188, 189, 193
Cincinnati Stock Exchange (CSE). 12,13,50,62,65,130, 136
Circuit breakers. 57-58, 174-175, 176
Clearing and settlement. 12,17,18,22,44,60,61, 62,70, 73,84-85, 86, 88-89, 107-125, 131, 140, 167, 168, 172, 173, 174, 176, 181-193
Commodities Exchange Act of 1936.75, 167, 168, 169, 170, 172, 175
Commodities markets. 13, 19,69, 70, 71, 93, 102, 159, 162, 169
Commodity Futures Trading Commission (CFTC) 4, 13, 15,16,17,20,21,22,71, 72,73,74,75,76,77,78, 80,83, 84, 85,86,87,93,94, 101, 102, 104, 109, 112, 115, 149, 158, 159, 160, 161, 162, 163, 167-178, 189, 193
Commodity Futures Trading Commission Act of 1974. 71, 169, 170
Continuous net settlement. 130, 132, 186, 191
Courts and litigation. 20,21,149,150,159,167, 170,171, 172, 177
Crashes (market):
  Crash of October 1987.8,9-10, 15,17,21,27,31,32, 41, 47, 53, 54-61, 80, 81, 82, 84, 85, 86, 87, 94, 96-97,101, 111, 112,114,115,153,169, 171,173, 174
  Crash, threatened in October 1989.15,47,81,94,169, 172
Custodians. 108, 125, 187

Depositories. 44, 107, 108, 118, 120, 124, 125, 131, 181, 187, 191
Depository Trust Co. 44, 181, 191
Digitilization of data.
Discount brokers. 37
Dow Jones. 54,58, 133, 134, 135
Dual trading. 14, 15,72,73, 74-75, 84,95, 160

Enforcement. 20,22,71,75, 149-163, 168, 176, 177
Exchanges, operation of:
  Futures exchanges, operation of: 13-16, 69-89, 136, 137, 145, 159-163, 170, 172, 173
  Options exchanges, operation of: 16-17,137,145,152, 153
  Stock exchanges, operation of: 4,5,8-9,10-13,28,41, 4245,47,48,49-53,58-60, 61-64, 149-159, 168, 169, 170, 171, 172
Exchange Stock Portfolio (ESP): 60
Exclusivity Clause: 21, 171

Federal Bureau of Investigations. 15, 75, 159, 160, 162, 163
Fedwire. 108, 111, 112, 114, 123, 131, 145
Financial futures markets. 13, 14,21,22,70,71,72,75, 87,88, 175
Floor brokers. 15, 32,27,42,48,49,63,69, 72,73,74, 75,78,95,98,99, 130
Floor traders. 44, 69, 72,74, 75, 76, 78, 154, 157, 159, 160, 161, 162
Fourth market. 8, 11, 12,52,57,64
Fraud. 4,15,19,20,28,47,73, 75,140,149-163,168,169 See *also:* Frontrunning, Insider trading, Penny stock
Frontrunning: 74,97, 152, 160, 163
Futures Commission Merchants (FCMS): 32,70,74, 103, 176
Futures markets: 3,4,5,6,8,10,11,13-16, 17,19,20-22, 32,54,55-57,58,61,64, 69-89,93,94,95,99,101, 102, 103, 104,107, 108, 109, 110, 111, 112, 113,

114, 115, 117, 121, 122, 136, 187-190
Futures Trading Act of 1982.169, 170

General Accounting Office (GAO). 134-135, 151, 161
GLOBEX. 14,65,88-89, 136, 138, 145
Gramm, Wendy. 173, 177
Greenspan, Alan. 83,122, 172, 173
Group of Thirty. 17, 117, 118, 119, 120, 124

Hedging. 4,6,8,10,14,15,16,17, 20,21,27,55-57,70, 72,76,77,78-80,94,97, 101, 102, 103, 167, 169, 172, 175

Index. 27,55-56,70,77,78,79-80, 82,93,94,95,96,97, 99, 102, 167, 170 See ***also:*** Index arbitrage, Index futures, Index options, Indexed portfolios.
Index arbitrage. 14, 15,55,56,58,64, 78-84, 100, 101, 129, 174
Index future (or stock-index future). 4,8, 13, 14, 15, 16, 20,21,54-57,58,61,64, 69,70,72,75,76-84,85, 86,87, 88,93,94,95, %, 99, 152, 159, 160, 169, 170, 171, 172, 173, 174, 175, 176, 177
Index options: 4,8,16,55,64,77,78,79, 80,87,94,95, 96,97,99, 102, 152,167,168, 169, 170,171,172, 173, 175, 177, 178
Index Participations (IPs): 171
Indexed portfolios. 30,55
Individual investors. 4,7,11,12,15,19,20,28-29, 33-34, 42,44,46,49, 61,78, 83, 94, 104, 152, 153-159, 160, 171 See ***also:*** Small investors
Information sharing. 18, 103, 114, 117, 120, 121, 122, 123, 125, 150, 154, 158, 159, 176
Information services vendors. 11, 12, 19,64,65, 100
Information technology. 3,4, 11, 12, 18, 19, 25-26,41, 45,46,47,49,50,51,52, 53,57,60,61-65,72,73, 74,78,80,84,88-89,96, 97,98,99, 100,129-146, 149, 154, 162, 167
Insider trading. 130, 149, 150, 152, 168, 174
Instinct. 12, 19,52,57,64, 136
Institutional investors. 3,4,6,7, 8,9, 10, 11, 12, 14, 15, 19,20,21,30,32,34-35, 42,46,49,50,52,55,57, 62, 64, 76-77, 78, 80, 81, 93, 94, 111, 118, 140, 159-163, 171
Insurance companies. 6,28,32,42
Intermarket Surveillance Group. 150, 163
Intermarket Trading System. 11,48,52-53,61,98, 130, 136
International securities and futures trading. 5,9, 14, 17, 18, 19,20,22,64-65,76,88-89, 155-163, 187
International Stock Exchange (London). 12,52,130,187

Jurisdictional issues. 20-21,72,76, 83,84-88, 104, 167, 168, 169, 174, 175-176, 177, 178

Knight-Ridder. 133, 135, 139

Leveraged buyouts. 26,30

Margin. 101,102,103,104,109, 111,113,114,116,117, 119, 121, 122, 131, 134, 138, 140, 181
  Futures margin, issues. 16, 18,20,21,22,57,69,76, 84-88, 111, 113, 114, 116, 117, 119, 122, 169, 172-174, 175, 176, 187, 188, 189, 190
  Options margin, issues. 17, 101-104, 121, 122, 191, 192, 193
  Securities, margin issues. 57, 60, 101-104, 113, 114, 115, 117, 119, 120, 121, 122, 153, 168, 186, 187
Market-makers, definition and functions: 8,9,10,11,12, 17, 18, 25, 41-42, 45, 47-48, 51-52, 53, 54, 57, 58-61,62
  In futures markets. 72,73
  In options markets. 16,95-96,97,98,99, 100
  In over-the-counter securities markets. 8,10,45,4647, 49,51,52,53,60-61,62, 172
  On securities exchanges. 8-9,172 See *also* Specialists.
Midwest Stock Exchange. 41,49,51,52, 130
Multiple trading of options. 16-17,97-100
Mutual funds. 4,6,28,32-33,36,42

NASDAQ. 10,42,44,4547,49,50, 52,53,60-61,64,95, 129, 130, 138
National Futures Association. 159
National Market System. 3,10-11, 12, 19,47-49,51,53, 64,97,98,99, 144
National Securities Clearing Corp. (NSCC). 120, 121, 181, 182, 186, 187
New York Futures Exchange. 78, 170
New York Stock Exchange (NYSE). 6,7,8,9,10,11,12, 13,19,20,33,35,41,42, 44,45,46,47,48,49,50, 51,52,53,54,55,56,57, 58,59-60,61,63,64-65, 116, 120, 129, 130, 132, 136, 142, 152, 156, 163, 168, 170, 174
North American Securities Administrators Association. 153

Options Clearing Corp. (OCC). 17, 94, 100, 101, 102, 103, 104, 111, 114, 121, 132, 190-193
Options markets. 4,6,16-17,27,55,58,63, 64,77,78, 79,80,81,82,84,87,88, 107, 108, 109, 111, 113, 114, 115, 117, 137, 152, 153, 167, 169, 172, 173, 175, 177-178
Outside Portfolio Managers. 37
Over-the-counter markets (OTC). 3,4,5,7, 8,9, 10, 11, 12, 13, 14, 18,19,4142,44,4547,48, 49,50,51, 52,53,54,60-61,62,64, 110, 133, 154, 168, 172, 181

Pacific Stock Exchange. 41,95,96, 130
Penny stock. 19, 153-159
Pension funds. 4,6,28,30,32,34,42,55, 80, 85-86
Philadelphia Board of Trade. 170

Philadelphia Stock Exchange. 41,49,50,93,95,98,100 170
PORTAL. 64, 187
Portfolio insurance. 10,54,55-57,80-81,83, 94
President's Task Force on Market Mechanisms (Brady Commission). 59,60,61,80,81, 85,87, 101, 112, 113, 115, 176
President's Working Group. 22,86, 104, 112, 173, 176
Primary markets. 25
Private placement. 19,62,64
Product innovation. 21,75-76, 169-172, 175-176, 177
Program trading. 4,8,9,10,15,19,30,54, 55-57,58,60, 61,78,80-83, 139, 143, 152, 171, 174
proprietary trading systems. 11,12,19,35,50,51,52, 62, 64,69, 138

Quot.ron. 19,133,134,135,136,137, 139

Racketeer Influenced and Corrupt Organization Act. 156, 159
Reuters. 13, 14, 19, 57, 65, 88-89, 132, 133, 134, 135, 136, 137, 139, 145, 157
Ruder, David. 85
Rule 10a-1. 58,79
Rule 19c-3. 48,52
Rule 19c-5. 16,97-100
Rule 80a. 55
Rule 127.50
Rule 144a. 62
Rule 390.11,48-49,51-52

Securities Acts Amendments, 1975.10,12,16,47,48, 49, 51,64, 109
Securities and Exchange Commission. 3,4,10,11,15,16, 17,19,20,21,22,47,48, 49,51,52,53,56,58,59, 60,62,64,72,77,79,80, 83,84,85,86,87,88,93, 94,97,98,99, 100, 101, 102, 103, 104, 109, 112, 131, 137, 138, 139, 149-153, 167-178
Securities Exchange Act of 1934.45,47, 167, 168, 170, 172, 175
Securities Industry Automation Corp. 47, 61, 130, 137, 187
Securities Investors Protection Corp. 122, 168
Self-Regulatory Organizations. 11, 41, 44, 45, 47, 71, 149, 150, 152, 159, 161, 162, 163
Shad-Johnson Agreement. 170
Short sales. 58,79
Single-price auction. 12,62,63,138
Small investors. 7,11, 19,27-29,32-37,44,46,49, 61,83, 140, 141, 153, 156 See ***also:*** Individual investors.
Software. 19,89,131,135,136,137, 139,140,142,143, 144
Specialists. 8,9,10,11,12,15,16,42, 44,45,49-52,53, 56,58-60,61,62,63,64, 72,74,79,95,97,99,130, 138, 150, 172
Speculators. 14, 15,20,27,29,70,72-73, 76,77,84,86, 87, 168, 169, 172,173, 174, 175
Sporkin, Judge Stanley. 177
Standards. 19,46,109,116,118,120, 123,124,125,136, 139, 142, 143, 144, 145
States' regulation. 30, 154, 155, 156, 168, 169
Stock-index arbitrage. (See Index arbitrage).
Stock-index futures contracts. (See Index futures)
Stock-index options contracts. (See Index options)
Surveillance. 15, 18, 19,20,63,71,73-74,75, 89, 125, 130, 131, 139, 140, 142, 150, 159, 160, 161, 162, 163, 168, 176, 187

Telerate. 19, 133, 134, 135,136, 139
Third market. 11,41,52

Underwriting. 7,35,36
UpSta.irs firms. 8,9,48,50,59,60,63,72, 74,96
U.S. Congress. 3,4,5,20,21,47,49,54, 58,71,81,85, 87, 115, 120, 125, 159, 157, 159, 162, 167, 168, 169, 170, 172, 173, 174, 177-178
U.S. Department of Agriculture. 71, 169
U.S. Department of the Treasury. 16, 72, 86, 115, 116, 122, 167, 173, 176

Volatility. 4,9, 15, 16, 19,20,21,27,41,51,54-55, 56, 57,58,60,61,79,81-83, 84-85,86,87,93,97,99, 122, 152, 167, 172-175

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