









Report of  
**THE PRESIDENTIAL TASK FORCE**  
on  
**MARKET MECHANISMS**

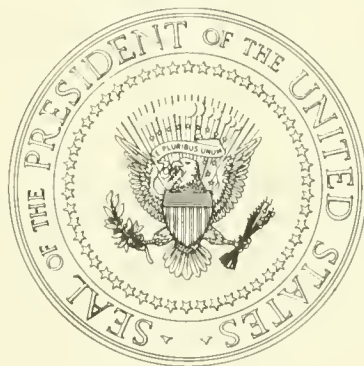


January 1988



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Report of  
THE PRESIDENTIAL TASK FORCE  
on  
MARKET MECHANISMS



Submitted to  
The President of the United States,  
The Secretary of the Treasury  
and  
The Chairman of the Federal Reserve Board

January 1988

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TREASURY DEPARTMENT



# The Presidential Task Force on Market Mechanisms

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January 8, 1988

The Honorable Ronald W. Reagan  
The President of the United States  
Washington, D.C.

Dear Mr. President:

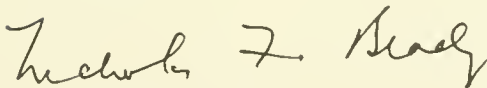
We respectfully submit to you the Report of The Presidential Task Force on Market Mechanisms, created pursuant to your Executive Order dated November 5, 1987.

For the last two months, we have studied the events surrounding the October 1987 market break with a view toward determining what happened, why it happened and how such an event can be avoided in the future.

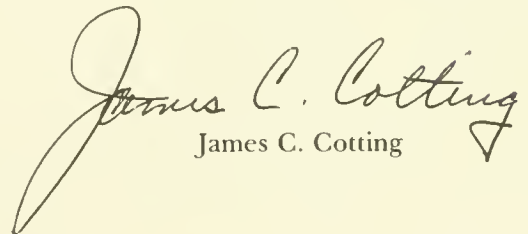
This Report is based in large part on information furnished to us by U.S. agencies and by various exchanges, clearinghouses and other market participants. We also held extensive interviews with market participants and regulatory officials. We believe that the results of our analysis, and the recommendations that this analysis led to, will enhance the integrity, efficiency and competitiveness of our nation's securities market and maintain investor confidence. When implemented, these recommendations will help to ensure that our securities market will maintain its global preeminence.

We are grateful for the honor of having served on this Task Force.

Sincerely,



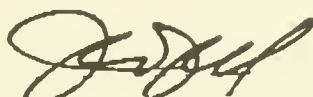
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Chairman



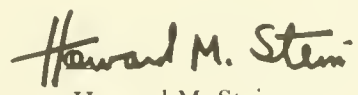
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# Preface

The written presentation of the Presidential Task Force on Market Mechanisms consists of two parts. The first is the Report, which contains a discussion of findings and recommendations. It is organized into eight chapters and an appendix. Chapter One contains the introduction. Chapter Two summarizes the various marketplaces in which equity instruments are traded, the instruments, the trading strategies used (index arbitrage, portfolio insurance and the like) and the regulation of the markets. Chapter Three summarizes the extended rise in stock market values that preceded the October market break. Chapter Four contains a detailed analysis of the events of the October market break. Chapter Five analyzes the performance of markets and market makers during the critical period. Chapter Six describes the fundamental interconnections of events and performance among the various equity marketplaces. Chapter Seven outlines the regulatory implications of the data and analysis contained in the earlier sections. Chapter Eight presents conclusions and recommendations. Finally, the Appendix discusses certain other regulatory issues the Task Force believes merit consideration but about which it makes no specific recommendations.

The second part of this written presentation consists of eight staff studies which contain the detailed information which the Task Force considered. The studies are:

- I. The Global Bull Market
- II. Historical Perspectives
- III. The October Market Break: October 14 through October 20
- IV. The Effect of the Stock Market Decline on the Mutual Funds Industry
- V. Surveys of Market Participants and Other Interested Parties
- VI. Performance of the Equity Market During the October Market Break and Regulatory Overview
- VII. The Economic Impact of the Market Break
- VIII. A Comparison of 1929 and 1987

We wish to acknowledge the extraordinary efforts of the many individuals on the staff, each of whom worked extremely long hours, under difficult time pressures and at great personal and professional cost. They were each dedicated to the work of the Task Force and their hard work, wisdom and judgment contributed immensely to our efforts.

We also wish to thank the U.S. Department of the Treasury, which provided the significant support staff listed below, and the Federal Reserve Bank of New York, which provided our working quarters.

Finally, the Task Force wishes to acknowledge the generous contribution that the institutions and firms listed below made to the Task Force by providing, on a pro bono basis, our staff as well as other support services.

---

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# Executive Summary

## Introduction

From the close of trading Tuesday, October 13, 1987 to the close of trading Monday, October 19, the Dow Jones Industrial Average declined by almost one third, representing a loss in the value of all outstanding United States stocks of approximately \$1.0 trillion.

What made this market break extraordinary was the speed with which prices fell, the unprecedented volume of trading and the consequent threat to the financial system.

In response to these events, the President created the Task Force on Market Mechanisms. Its mandate was, in 60 days, to determine what happened and why, and to provide guidance in helping to prevent such a break from happening again.

## The Market Break

The precipitous market decline of mid-October was "triggered" by specific events: an unexpectedly high merchandise trade deficit which pushed interest rates to new high levels, and proposed tax legislation which led to the collapse of the stocks of a number of takeover candidates. This initial decline ignited mechanical, price-insensitive selling by a number of institutions employing portfolio insurance strategies and a small number of mutual fund groups reacting to redemptions. The selling by these investors, and the prospect of further selling by them, encouraged a number of aggressive trading-oriented institutions to sell in anticipation of further market declines. These institutions included, in addition to hedge funds, a small number of pension and endowment funds, money management firms and investment banking houses. This selling, in turn, stimulated further reactive selling by portfolio insurers and mutual funds.

Portfolio insurers and other institutions sold in both the stock market and the stock index futures market. Selling pressure in the futures market was transmitted to the stock market by the mechanism of index arbitrage. Throughout the period of the decline, trading volume and price volatility increased dramatically. This trading activity was concentrated in the hands of a surprisingly few institutions. On October 19, sell programs by three portfolio insurers accounted for just under \$2 billion in the stock market; in the futures market three portfolio insurers accounted for the equivalent in value of \$2.8 billion of stock. Block sales by a few mutual funds accounted for about \$900 million of stock sales.

The stock and futures market handled record volume of transactions and had a generally good record of remaining available for trading on October 19 and 20. However, market makers were unable to manage smooth price transitions in the face of overwhelming selling pressure.

Clearing and credit system problems further exacerbated the difficulties of market participants. While no default occurred, the possibility that a clearing-house or a major investment banking firm might default, or that the banking system would deny required liquidity to the market participants, resulted in certain market makers curtailing their activities and increased investor uncertainty. Timely intervention by the Federal Reserve System provided confidence and liquidity to the markets and financial system.

## One Market

Analysis of market behavior during the mid-October break makes clear an important conclusion. From an economic viewpoint, what have been traditionally seen as separate markets—the markets for stocks, stock index futures, and stock options—are in fact one market. Under ordinary circumstances, these marketplaces move sympathetically, linked by financial instruments, trading strategies, market participants and clearing and credit mechanisms.

To a large extent, the problems of mid-October can be traced to the failure of these market segments to act as one. Confronted with the massive selling demands of a limited number of institutions, regulatory and institutional structures designed for separate marketplaces were incapable of effectively responding to “intermarket” pressures. The New York Stock Exchange’s (“NYSE”) automated transaction system (“DOT”), used by index arbitrageurs to link the two marketplaces, ceased to be useful for arbitrage after midday on October 19. The concern that some clearinghouses and major market participants might fail inhibited intermarket activities of other investors. The futures and stock markets became disengaged, both nearly going into freefall.

The ability of the equity market to absorb the huge selling pressure to which it was subjected in mid-October depended on its liquidity. But liquidity sufficient to absorb the limited selling demands of investors became an illusion of liquidity when confronted by massive selling, as everyone showed up on the same side of the market at once. Ironically, it was this illusion of liquidity which led certain similarly motivated investors, such as portfolio insurers, to adopt strategies which call for liquidity far in excess of what the market could supply.

## Regulatory Implications

Because stocks, futures and options constitute one market, there must be in place a regulatory structure designed to be consistent with this economic reality. The October market break illustrates that regulatory changes, derived from the one-market concept, are necessary both to reduce the possibility of destructive market breaks and to deal effectively with such episodes should they occur. The guiding objective should be to enhance the integrity and competitiveness of U.S. financial markets.

Analysis of the October market break demonstrates that one agency must have the authority to coordinate a few critical intermarket issues cutting across market segments and affecting the entire financial system; to monitor activities of all market segments; and to mediate concerns across marketplaces. The specific issues which have an impact across marketplaces and throughout the financial system include: clearing and credit mechanisms; margin requirements; circuit breaker mechanisms, such as price limits and trading halts; and information systems for monitoring activities across marketplaces.

The single agency required to coordinate cross-marketplace issues must have broad and deep expertise in the interaction of the stock, stock option and stock index futures marketplaces, as well as in all financial markets, domestic and global. It must have broad expertise in the financial system as a whole.

The Task Force compared these requirements with possible alternative regulatory structures, including: existing self-regulatory organizations, such as the exchanges; existing government regulatory agencies, namely the Securities and Exchange Commission and the Commodity Futures Trading Commission; the Department of the Treasury; the Federal Reserve Board; a combination of two or more of these; and a new regulatory body.

## Conclusion

Our understanding of these events leads directly to our recommendations. To help prevent a repetition of the events of mid-October and to provide an effective and coordinated response in the face of market disorder, we recommend:

- One agency should coordinate the few, but critical, regulatory issues which have an impact across the related market segments and throughout the financial system.
- Clearing systems should be unified across marketplaces to reduce financial risk.
- Margins should be made consistent across marketplaces to control speculation and financial leverage.
- Circuit breaker mechanisms (such as price limits and coordinated trading halts) should be formulated and implemented to protect the market system.
- Information systems should be established to monitor transactions and conditions in related markets.

The single agency must have expertise in the interaction of markets—not simply experience in regulating distinct market segments. It must have a broad perspective on the financial system as a whole, both domestic and foreign, as well as independence and responsiveness.

The Task Force had neither the time nor the mandate to consider the full range of issues necessary to support a definitive recommendation on the choice of agency to assume the required role. However, the weight of the evidence suggests that the Federal Reserve is well qualified to fill that role.

## Other Issues

Certain other issues were discussed by the Task Force without reaching definitive conclusions. The Task Force identified the following issues as warranting review by the appropriate authorities:

- Short selling—There are restrictions on short selling in the stock market, but not in the futures or options markets. Linkages, such as index arbitrage, among these markets may operate to incapacitate the short selling restriction. This issue should be reviewed from an intermarket perspective.
- Customer vs. Proprietary Trading—Under certain circumstances, broker-dealers and futures market makers can act as principal for their own account as well as execute customer orders. Potential problems posed by the opportunity to trade in anticipation of customer orders in different marketplaces should also be reviewed from an intermarket perspective.
- NYSE Specialists—The adequacy of specialist capital and specialist performance in meeting their responsibility to maintain a fair and orderly market are issues raised by the October market experience.
- NYSE Order Imbalances—When there are serious imbalances of orders, consideration should be given to favoring public customers in execution over institutional and other proprietary orders through the DOT system and to making the specialist book public to help attract the other side of the imbalance.





# Chapter One

## Introduction

From the close of trading on Tuesday, October 13, 1987, to the close of trading on October 19, 1987, the Dow Jones Industrial Average ("Dow") fell 769 points or 31 percent (see Figure 1). In those four days of trading, the value of all outstanding U.S. stocks decreased by almost \$1.0 trillion. On October 19, 1987, alone, the Dow fell by 508 points or 22.6 percent. Since the early 1920's, only the drop of 12.8 percent in the Dow on October 28, 1929 and the fall of 11.7 percent the following day, which together constituted the Crash of 1929, have approached the October 19 decline in magnitude.

The significance of this decline lies in the role that the stock market plays in a modern industrial economy, both as a harbinger and a facilitator of economic activity. Stock price levels can have an important effect on the confidence and, hence, the behavior of both businesses and households. Further, equity markets are a primary means by which businesses and industries raise capital to finance growth and provide jobs. Gross sales of newly issued common stock increased substantially over the course of the 1982 to 1987 bull market, reaching \$56.3 billion in 1986 and \$27 billion in the first six months of 1987. However, the importance of stock sales is greater than simply the amount of funds raised. New equity capital and public equity markets are essential to financing innovative business ventures which are a primary engine of the nation's economic growth.

Moreover, publicly traded equities are a repository of a significant fraction of U.S. household wealth. Households directly own about 60 percent of all U.S. publicly owned common stock, which was worth approximately \$2.25 trillion before the October market decline. Households hold another \$210 billion of common stock through mutual funds and \$740 billion through pension funds. Thus, in the early fall of 1987, the stock market accounted for approximately \$3.2 trillion worth of household wealth.

Equity markets are also inextricably tied to the wider financial system through the structure of banks and other financial institutions. Given the importance of equity markets to the economy and to the public, effectively structured and functioning equity markets are critical.

Consequently, in response to October's extraordinary events, the President created a Task Force on Market Mechanisms, the purpose of which was to:

. . . review relevant analyses of the current and long-term financial condition of the Nation's securities markets; identify problems that may threaten the short-term liquidity or long-term solvency of such markets; analyze potential solutions to such problems that will both assure the continued functioning of free, fair, and competitive securities markets and maintain investor confidence in such markets; and provide appropriate recommendations to the President, to the Secretary of the Treasury, and to the Chairman of the Board of Governors of the Federal Reserve System.

What made the October market break extraordinary was the speed with which prices fell, the unprecedented volume of trading and the consequent dislocations of the financial markets. Thus, whatever the causes of the original downward pressure on the equity market, the mandate of the Task Force was to focus on those factors which transformed this downward pressure into the alarming events of the stock market decline and to recommend measures to

ensure, as far as possible, that future market fluctuations are not of the extreme and potentially destructive nature witnessed in October 1987.

Fundamental causes of the recent market decline should not, of course, be ignored. To the extent that existing imbalances in the budget, foreign transactions, savings, corporate asset positions and other fundamental factors are perceived to be problems, they merit attention.

The events of October demonstrated an unusual frailty in the markets. Only 3 percent of the total shares of publicly traded stock in the U.S. changed hands during this period, but it resulted in the loss in stock value of \$1 trillion. That such a relatively small transaction volume can produce such a large loss in value over such a short time span suggests the importance of determining the extent to which market mechanisms themselves were an important factor in the October market break. The work of the Task Force, therefore, focused on the individual marketplaces and the interrelationship of existing market mechanisms, including the instruments traded, the strategies employed and the regulatory structures.

\* \* \*

The Task Force's findings and conclusions are based significantly on the primary transaction data and information that we accumulated. Recognizing the importance of determining as much as possible about each transaction, the Task Force spent much of its time gathering and then analyzing transactions on the New York Stock Exchange ("NYSE"), Chicago Mercantile Exchange ("CME"), Chicago Board of Trade ("CBOT"), American Stock Exchange ("Amex") and the Chicago Board Options Exchange ("CBOE").

As a vehicle for expanding on, and cross-referencing, this exchange data, the Task Force analyzed information on transactions supplied to the Securities and Exchange Commission ("SEC") and the Commodity Futures Trading Commission ("CFTC"). In addition, we received information directly from certain major investment banks and institutional investors.

Finally, the Task Force spoke in person with hundreds of market participants in order to understand better their perspectives on individual transactions and all the events of the October 1987 decline.



Figure 1

# DOW JONES INDUSTRIAL ONE MINUTE CHART

October 14, 1987 to October 20, 1987





# Chapter Two

## **Instruments, Markets, Regulation and Trading Strategies**

This chapter is designed to serve as a brief introductory guide for readers less familiar with the instruments, marketplaces and trading strategies important to understanding the events of mid-October. A more complete discussion is presented in Study VI.

### **Stocks, Futures Contracts and Options Contracts**

Shares of stock are claims of ownership in corporations. The price of a stock in effectively operating stock markets depends largely on the current performance and future earnings prospects of a corporation. Futures contracts and options contracts are not corporate ownership claims. They are “derivative” instruments whose value depends primarily on the underlying price of the stock or portfolio of stocks from which they are derived. The most heavily traded equity-related futures and options contracts are based upon certain standardized portfolios of stock such as the Standard and Poor’s 500 Stock Index (“S&P 500”), the Standard and Poor’s 100 Stock Index (“S&P 100”) and the Major Market Index of 20 stocks (“MMI”).

### **Exchanges and Market Making**

Stocks are traded on the New York Stock Exchange and American Stock Exchange, as well as on several other exchanges throughout the country. Other stocks are traded in the over-the-counter (“OTC”) market, a dealer market connected by computers and telephones.

The S&P 500 futures contract is traded on the Chicago Mercantile Exchange, and the MMI futures contract is traded on the Chicago Board of Trade. The preponderance of the daily volume of index futures trading takes place on the CME. Although the value of open interest in the futures contracts is only a small fraction of the value of NYSE stocks, the value of the stocks represented by the volume of futures contracts traded on the CME daily is typically about twice the value of stocks traded on the NYSE daily.

Options contracts on the S&P 100 are traded on the Chicago Board Options Exchange. The Amex trades an option on the MMI. Options whose value is related to individual stocks are also traded on various exchanges.

A specialist system is used by the various stock exchanges for exchange-listed stocks. Under the specialist system, a single dealer is given the right to make the market in a specific stock or option on the exchange. In return, the specialist assumes the responsibility to make an “orderly” market by buying and selling from inventory. In the competitive market maker system, competing dealers set the price of an options or futures contract in an auction process. A competitive market maker system is used by the CBOE for options, and by the CME and the CBOT for futures. The OTC also uses a competing dealer system to make markets. A hybrid system employing both specialists and competing market makers is used for options sponsored by the stock exchanges.

## Regulation

The stock, futures and options exchanges organize, manage, promote and oversee the individual stock and derivative contract markets. They set and enforce rules regarding trading practices, monitor the financial resources and obligations of participants and supervise the settlement of transactions.

There is a system of federal regulatory oversight which requires or prohibits particular rules and practices, approves rule changes, and audits the exchanges' trading and financial surveillance. The Securities and Exchange Commission has responsibility for stocks and options; the Commodity Futures Trading Commission oversees futures.

## Margin

Customers of futures commission merchants and broker-dealers in stock markets must post collateral, called "margin", consisting of cash and securities, against their obligations. These obligations are twofold. First, they are loans from a broker-dealer to purchase stock. Second, they are obligations created by a short sale of stock, the purchase or sale of a futures contract and the sale of an options contract.

The equity balance of a customer's margin account, equal to the difference between the market value of securities and the amount of the loan or other obligation, is calculated each day. The equity value must be greater than the margin requirement; otherwise the broker-dealer may call for more margin or sell the customer's positions.

The Federal Reserve has final authority for setting initial margin requirements for stocks and options. The individual commodity exchanges have the authority to set margins in the futures contracts traded on their floors.

## Clearing

Trades executed on an exchange are guaranteed by a "clearinghouse," whose performance is in turn guaranteed to varying degrees by the clearing members (broker-dealers or futures commission merchants) of that exchange. Most U.S. stock exchanges clear their transactions through a single stock clearinghouse. Similarly, all U.S. options exchanges clear through a single options clearinghouse. In contrast, each of the largest futures exchanges maintains its own clearinghouse.

## Trading Strategies

The price of an index futures contract and the price of the stock index portfolio underlying it are directly related. Normally, the price of a futures contract exceeds the price of the underlying portfolio by an amount reflecting the "cost of carry," which relates to the difference between the Treasury bill rate and the dividend yield on the portfolio.

An index arbitrageur attempts to profit when the price difference is abnormal, either by simultaneously buying futures contracts and selling the index portfolio of stocks or by doing the reverse. When the futures price is at a discount, the arbitrageur engages in index substitution by selling an index portfolio of stocks and replacing it with futures contracts. This is typically done by a pension fund which owns an indexed portfolio of stocks. In executing this arbitrage, the institution takes on whatever greater credit risk there is in owning the futures contract rather than the stocks themselves. When the futures contract is at a premium, the arbitrageur may execute a "synthetic cash" transaction, buying the stock portfolio and selling futures. Typically, a corporation holding short term money market investments would perform this arbitrage to increase its yield.

There are also a number of non-arbitrage trading strategies which involve stocks and futures contracts. First, when trading-oriented investors want to trade on the direction of the market as a whole, they often buy or sell index futures because futures transactions can be executed more quickly and cheaply than transactions involving a diversified portfolio of stocks. Lower transaction costs and lower margin requirements make this possible. Second, longer term investors often find it faster and initially cheaper to initiate portfolio position changes through the futures market. Eventually, the futures position is replaced with stocks. Third, block traders, exchange specialists and investment bankers marketing new stock issues can use index futures to hedge their positions.

Other strategies are designed to react mechanically to market movements by selling in a falling market and buying in a rising market. One such strategy, "portfolio insurance," is designed to allow institutional investors to participate in a rising market yet protect their portfolio as the market falls. Using computer-based models derived from stock options analysis, portfolio insurance vendors compute optimal stock-to-cash ratios at various stock market price levels. But rather than buying and selling stocks as the market moves, most portfolio insurers adjust the stock-to-cash ratio by trading index futures. Indeed, several major portfolio insurance vendors have been authorized to trade only futures and have no access to their clients' stock portfolios. Some option hedging strategies employed by options traders use the same method of buying futures as the market rises and selling futures as the markets falls.

Underlying many of these strategies is the ability to use stock index futures to trade the entire "stock market," as if it were a single commodity. Futures contracts make it possible to do this quickly, efficiently and cheaply. However, to the extent they do this, traders and investors treat the stock market as if it were a single commodity rather than a collection of individual stocks.





## Chapter Three

# The Bull Market

All major stock markets began an impressive period of growth in 1982. Spurred by the economic turnaround, the growth in corporate earnings, the reduction in inflation and the associated fall in interest rates, the Dow rose from 777 to 1,896 between August 1982 and December 1986 (see Figure 2). Other factors contributing to this dramatic bull market included: continuing deregulation of the financial markets; tax incentives for equity investing; stock retirements arising from mergers, leveraged buyouts and share repurchase programs; and an increasing tendency to include "takeover premiums" in the valuation of a large number of stocks.

Despite the dramatic rise in the market, stock valuation at the end of 1986 was not out of line with levels achieved in past periods. (Figures 3 and 4 show two common stock valuation measures, the price-to-earnings ratio and the ratio of price-to-book value per share, for the stocks in the S&P 500 Index from 1950 to 1987.)

### 1987

Stocks in the U.S. continued to appreciate rapidly during the first eight months of 1987, despite rapidly increasing interest rates (see Figure 5). When the Dow reached its peak of 2,722 in August, stocks were valued at levels which challenged historical precedent and fundamental justification (see Figures 3 to 6). Factors which contributed to this final rise included, in addition to those listed earlier, increased foreign investment in U.S. equities and growing investment in common stock mutual funds.

The rapid rise in the popularity of portfolio insurance strategies also contributed to the market's rise. Pension fund managers adopting these strategies typically increased the funds' risk exposure by investing more heavily in common stock during this rising market. The rationale was that portfolio insurance would cushion the impact of a market break by allowing them to shift quickly out of stocks.

During this period, the OTC market also advanced rapidly, and institutional participation and trading volume rose. The OTC and NYSE increasingly moved in parallel, with relative price levels in one matching those in the other.

Moreover, volatility in all the U.S. equity markets increased somewhat during this period.<sup>1</sup> However, prior to October, it was not substantially high by historical standards and increases in U.S. stock market volatility were comparable to increases in volatility in foreign markets.

### International Equity Markets

Foreign stock exchanges enjoyed bull markets similar to the U.S. during this period (see Figures 7 and 8). As in the U.S., stock valuation in these markets by 1987 began to rise above levels apparently justified by historical precedent or economic factors (see Figures 9 and 10). In Japan, for example, stocks were selling at a ratio of 70 times earnings in October 1987, more than double the price-to-earnings ratio in the beginning of 1986.

Aided by significantly improved computer and communications technology, cross-border equity investment increased rapidly during this period. The

<sup>1</sup> See Study II for a more detailed analysis of volatility levels in U.S. stock markets.

communications networks of four key data providers alone cover over 100,000 equities, connect over 110 exchanges and include 300,000 terminals in over 110 countries. In the first nine months of 1987 alone, Japanese investment in U.S. equities increased by about \$15 billion. As cross-border investment grew, so did U.S. investors' sensitivity to foreign common stock performance. Investors made comparisons of valuations in different countries, often using higher valuations in other countries as justification for investing in lower valued markets. Consequently, a process of ratcheting up among worldwide stock markets began to develop. In the midst of this globalization of equity investment, trading volume on U.S. markets continued to dominate worldwide trading. Trading on U.S. markets tended to lead other markets around the world.

This economic and financial panorama was the backdrop to the October market break in the U.S.

Figure 2

## U.S. MARKET

### S&P 500 Index

January 1982 to November 1987



Figure 3  
**U.S. MARKET**  
 Price/Earnings Multiple vs Long Term  
 Govt. Bond Yield  
 January 1950 to November 1987

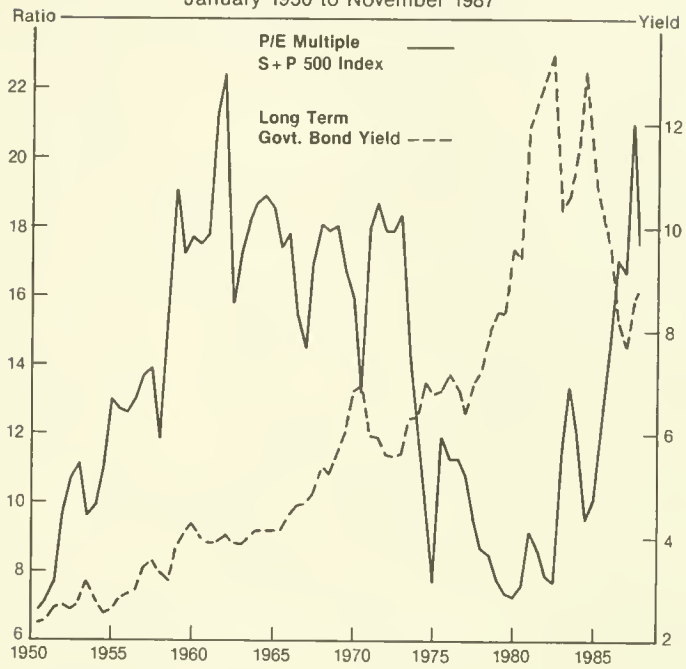


Figure 4  
**U.S. MARKET**  
 S&P 400 Price-to-Book Ratio  
 January 1950 to November 1987

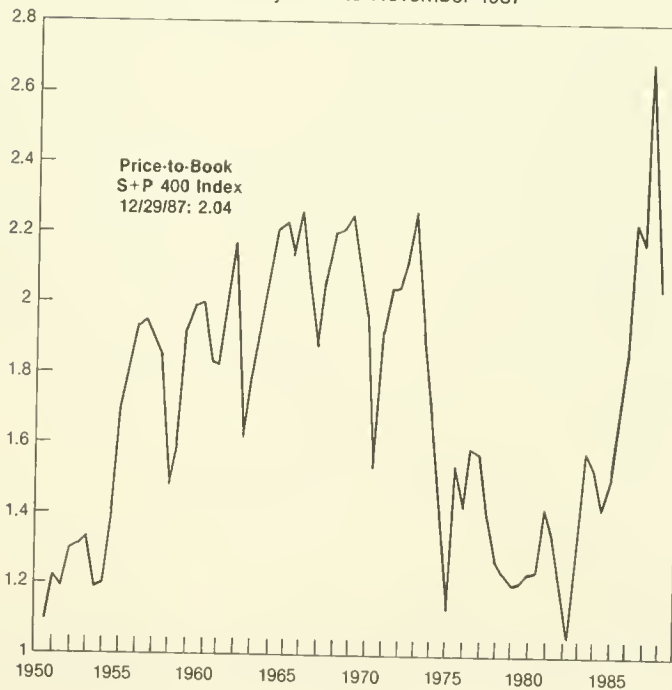


Figure 5

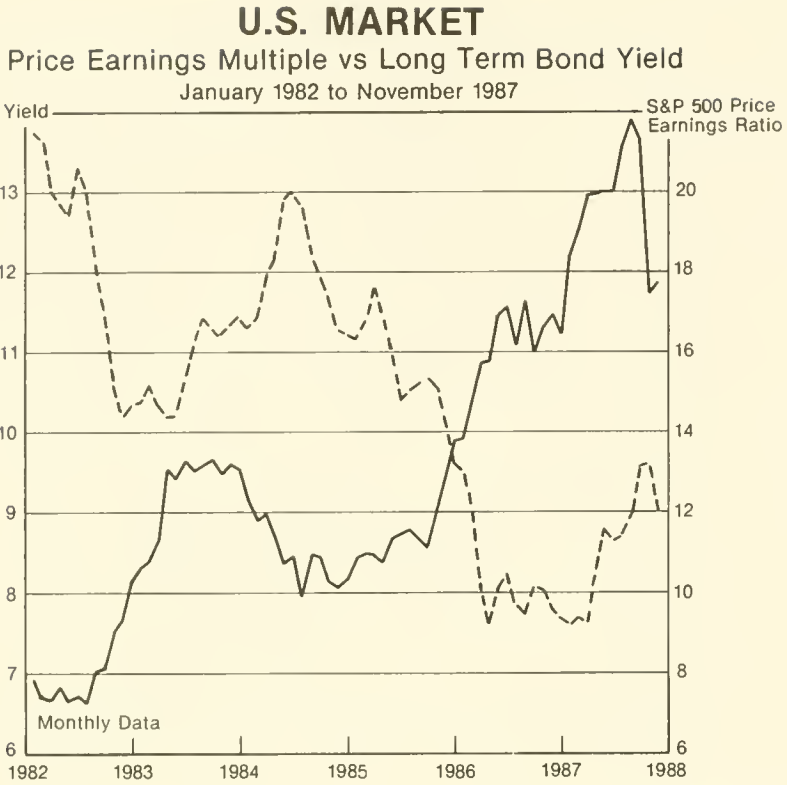


Figure 6

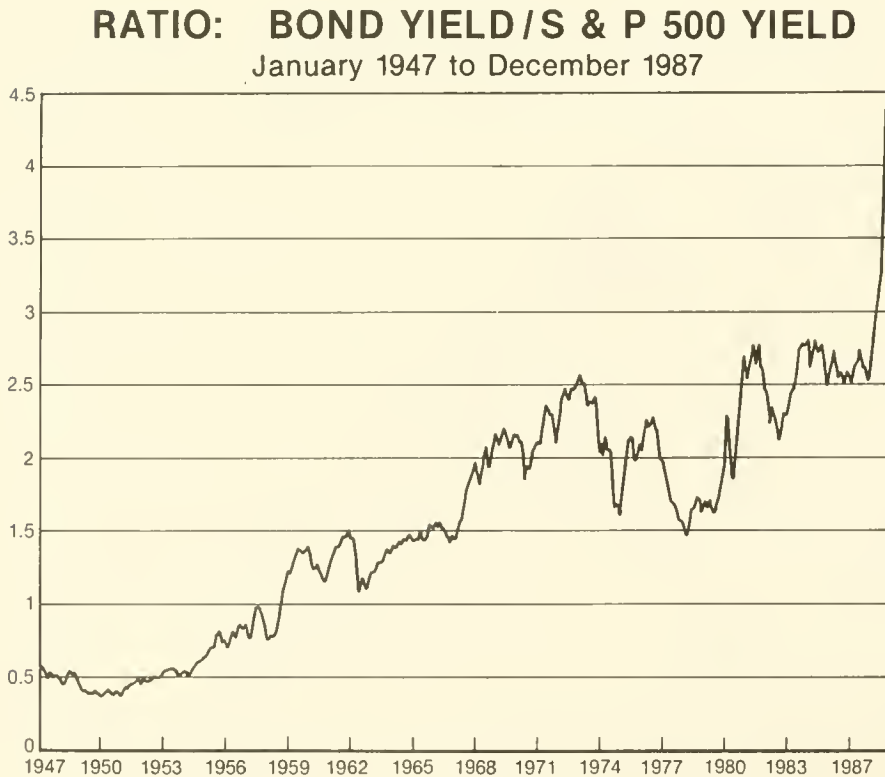


Figure 7

# JAPAN MARKET

Tokyo SE New Index  
January 1982 to December 1987

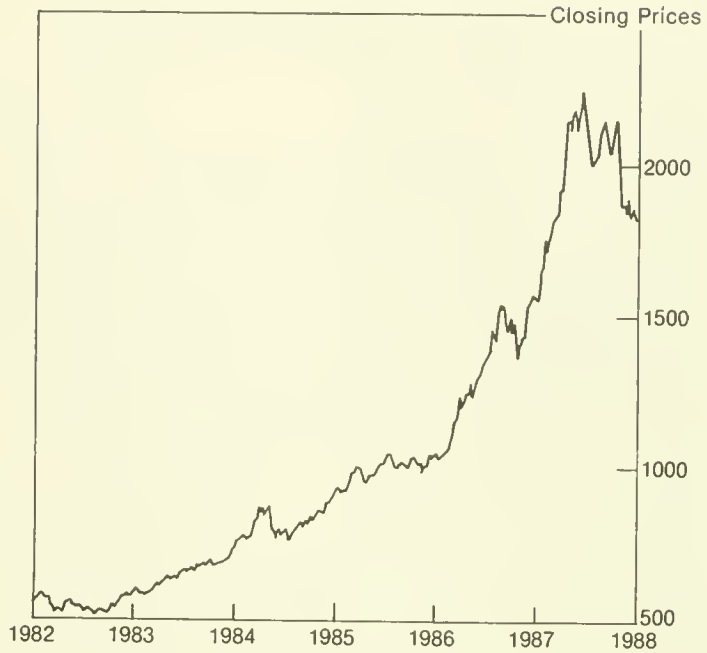


Figure 8

# LONDON MARKET

FTA All Share Index  
January 1982 to December 1987



Figure 9

## JAPAN MARKET

Price/Earnings Multiple vs Long Term Govt. Bond Yield  
January 1982 to November 1987

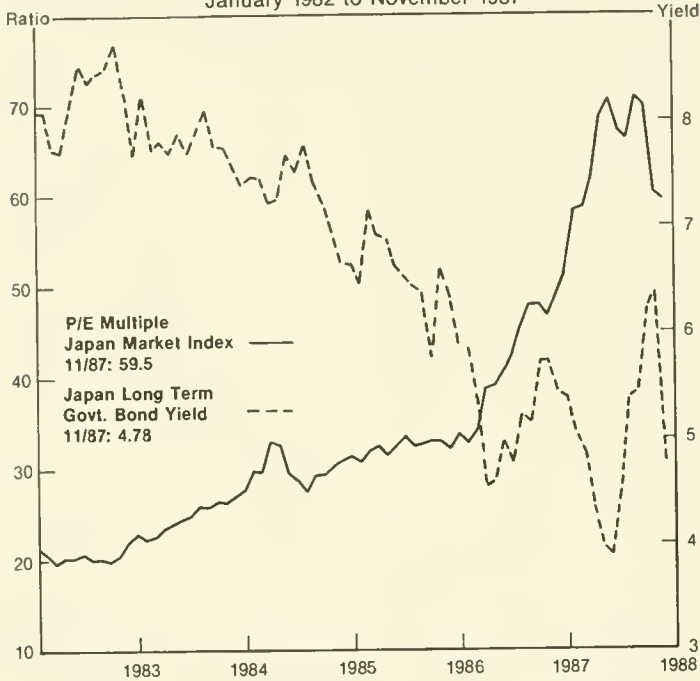
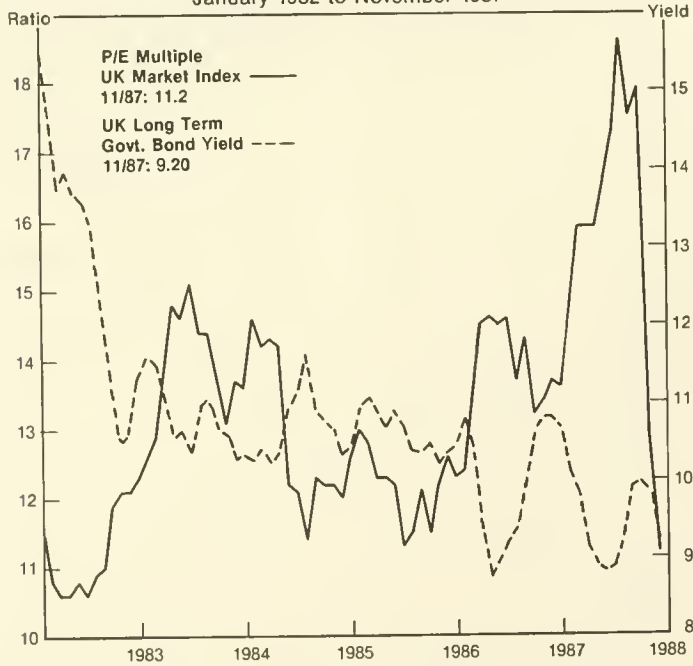


Figure 10

## UK MARKET

Price/Earnings Multiple vs Long Term Govt. Bond Yield  
January 1982 to November 1987





# Chapter Four

## The Market Break

### Introduction

On Wednesday morning, October 14, 1987, the U.S. equity market began the most severe one-week decline in its history. The Dow stood at over 2,500 on Wednesday morning. By noon on Tuesday of the next week, it was just above 1,700, a decline of almost one third. Worse still, at the same time on Tuesday, the S&P 500 futures contract would imply a Dow level near 1,400.

This precipitous decline began with several "triggers," which ignited mechanical, price-insensitive selling by a number of institutions following portfolio insurance strategies and a small number of mutual fund groups. The selling by these investors, and the prospect of further selling by them, encouraged a number of aggressive trading-oriented institutions to sell in anticipation of further declines. These aggressive trading-oriented institutions included, in addition to hedge funds, a small number of pension and endowment funds, money management firms and investment banking houses. This selling in turn stimulated further reactive selling by portfolio insurers and mutual funds. Selling pressure in the futures market was transmitted to the stock market by the mechanism of index arbitrage. Throughout the period, trading volume and price volatility increased dramatically. This may suggest that a broad range of investors all decided to reduce their positions in equities. In reality, a limited number of investors played the dominant role during this tumultuous period.

### The Days Before the Break (October 14 to 16)

**Wednesday, October 14.** The stock market's break began with two events which contributed to a revaluation of stock prices and triggered the reactive selling which would exacerbate the decline the following week. At 8:30 a.m., Eastern Time,<sup>1</sup> the government announced that the merchandise trade deficit for August was \$15.7 billion, approximately \$1.5 billion above the figure expected by the financial markets. Within seconds, traders in the foreign exchange markets sold dollars in the belief that the value of the dollar would have to fall further before the deficit could narrow. The German Deutsche mark and the Japanese yen rose dramatically in value. Treasury bond traders, fearing that a weakening dollar could both discourage international investment in U.S. securities and stimulate domestic inflation, sold on the London market and on the U.S. bond market, when it opened. The Treasury's bellwether 30-year bond began to trade above a 10 percent yield for the first time in two years. Equity returns at current levels became even less attractive compared to returns on bonds.

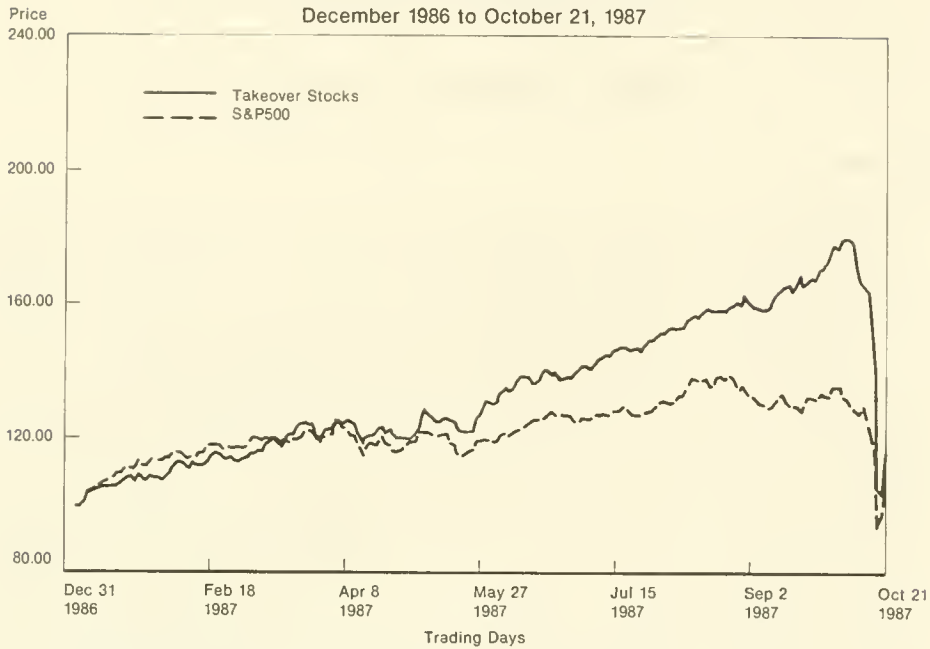
The second event was the announcement early Wednesday that members of the House Ways and Means Committee were filing legislation to eliminate tax benefits associated with the financing of corporate takeovers. While rumors of the legislation had been circulating on Wall Street for several weeks, its actual announcement had a galvanizing effect on investors, particularly risk arbitrageurs, who specialize in buying shares of takeover candidates. Figures 11 and 12 show the performance of a small number of takeover

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<sup>1</sup> Throughout the Report, all times are Eastern Time.

Figure 11

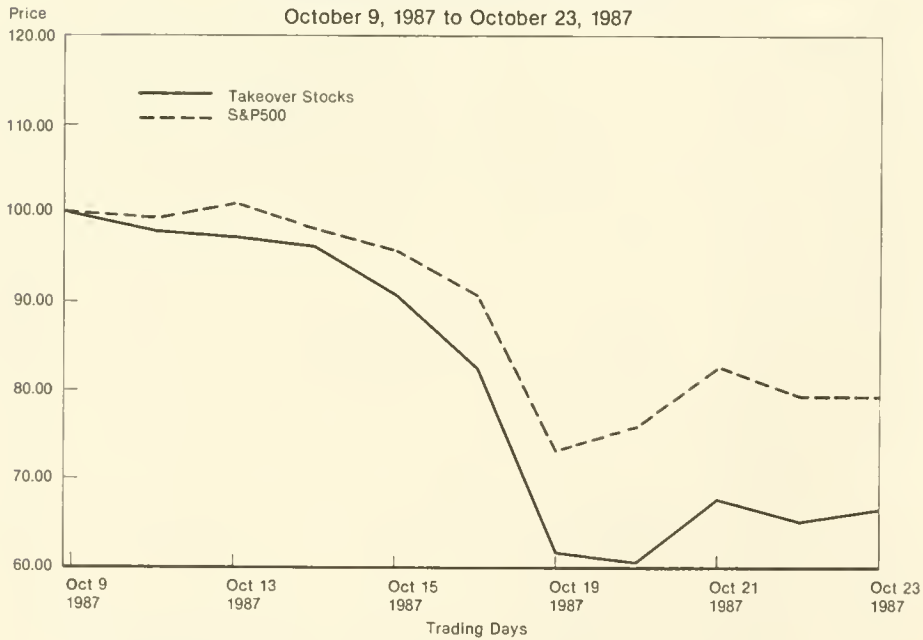
### TAKEOVER STOCK INDEX VS S&P 500 INDEX NORMALIZED PRICE SERIES



B-75

Figure 12

### TAKEOVER STOCK INDEX VS S&P 500 INDEX NORMALIZED PRICE SERIES



B-74

candidates compared to that of the S&P 500 index. As risk arbitrageurs came to appreciate the seriousness of the legislative initiative, they began to liquidate their positions, collapsing the prices of takeover shares. These stocks had led the bull market up and now, during the week of October 14 to October 20, they would begin to lead it back down again.

In response to these events, the equity market declined immediately on Wednesday's opening. The S&P 500 futures contract fell sharply as trading-oriented investors sold. This was followed by large block sales of individual stocks on the NYSE as institutions joined the selling. The Dow dropped 44 points in the first half hour. During this period, index arbitrage program sales through the NYSE's Designated Order Turnaround ("DOT") automated execution system, totaled almost \$200 million, which was 18 percent of volume, double the normal level.<sup>2</sup>

Index arbitrageurs attempt to profit from price differences in futures and stocks either by simultaneously buying futures and selling baskets of stock or vice versa. This arbitrage activity usually has the effect of eliminating the price differences. It also transfers buying or selling pressure between the futures market and the stock market.

The morning decline was followed by another 45 point decline between 12:15 p.m. and 1:15 p.m. This midday decline was the result mainly of selling in the futures market by portfolio insurers (see Figure 13) and, then, the transmission of this selling activity back into the stock market by the actions of index arbitrageurs who bought futures and sold stocks (see Figures 14 and 15). Index arbitrage activity during this hour was \$300 million, almost 25 percent of volume.

Portfolio insurance, a strategy using computer-based models, computes optimal stock-cash ratios at various market price levels. Rather than buying and selling stocks as the market moves, most portfolio insurers adjust the stock-cash ratio within their clients' investment portfolios by trading index futures. Indeed, several major portfolio insurance vendors are authorized to trade only futures, and have no access to their clients' stock portfolios.

At the end of Wednesday there was a sell-off by trading-oriented institutions. Institutional sellers moved large blocks in the stock market and sold futures as well. In the last half hour, the Dow fell 17 points. Index arbitrage sales were \$140 million, 15 percent of volume.

For the day, the Dow was down an historic 95 points on volume of 207 million shares. Of this volume, index arbitrage sales through DOT were \$1.4 billion, 17 percent of volume or twice the normal level. The 20 largest NYSE member firms sold as principal \$689 million of stock. Trading-oriented investors in the futures market were net sellers of about \$500 million. Portfolio insurance selling was heavy, particularly in early and mid-afternoon.

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<sup>2</sup> The data, on which the analysis contained in the Report and Studies is based, are taken primarily from databases containing individual transactions on the NYSE, CME (for stock index futures), and the Amex and CBOE (for stock index options). For NYSE stocks, the staff of the Task Force assembled databases showing transactions for broker-dealers, for all large institutions clearing trades through the Depository Trust Company, and for all trades done through the DOT system. For the CME, Amex and CBOE, the staff assembled databases containing all transactions by customer and end-of-day positions of all large traders. As a basis for verifying and elaborating on the information contained in these databases, the staff had access to information on a sample of transactions supplied to the SEC and CFTC by large institutional investors, broker-dealers, and the various exchanges and supplied to the Task Force by certain large institutional investors. In addition, the Task Force spoke in person with many market participants and representatives of the exchanges and regulatory bodies.

# Figure 13 S & P INDEX AND FUTURES CONTRACT

Wednesday, October 14, 1987

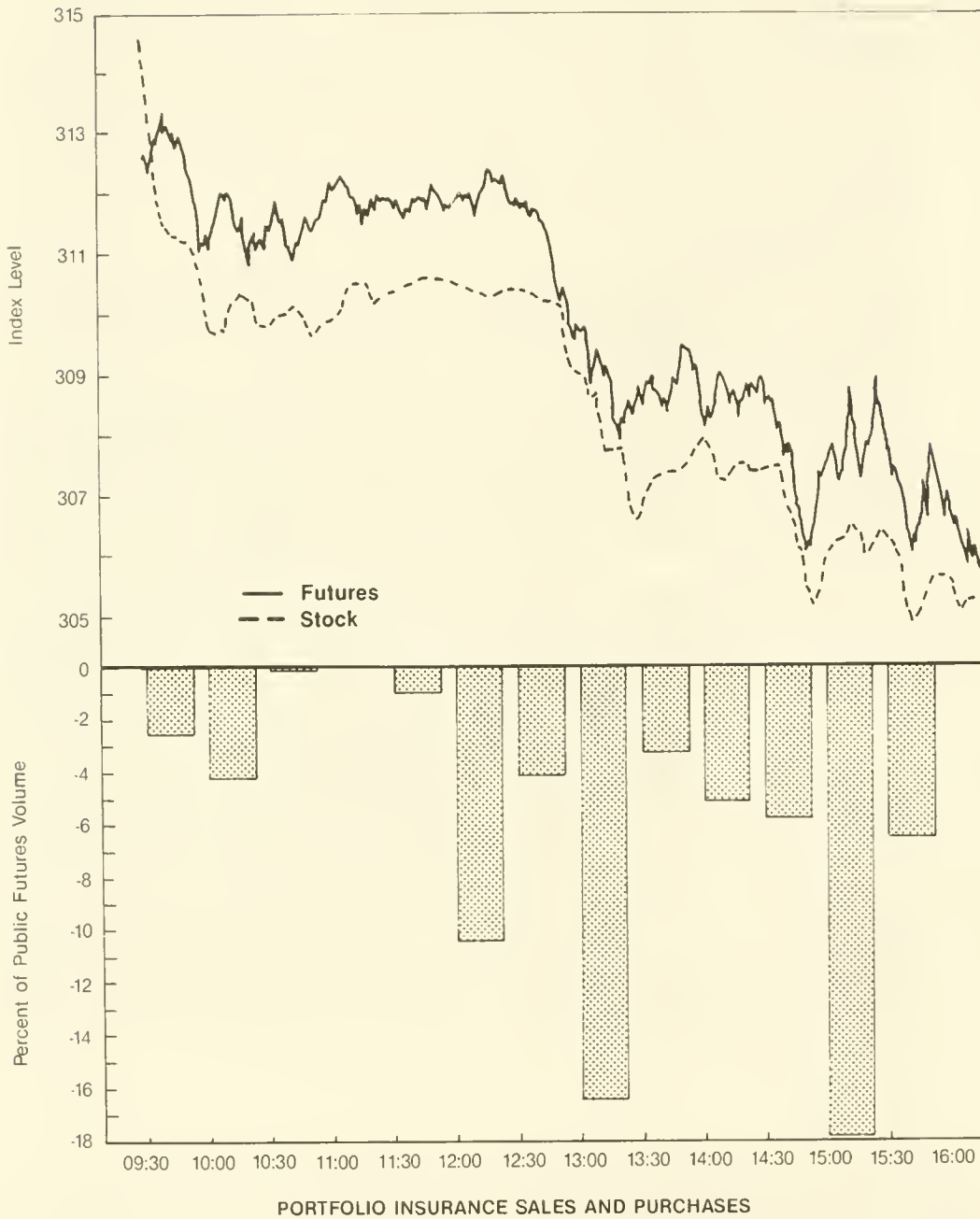


Figure 14  
**DOW JONES INDUSTRIAL ONE MINUTE CHART**  
 Wednesday, October 14, 1987

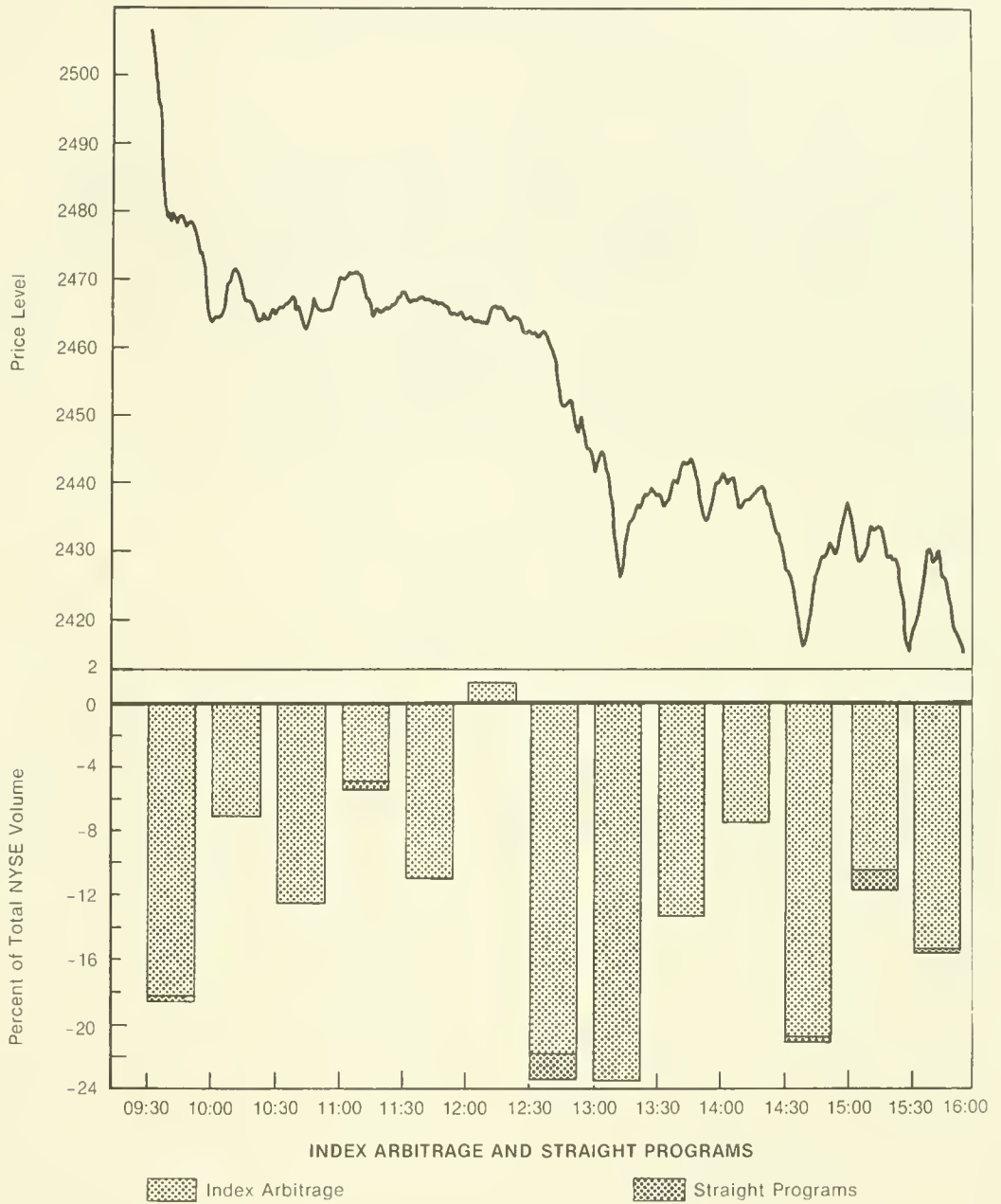
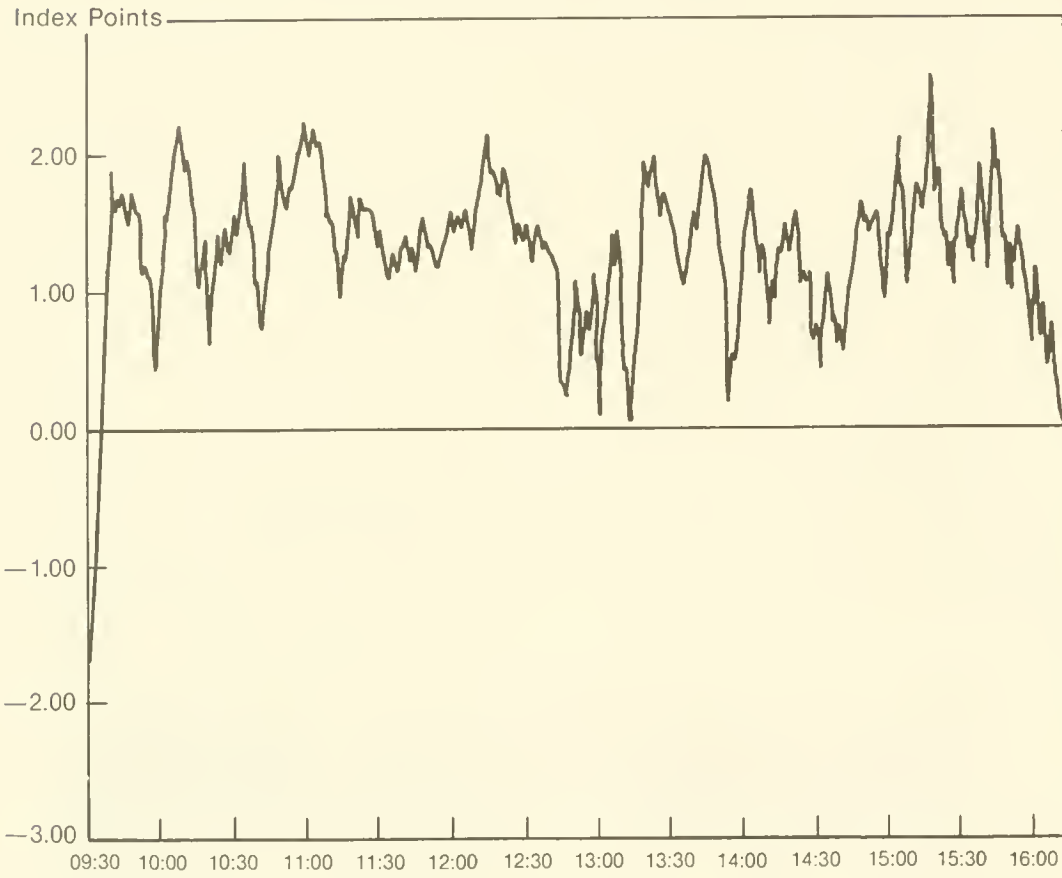


Figure 15

# S & P INDEX AND FUTURES CONTRACT SPREAD

Wednesday, October 14, 1987





**Thursday, October 15.** Selling in Tokyo and London overnight continued the pattern seen in New York and Chicago on Wednesday. When the U.S. markets opened, they were greeted by heavy selling from portfolio insurers. During the first half hour, this group sold approximately 2,500 futures contracts (\$380 million), more than 26 percent of public volume. The Dow opened 20 points down on heavy volume of 48 million shares in the first half hour, with approximately 60 percent of the trading in large blocks of 10,000 shares or more. Even with the opening drop in the Dow, the futures went to a discount.

Despite the opening, the Dow recovered during the day and was down only four points at 3:30 p.m. In the last 30 minutes of trading, however, it fell another 53 points to close down 57 points for the day. This sharp decline on heavy volume so late in the day bewildered investors. Broad-based selling by futures market participants, including portfolio insurers, led the fall, and index arbitrage activity quickly followed to bring the stock market into line (see Figures 16 to 18). Index arbitrage amounted to almost \$175 million in stock sales on the NYSE, and straight selling of stock baskets amounted to another \$100 million; together the two trading strategies accounted for approximately one quarter of the last half hour's volume on the NYSE. Throughout the day, a concentration of trading activity was evident. Seven aggressive trading institutions sold a total of just over \$800 million of stocks, about 9 percent of NYSE volume.

Figure 16  
**S & P INDEX AND FUTURES CONTRACT**  
 Thursday, October 15, 1987

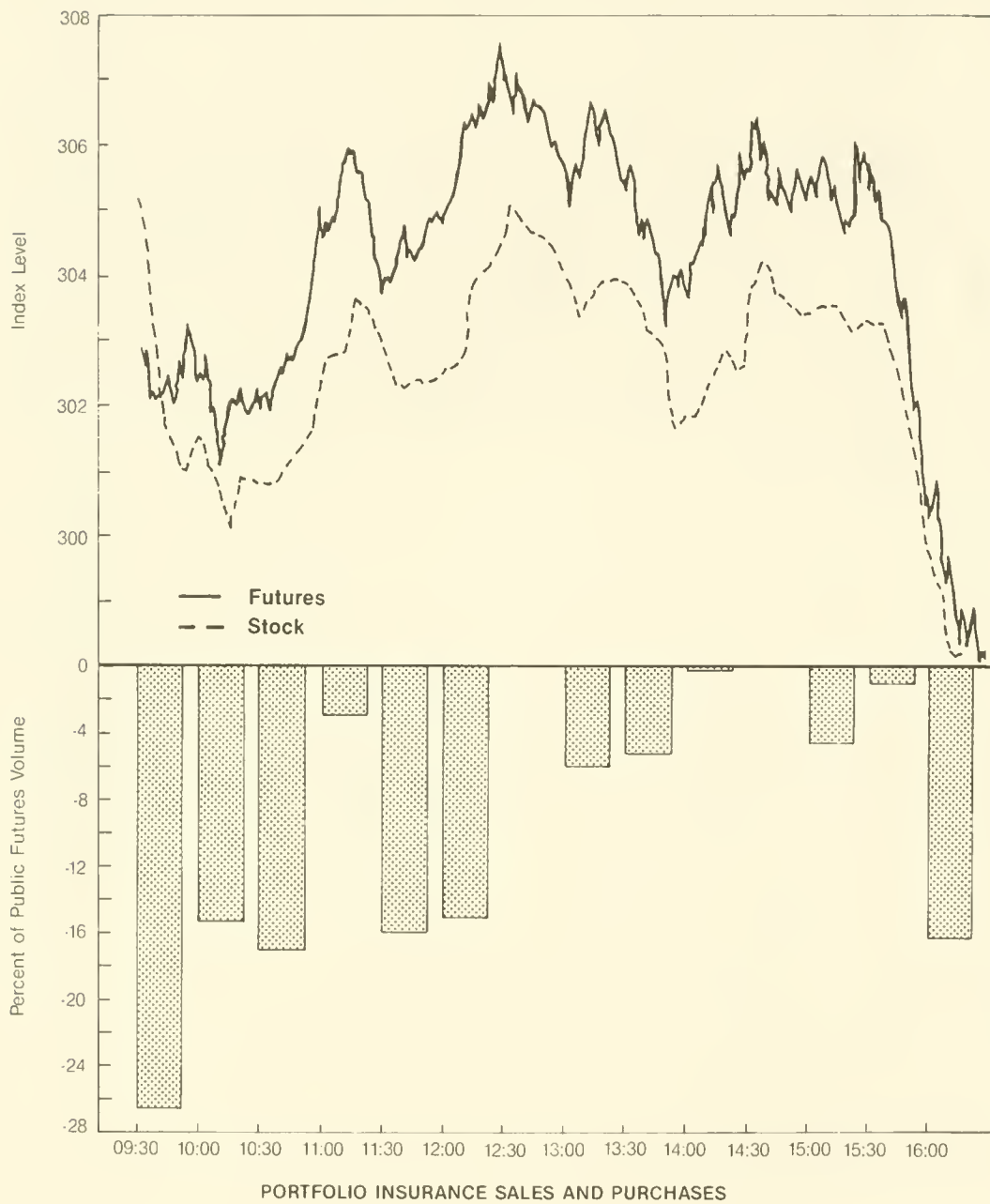


Figure 17  
**DOW JONES INDUSTRIAL ONE MINUTE CHART**  
 Thursday, October 15, 1987



Figure 18

# S & P INDEX AND FUTURES CONTRACT SPREAD

Thursday, October 15, 1987



**Friday, October 16.** Despite the sell-off at the close on Thursday in the U.S., trading in Tokyo on Friday was quiet. London was closed because of a freak hurricane.

Trading in the U.S. markets Friday was affected strongly by the expiration of options on several stock indices. A few firms noted for trading heavily in options were major participants on both sides of the futures market. Because the marked decline in stock prices had made it difficult for options traders to hedge effectively in the options market, much of their activity spilled into the futures market, where they sold futures as a hedge. In so doing, they responded in a manner similar to the reactive decisions of portfolio insurers. All told, options traders accounted for 7 percent of gross selling and 6 percent of gross buying in the futures market.

The stock market was relatively quiet until 11:00 a.m., with the Dow down only seven points, when futures selling by portfolio insurers picked up significantly, running over 2,000 contracts, or \$300 million of stock, an hour (see Figures 19 to 21). Index arbitrageurs quickly transmitted this pressure to the stock market, selling \$183 million of stock, 18 percent of NYSE volume. The Dow fell 30 points.

The stock market rallied briefly but then plummeted 70 points between noon and 2:00 p.m. Index arbitrage selling was active, accounting for about 16 percent of NYSE volume between 1:00 p.m. and 2:00 p.m. Large block transactions accounted for about half the volume in the 30 stocks making up the Dow. After a technical trading rally fizzled at about 2:30 p.m., the decline quickened in the last half hour of trading. Between 3:30 p.m. and 3:50 p.m., the Dow fell 50 points, then recovered 22 points in the last 10 minutes of trading. During this last half hour, index arbitrageurs had gross sales of \$620 million of stock, and institutions sold \$151 million of stock baskets. Together, this \$771 million of stock sales through the DOT system made up 45 percent of NYSE sales volume during this period.<sup>3</sup>

The Dow was off 108 points, the largest one day drop ever, on volume of 338 million shares. Sales by aggressive trading institutions were especially heavy and concentrated. Four of them sold over \$600 million of stock in total. To put this in perspective, an investor transacting \$10 million on a normal day would be considered an active trader.

Portfolio insurers and index arbitrageurs were also active. Five of the top seven net sellers in futures were portfolio insurers. As a group they accounted for sales equivalent to \$2.1 billion of stock, 17 percent of the non-market maker future sales. Index arbitrageurs transmitted \$1.7 billion of selling pressure to the stock market.

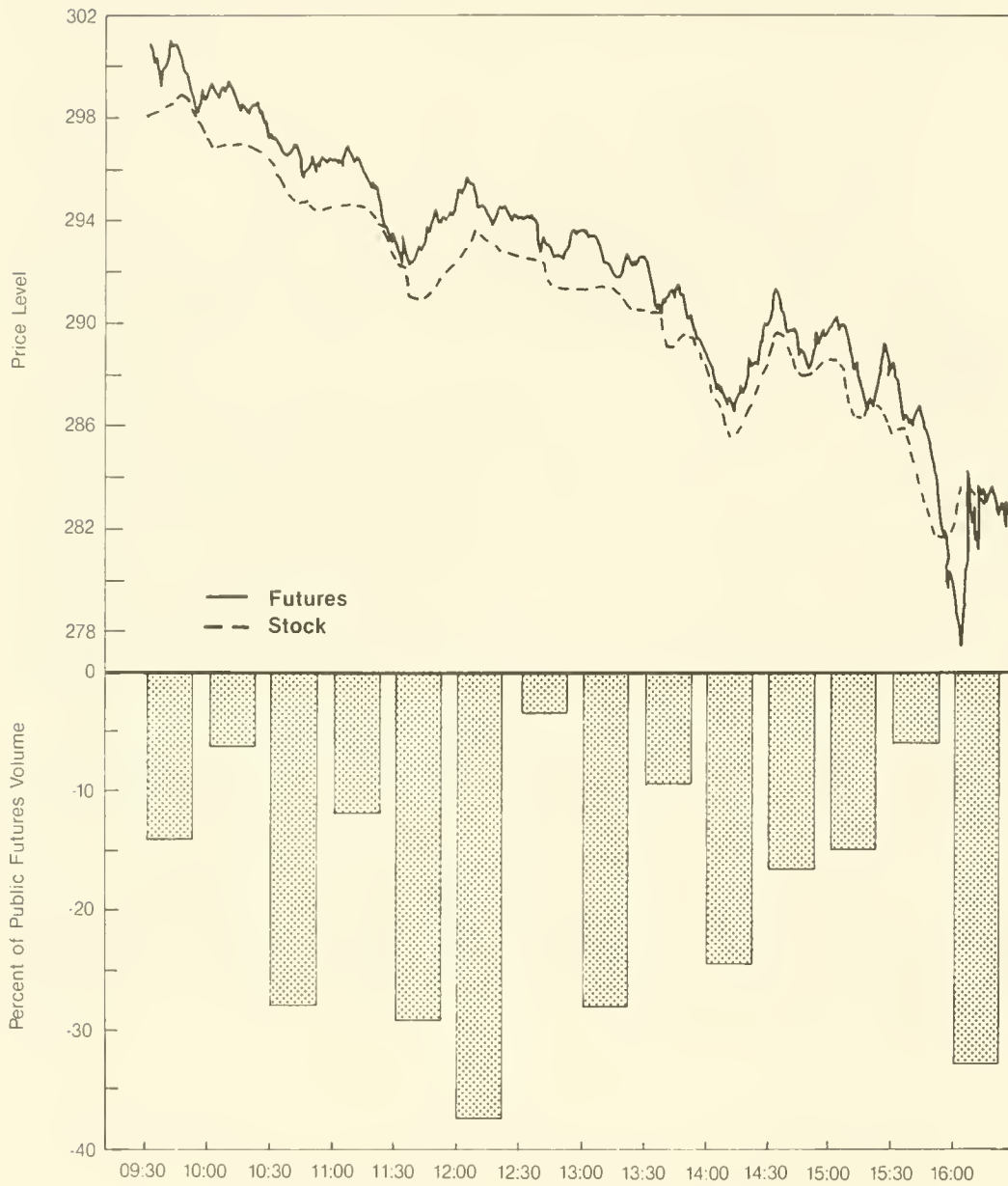
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<sup>3</sup>These gross sales exceed the numbers shown in Figure 20, which are net. All volume numbers in the daily graphs represent net sales or purchases for the period.

Figure 19

# S & P INDEX AND FUTURES CONTRACT

Friday, October 16, 1987



PORTFOLIO INSURANCE SALES AND PURCHASES



Figure 20

# DOW JONES INDUSTRIAL ONE MINUTE CHART

Friday, October 16, 1987

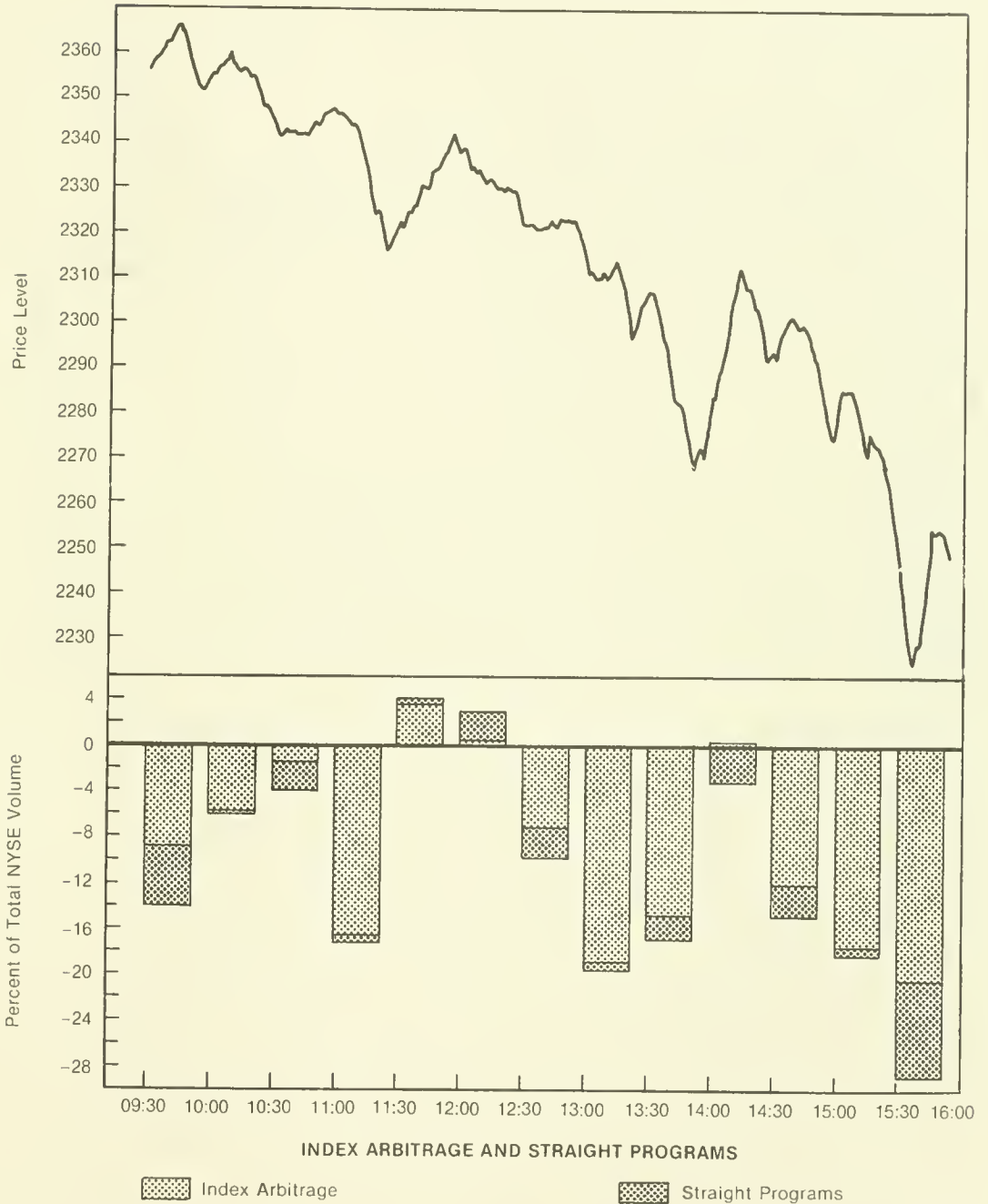


Figure 21

# S & P INDEX AND FUTURES CONTRACT SPREAD

Friday, October 16, 1987



**The Three Days in Perspective.** During October 14 to 16, the Dow fell by over 250 points. The selling was triggered primarily by two proximate causes: disappointingly poor merchandise trade figures, which put downward pressure on the dollar in currency markets and upward pressure on long term interest rates; and the filing of anti-takeover tax legislation, which caused risk arbitrageurs to sell stocks of takeover candidates resulting in their precipitate decline and a general ripple effect throughout the market. The market's decline created a huge overhang of selling pressure—enough to crush the equity markets in the following week. This overhang was concentrated within two categories of reactive sellers, portfolio insurers and a few mutual fund groups, and exacerbated by the actions of a number of aggressive trading-oriented institutions selling in anticipation of further declines.

An example may help illustrate the extent of the portfolio insurance overhang by Friday's close. One portfolio insurance client had followed exactly the instructions of its advisor during the Wednesday to Friday period. Over the weekend, the advisor informed the client that, based on Friday's market close, it should sell on Monday 70 percent of its remaining equities in order to conform to the parameters of the insurance model. This is, of course, an extreme example. But the typical portfolio insurance model calls for stock sales in excess of 20 percent of a portfolio in response to a 10 percent decline in the market.

Various sources indicate that \$60 to \$90 billion of equity assets were under portfolio insurance administration at the time of the market break.<sup>4</sup> Two consequences were evident. First, portfolio insurers were very active sellers during the Wednesday to Friday period. In the futures market, where they concentrated their activity during this week, they sold the equivalent in stocks of approximately \$530 million on Wednesday, \$965 million on Thursday and \$2.1 billion on Friday. Second, they approached Monday with a huge amount of selling already dictated by their models. With the market already down 10 percent, their models dictated that, at a minimum, \$12 billion (20 percent of \$60 billion) of equities should already have been sold. Less than \$4 billion had in fact been sold.

A small number of mutual fund groups were also confronted with an overhang. These funds had designed strategies which made it easy for customers to redeem mutual fund shares. On Friday alone, customer redemptions at these funds exceeded fund sales of stock by \$750 million. These customers were entitled to repayment based on market prices at the close on Friday. These funds also received substantial redemption requests over the weekend.

The activities of a small number of aggressive trading-oriented institutions both contributed to the decline during this week and posed the prospect of further selling pressure on Monday. These traders could well understand the strategies of the portfolio insurers and mutual funds. They could anticipate the selling those institutions would have to do in reaction to the market's decline. They could also see those institutions falling behind in their selling programs. The situation presented an opportunity for these traders to sell in anticipation of the forced selling by portfolio insurers and mutual funds, with the prospect of repurchasing at lower prices.

During this period, these trading-oriented institutions were active, typically on both sides of the market and often on the same day. On Thursday, seven of these trading-oriented institutions sold a total of just over \$800 million of stocks, 9 percent of NYSE volume. The same institution was the fourth largest seller of stocks and the second largest buyer. This institution also ranked third and fourth, respectively, in futures sales and purchases and was active in options trading. On Friday, seven aggressive trading-oriented institutions sold more than \$100 million each; four of the seven also bought more than \$100

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<sup>4</sup> Assets under portfolio insurance administration increased more than fourfold during 1987.

million. That day traders as a group sold \$1.4 billion of stocks and bought \$1.1 billion. Their activities on these days were a prelude to Monday's sell-off.

Index arbitrage was active throughout the three day period to transmit selling pressure from the futures market to the stock market. But as several charts make apparent (see Figures 14, 17 and 20), it was the timing of arbitrage activities, rather than the aggregate daily level, which had specific impact on the stock market. Heavy index arbitrage activity was most often coincident with substantial intraday stock market moves.

## Monday, October 19

In Tokyo, the Nikkei Index, Japan's equivalent of the Dow, fell 2.5 percent. Investors in London sold shares heavily, and by midday the market index there was down 10 percent. Selling of U.S. stocks on the London market was stoked by some U.S. mutual fund managers who tried to beat the expected selling on the NYSE by lightening up in London. One mutual fund group sold just under \$90 million of stocks in London.

Selling activity shifted to the U.S. when the equity markets opened. At 9:15 a.m., the MMI futures opened down 2.5 percent from an already weak close on Friday. Fifteen minutes later the S&P 500 futures also opened down under heavy selling pressure by portfolio insurers. During the first half hour of trading, a few portfolio insurers sold futures equivalent to just under \$400 million of stocks, 28 percent of the public volume.

By the scheduled 9:30 a.m. opening on the NYSE, specialists faced large order imbalances. In the DOT system alone, almost \$500 million of market sell orders were loaded before the market opened. Of this total, \$250 million were sales by index arbitrageurs responding to an apparent record futures discount. The remaining \$250 million included straight sell programs by a few portfolio insurers permitted by their clients to sell stocks as well as futures; this group would sell more or less consistently from the opening to the closing bell. There were also large sell orders on the floor for blocks of individual stocks by a small number of mutual funds.

Faced with this massive order imbalance, many specialists did not open trading in their stocks during the first hour. Nevertheless, volume was impressive; in the first half hour alone about \$2 billion crossed the tape. Of this total, about \$500 million, roughly 25 percent of volume in this period, came from one mutual fund group. Slightly less came from the execution of orders in the DOT system for index arbitrageurs and portfolio insurers. In addition, even as these trades were being executed through DOT, another \$500 million of sell orders were being loaded into the system backlog. Thus, sell orders from a few institutional traders overwhelmed the stock market at the opening (see Figures 22 to 24).

During the first hour, the reported levels of the S&P and Dow indices reflected out-of-date Friday closing prices for the large number of stocks which had not yet been opened for trading. The result was an apparent record discount for the futures relative to stocks. Based on this apparent discount, index arbitrageurs entered sell-at-market orders through DOT, planning to cover by later purchases of futures at lower prices. However, specialists ultimately opened their stocks at sharply lower levels, in line with the prices at which futures had opened earlier. As this fact became evident, index arbitrageurs realized they had sold stock at prices lower than expected. By 10:30 a.m., when most stocks had opened, the Dow was around 2,150 compared with the Friday close of near 2,250.

Starting around 10:50 a.m., these arbitrageurs rushed to cover their positions through purchases of futures. The result was an immediate rise in the futures market. By 11:00 a.m., futures were at a premium, and the stock market in turn began an hour-long rally.

Figure 22  
**S & P INDEX AND FUTURES CONTRACT**  
 Monday, October 19, 1987

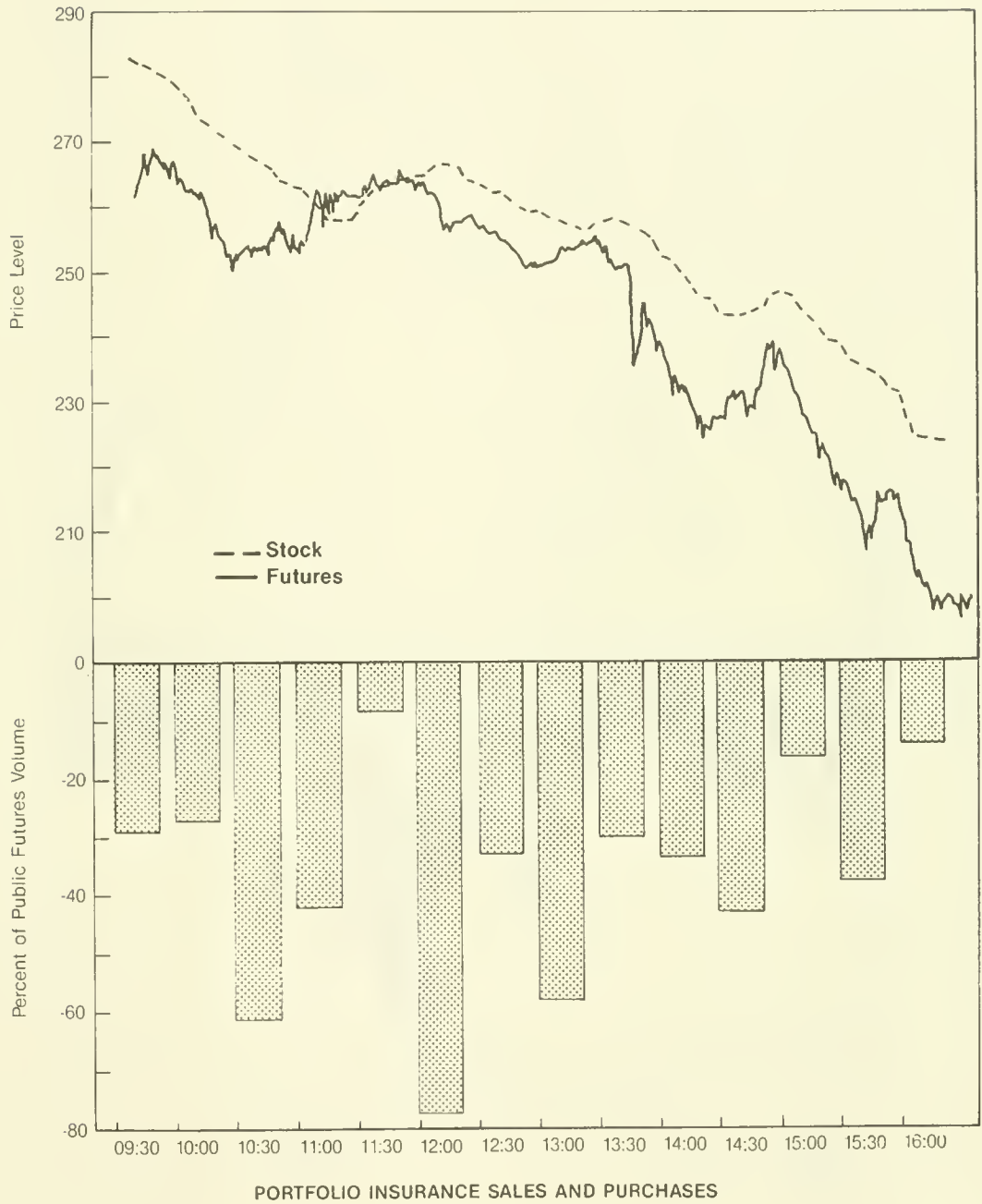




Figure 23

# DOW JONES INDUSTRIAL ONE MINUTE CHART

Monday, October 19, 1987

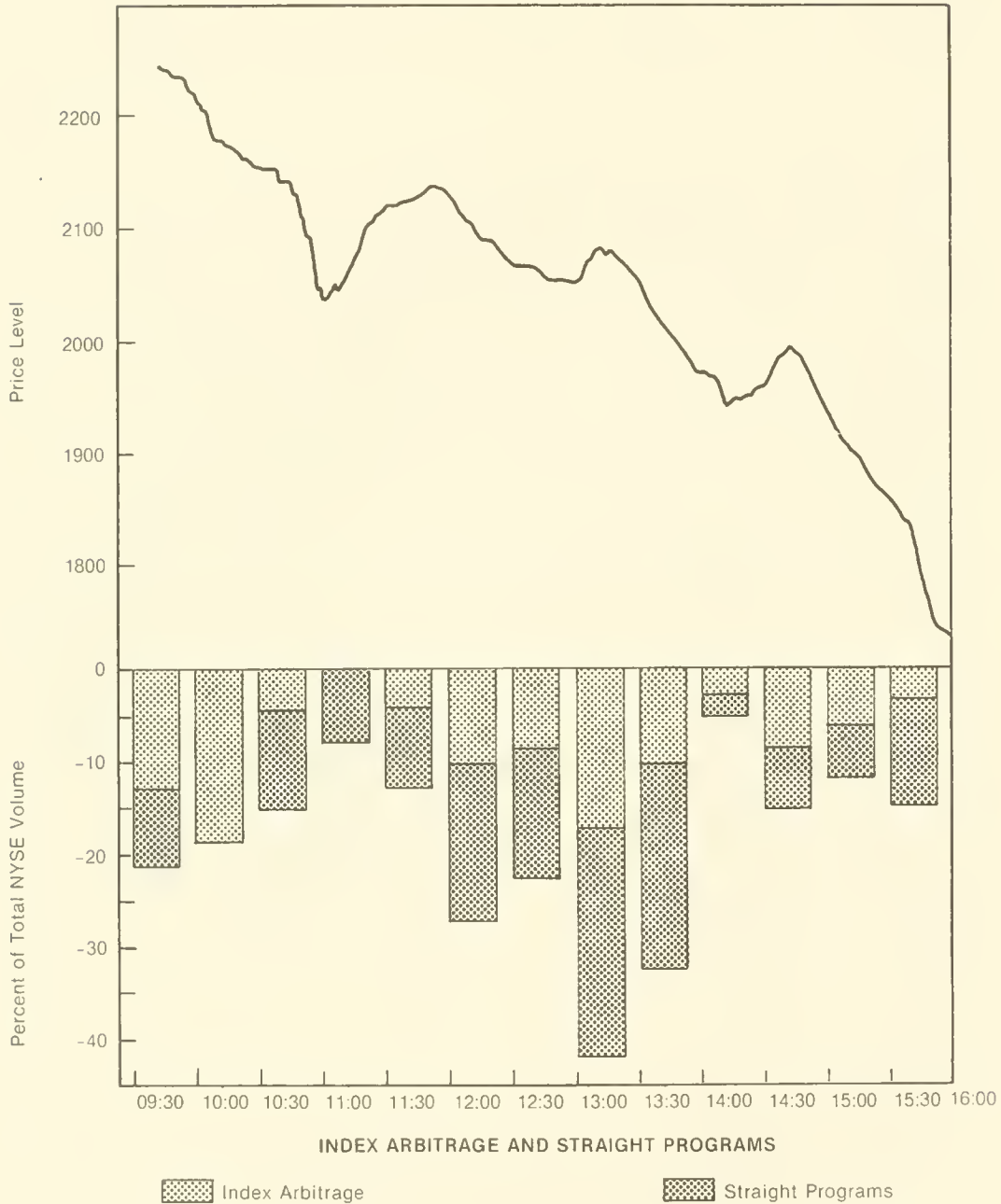


Figure 24  
**S & P INDEX AND FUTURES CONTRACT SPREAD**

Monday, October 19, 1987





Even as the futures and then the stock markets rallied, one portfolio insurance client began to modify its selling strategy in response to the anticipated volume of sales. On previous days and during the first hour of Monday, this institutional investor had relied on futures sales as the method to increase its cash position. Around 10:30 a.m., this institution augmented futures sales with straight stock sell programs through DOT. These sales of stock baskets by this institution would ultimately continue in 13 waves of almost \$100 million each until about 2:00 p.m. and total just under \$1.1 billion.

Thus, one hour into the trading day, two mechanisms were operating at high volume through DOT to transmit futures selling pressure to the stock market: index arbitrage and the diversion of portfolio insurance sales from the futures market into straight stock sell programs.

Trading on the NYSE and CME is shown schematically in Figure 25. In New York, the stock exchange traded about \$21 billion of stock. In Chicago, the CME traded futures equivalent to almost \$20 billion, of which about 50 percent was trading by public customers. Including trading by specialists and market makers, almost \$41 billion of stock or equivalent futures was traded on these exchanges.

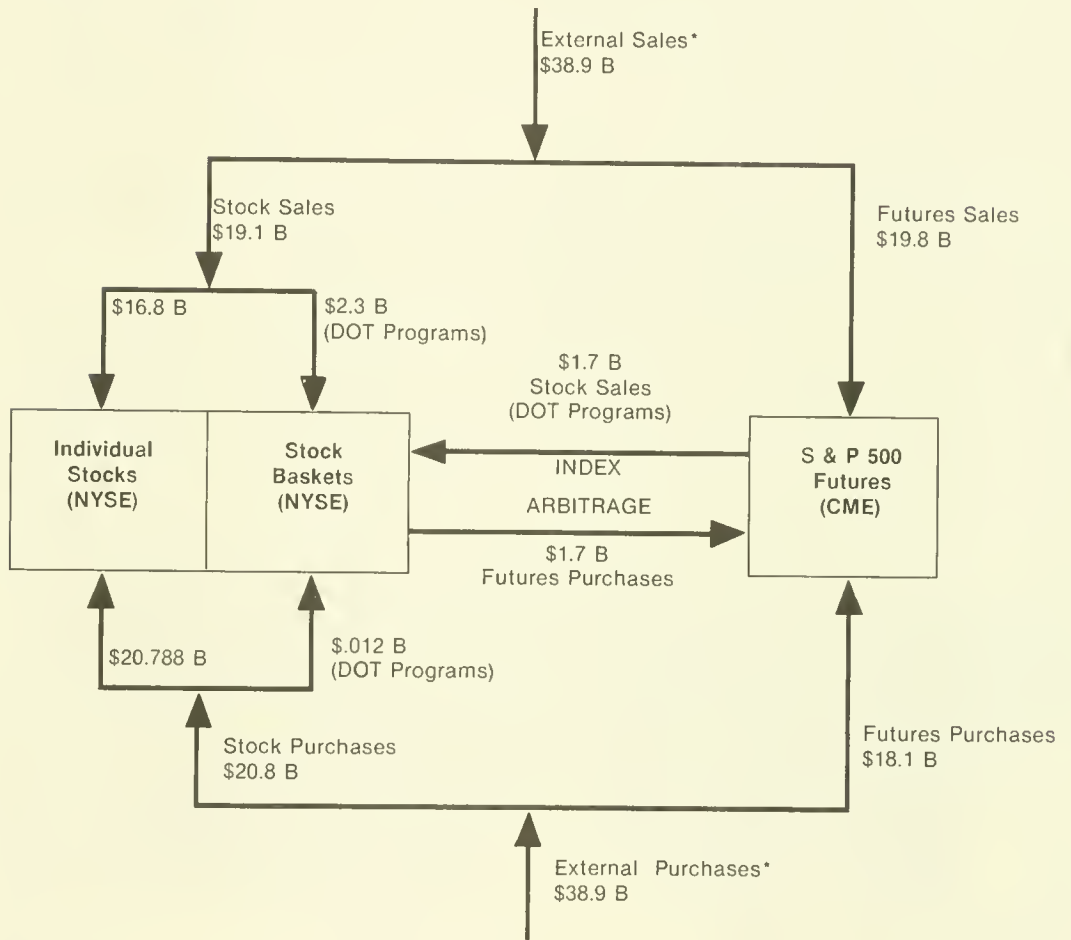
The selling pressure in futures led to discounts of historic size. In response to these huge discounts, three mechanisms came into play to transmit selling pressure from futures to stocks. First, index arbitrage executed \$1.7 billion of program sales through DOT, matched by equivalent futures purchases. Second, there were additional straight program sales of stock equal to \$2.3 billion. Most of this was portfolio insurance selling diverted from the futures market to the stock market by the large discount. Taken together, arbitrage programs and straight sell programs totaled \$4 billion, almost 20 percent of the sales on the first 600 million share day in the NYSE's history. These program sales would no doubt have been even higher if the DOT system had functioned more effectively after 2:00 p.m. Third, some indeterminate portion of the \$41 billion of purchases was diverted from more expensive stocks to cheaper futures.

Starting around 11:40 a.m., portfolio insurance sales overwhelmed the rally. Between then and 2:00 p.m., the Dow fell from 2,140 to 1,950, a decline of just under 9 percent. The last 100 points of this decline occurred after reports began circulating that the NYSE might close. The break below 2,000 was the first time this level had been penetrated since January 7, 1987. Over these two hours, the futures index fell 14.5 percent. Portfolio insurance activity intensified. Between 11:40 a.m. and 2:00 p.m., in the futures market portfolio insurers sold approximately 10,000 contracts, equivalent to about \$1.3 billion and representing about 41 percent of futures volume exclusive of market makers (i.e. locals). In addition, portfolio insurers authorized to sell stock directly sold approximately \$900 million in stocks on the NYSE during this period. In the stock and futures markets combined, portfolio insurers contributed over \$3.7 billion in selling pressure by early afternoon.

Throughout most of this period, index arbitrage had succeeded in transmitting futures selling pressure back to the stock market. After about 2:00 p.m., index arbitrage slowed because of concerns about delays in DOT and the consequent ineffective execution of basket sales. Another source of sales through DOT stopped at around 2:00 p.m. when the one institution which had already sold 13 baskets of stock, each worth just under \$100 million, discontinued its sell program. Up until this hour, index arbitrage and straight program selling totaled \$3.2 billion. Relieved of these selling pressures, the stock market enjoyed a brief respite. The Dow rallied back to the psychologically important 2,000 level by 2:45 p.m.

The result of the withdrawal of some index arbitrage and diverted portfolio insurer sales from the DOT system was that neither mechanism was sufficient to keep the stock and futures markets from disconnecting. Enormous

Figure 25  
**SCHEMATIC OF EQUITY AND PURCHASES**  
**NYSE STOCKS AND CME FUTURES**  
 Monday, October 19th



\*Includes Specialists and Market Makers

discounts of futures relative to stocks were free to develop as the futures market plummeted, disconnected from the stock market.

The rest of Monday afternoon was disastrous. Heavy futures selling continued by a few portfolio insurers. In the last hour and one half of futures trading, these institutions sold 6,000 contracts, the equivalent of \$660 million of stock. With some index arbitrageurs unwilling to sell stock through DOT, they also withdrew from the futures side of their trading, denying buying support to the futures market, allowing it to fall to a discount of 20 index points. In addition, the appearance of this dysfunctionally large discount inhibited buyers in the stock market. With these stock buyers gone, the Dow sank almost 300 points in the last hour and one quarter of stock trading, to close at 1,738. Portfolio insurance futures selling continued even after stocks closed.

All told, Monday, October 19 was perhaps the worst day in the history of U.S. equity markets. By the close of trading, the Dow index had fallen 508 points, almost 23 percent, on volume of 604 million shares worth just under \$21 billion. Even worse, the S&P 500 futures had fallen 29 percent on total volume of 162,000 contracts, valued at almost \$20 billion.

This record volume was concentrated among relatively few institutions. In the stock market, the top four sellers alone accounted for \$2.85 billion, or 14 percent of total sales. The top 15 sellers as a group accounted for \$4.1 billion, or about 20 percent of total sales. The top 15 buyers purchased \$2.2 billion, almost 11 percent of total volume.<sup>5</sup> In the futures market the top 10 sellers accounted for sales equivalent to \$5 billion, roughly 50 percent of the non-market maker total volume.

The contribution of a small number of portfolio insurers and mutual funds to the Monday selling pressure is even more striking. Out of total NYSE sales of just under \$21 billion, sell programs by three portfolio insurers made up just under \$2 billion. Block sales of individual stocks by a few mutual funds accounted for another \$900 million. About 90 percent of these sales were executed by one mutual fund group. In the futures market, portfolio insurer sales amounted to the equivalent of \$4 billion of stocks, or 34,500 contracts, equal to over 40 percent of futures volume, exclusive of locals' transactions; \$2.8 billion was done by only three insurers. In the stock and futures markets together, one portfolio insurer sold stock and futures with underlying values totaling \$1.7 billion. Huge as this selling pressure from portfolio insurers was, it was a small fraction of the sales dictated by the formulas of their models.

## Tuesday, October 20

Overnight the Tokyo and London stock markets declined dramatically, falling just under 15 percent. In the U.S., the Federal Reserve issued a statement just before the equity market's opening that it would provide needed liquidity to the financial system. On U.S. equity markets, the start of trading Tuesday stood in marked contrast to Monday. Both stock and futures markets opened with dramatic rises. On the NYSE, many stocks could not open due to "buy-side" order imbalances. The majority of these imbalances were made up of "market orders," primarily from value-oriented investors and traders with short stock or futures positions. The NYSE specialists, burdened with more than \$1 billion in stock inventories at Monday's close, opened stocks at higher levels and reduced their inventories. In the first hour, the Dow index rose just under 200 points (see Figures 26 to 28).

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<sup>5</sup> This compares with specialist buying power estimated to be no more than \$3 billion at the start of Monday.

Figure 26  
S & P INDEX AND FUTURES CONTRACT

Tuesday, October 20, 1987

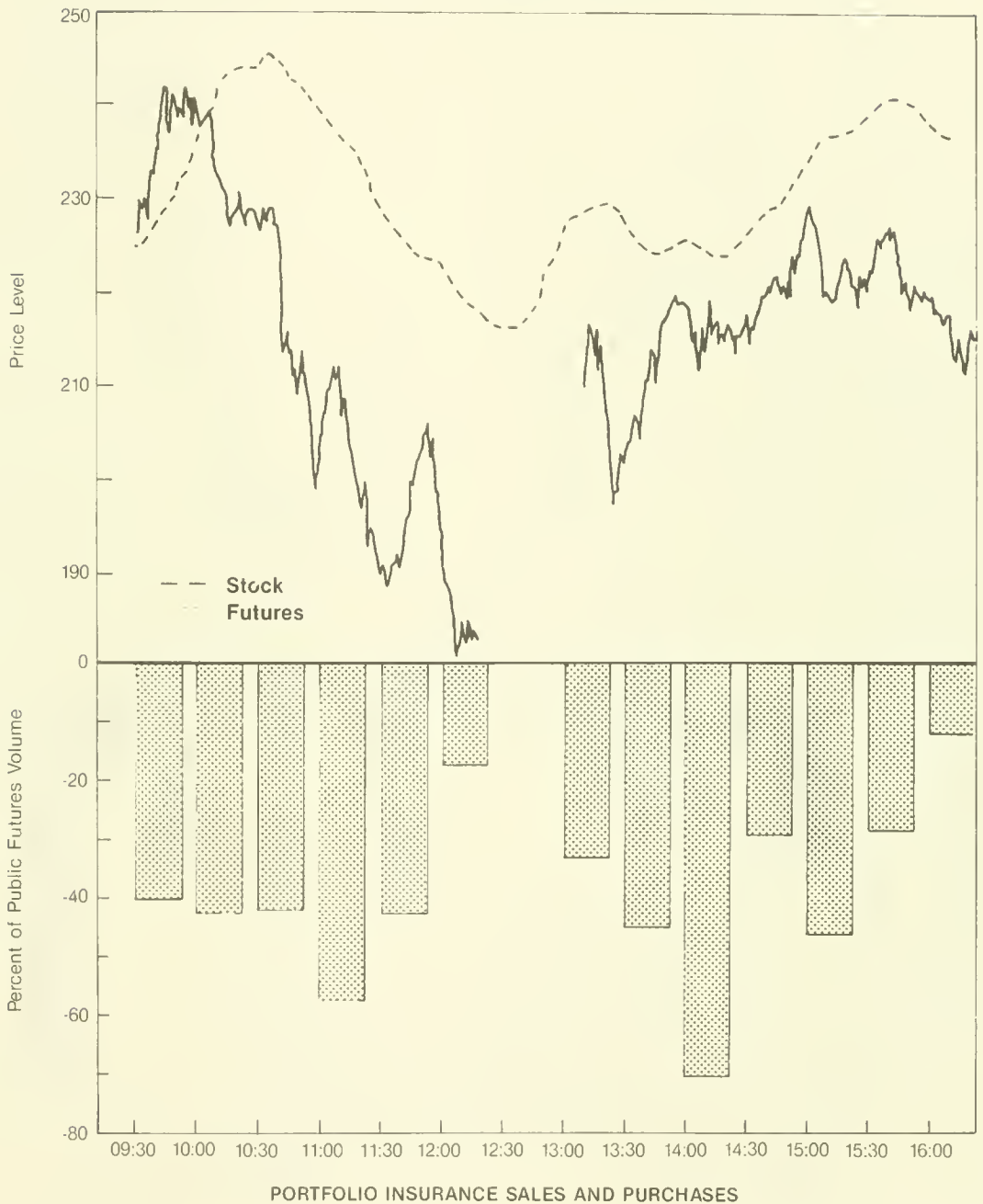


Figure 27  
**DOW JONES INDUSTRIAL ONE MINUTE CHART**  
 Tuesday, October 20, 1987



Figure 28  
**S & P INDEX AND FUTURES CONTRACT SPREAD**

Tuesday, October 20, 1987





In the futures market, the S&P 500 contract opened up 10 percent at 223. Buying pressure came from aggressive trading-oriented institutions who wanted to buy the market but were unsure how quickly they could get execution on the NYSE. Buying pressure also came from traders wanting to close out short positions after hearing rumors about the financial viability of the CME's clearinghouse. These rumors were unfounded, although two New York investment banks had to wait until late in the afternoon before receiving variation margin payments totaling about \$1.5 billion from the CME clearinghouse. The rumors did affect Tuesday's trading, with futures volume dropping 22 percent below Monday's level.

The morning rally in the futures market ended abruptly at 10:00 a.m., as heavy selling by portfolio insurers and traders overwhelmed buying. Portfolio insurance selling in the first hour totaled the equivalent of almost \$900 million of stock. The futures contract quickly moved to an enormous discount (as large as 40 index points) as the market went into freefall, plummeting 27 percent between 10:00 a.m. and 12:15 p.m. By the end of this period, portfolio insurance sales for the day totaled the equivalent of \$1.75 billion of stock; by the end of the day it added up to 40 percent of futures activity of public sellers. At its low, the S&P 500 futures contract price implied a Dow level of about 1,400. Contributing greatly to this freefall was the lack of index arbitrage buying which would normally have been stimulated by the huge discount of futures to stock. At its opening, the NYSE had prohibited broker-dealers from using the DOT system to execute index arbitrage orders for their own accounts. As on Monday afternoon, the primary linkage between the two markets had been disconnected.

The stock market also ran out of buying support by midmorning and began to follow the futures market down. Although individual stocks were opening and closing again at various times all morning and early afternoon, record or near-record volume was executed in every half hour period. During the first two hours, 259 million shares were traded. Selling pressure was widespread, much of it from mutual funds who were dealing with expected redemptions, portfolio insurers who were switching from selling futures to selling stocks, and some index arbitrageurs. In addition, the large discount between futures and stocks acted as a "billboard," worrying many investors that further declines were imminent. By 12:30 p.m., the Dow had fallen to just above 1,700.

At this point a number of exchanges closed trading temporarily. The CBOE suspended trading at 11:45 a.m., based on its rule that trading on the NYSE must be open in at least 80 percent of the stocks which constitute the options index it trades. At 12:15 p.m., the CME announced a trading suspension in reaction to individual stock closings on the NYSE and the rumor of the imminent closing of the NYSE itself.

During Tuesday morning, the dynamics of trading in stocks and futures had become dysfunctional. The futures market was falling under selling pressure from portfolio insurers. Normally, the large discount would have attracted buyers; under the current circumstances, however, some potential buyers were afraid of the credit risk perceived to exist in futures and many stock investors were simply not authorized to buy futures. In addition, index arbitrage activity was limited because DOT was no longer available to some market participants. Because of the futures discount, those market professionals who could sell stocks did so. At the same time, the huge discount at which futures were selling made stocks look "expensive" and stifled buying demand in the stock market. The stock market "drafted" down in the wake of the futures market. The result was sell-side order imbalances in both markets, leading to the near disintegration of market pricing.

Closing the futures market had a number of marked effects on the equity market. On the sell side, it disconnected most of the portfolio insurers from the market. On the buy side, there was no longer a "cheap" futures alternative



to buying stocks. Finally, the negative psychology of the “billboard” effect was eliminated. The reaction of the stock market was dramatic: the Dow rallied 125 points in the next 45 minutes.

When the futures market reopened just after 1:00 p.m., it was still at a substantial 17 point discount to stocks. Many of the effects which had rallied the stock market were reversed. Portfolio insurers resumed selling futures and the stock market began drafting down again. The Dow lost almost 100 points in the next half hour.

By early Tuesday afternoon, the equity market was again in freefall and needed reassurance. This came from a series of announced stock buyback programs by major corporations. By committing to these programs, the corporations provided needed support for the future level of their stocks. The buying power represented by these announced programs would ultimately total over \$6 billion by Tuesday evening.<sup>6</sup> Around 2:00 p.m., the combined effect of buybacks already announced and those expected turned the equity market around. The Dow rallied 170 points between 2:00 p.m. and 3:30 p.m. After a decline in the last 30 minutes induced by program sales, the Dow closed with a net gain for the day of over 100 points, the largest gain on record.

Although Monday was the day of the dramatic stock market decline, it was midday Tuesday that the securities markets and the financial system approached breakdown. First, the ability of securities markets to price equities was in question. The futures and stock markets were disconnected. There were few buyers in either market and individual stocks ceased to trade. Investors began to question the value of equity assets.

Second, and more serious, a widespread credit breakdown seemed for a period of time quite possible. Amid rumors, subsequently revealed to be unfounded, of financial failures by some clearinghouses and several major market participants, and exacerbated by the fragmentation and complexity of the clearing process, the financial system came close to gridlock. Intermarket transactions required funds transfers and made demands for bank credit almost beyond the capacity of the system to provide.

## Summary

Although the equity market’s behavior during this week was complex and rich in detail, several important themes emerge. First, reactive selling by institutions, which followed portfolio insurance strategies and sought to liquidate large fractions of their stock holdings regardless of price, played a prominent role in the market break. By reasonable estimates, the formulas used by portfolio insurers dictated the sale of \$20 to \$30 billion of equities over this short time span. Under such pressure, prices must fall dramatically. Transaction systems, such as DOT, or market stabilizing mechanisms, such as the NYSE specialists, are bound to be crushed by such selling pressure, however they are designed or capitalized.

Second, a few mutual funds sold stock in reaction to redemptions. To the market their behavior looked much like that of the portfolio insurers, that is, selling without primary regard to price. Third, some aggressive trading-oriented investors, seizing the profit opportunity presented by the predictable forced selling by other institutions, contributed to the market break. Fourth, much of the selling pressure was concentrated in the hands of surprisingly few institutions. A handful of large investors provided the impetus for the sharpness of the decline.

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<sup>6</sup> A number of companies made buyback announcements during Monday afternoon and Tuesday morning. Those made early Tuesday afternoon, however, came from many “blue chip” companies and seemed sufficient to turn the tide of investor sentiment.

Fifth, as the Figures showing intraday trading patterns make clear, futures and stock market movements were inextricably related. Portfolio insurers sold in the futures market, forcing prices down. The downward price pressure in the futures market was then transmitted to the stock market by index arbitrage and diverted portfolio insurance sales. While index arbitrageurs may not have accounted for a substantial part of total daily volume, they were particularly active during the day at times of substantial price movements. They were not, however, the primary cause of the movements; rather, they were the transmission mechanism for the pressures initiated by other institutions.

Finally, there were periods when the linkage between stock and futures markets became completely disconnected, leading to a freefall in both markets.

The juxtaposition of a record 508 point decline on Monday and a record 102 point bounceback on Tuesday suggests that these trading forces outstripped the capacity of market infrastructures.

The over-the-counter market and foreign stock markets experienced concurrent declines. The dominant position of NYSE stocks made such a sympathetic reaction predictable.

**FIGURE 29.—NYSE LARGE INSTITUTIONAL DOLLAR  
VOLUME—SALES <sup>1</sup>**

[In millions of dollars]

|  | October 15   | October 16   | October 19   | October 20   |
|--|--------------|--------------|--------------|--------------|
| SELL   |              |              |              |              |
| Portfolio insurers.....                      | \$257        | \$566        | \$1,748      | \$698        |
| Other pension .....                          | 190          | 794          | 875          | 334          |
| Trading-oriented investors .....             | 1,156        | 1,446        | 1,751        | 1,740        |
| Mutual funds .....                           | 1,419        | 1,339        | 2,168        | 1,726        |
| Other financial .....                        | 516          | 959          | 1,416        | 1,579        |
| <b>Total .....</b>                           | <b>3,538</b> | <b>5,104</b> | <b>7,598</b> | <b>6,077</b> |
| Index arbitrage (included in<br>above) ..... | 717          | 1,592        | 1,774        | 128          |

<sup>1</sup> Sample does not include: (1) individual investors, (2) institutional accounts with purchases and sales less than \$10 million per day and (3) certain sizable broker/dealer trades.

**FIGURE 30.—NYSE LARGE INSTITUTIONAL DOLLAR  
VOLUME—PURCHASES <sup>1</sup>**

[In millions of dollars]

|  | October 15   | October 16   | October 19   | October 20   |
|--|--------------|--------------|--------------|--------------|
| BUY  |              |              |              |              |
| Portfolio insurers.....                      | \$201        | \$161        | \$449        | \$863        |
| Other pension .....                          | 368          | 773          | 1,481        | 920          |
| Trading-oriented investors .....             | 1,026        | 1,081        | 1,316        | 1,495        |
| Mutual funds .....                           | 998          | 1,485        | 1,947        | 1,858        |
| Other financial .....                        | 798          | 1,221        | 2,691        | 2,154        |
| <b>Total .....</b>                           | <b>3,391</b> | <b>4,721</b> | <b>7,884</b> | <b>7,290</b> |
| Index arbitrage (included in<br>above) ..... | 407          | 394          | 110          | 32           |

<sup>1</sup> Sample does not include: (1) individual investors, (2) institutional accounts with purchases and sales less than \$10 million per day and (3) certain sizable broker/dealer trades

**FIGURE 31.—CME LARGE TRADER SALES**

[Dollar amounts in millions]

|  | October 14      | October 15      | October 16      | October 19      | October 20      |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|
| SELL   |                 |                 |                 |                 |                 |
| Portfolio insurers.....  | \$534           | \$968           | \$2,123         | \$4,037         | \$2,818         |
| Arbitrageurs.....  | \$108           | \$407           | \$392           | \$129           | \$31            |
| Options .....  | \$554           | \$998           | \$1,399         | \$898           | \$635           |
| Locals .....   | \$7,325         | \$7,509         | \$7,088         | \$5,479         | \$2,718         |
| Other pension .....  | \$37            | \$169           | \$234           | \$631           | \$514           |
| Trading-oriented investors .....                                     | \$1,993         | \$2,050         | \$3,373         | \$2,590         | \$2,765         |
| Foreign.....   | \$398           | \$442           | \$479           | \$494           | \$329           |
| Mutual funds .....   | \$46            | \$3             | \$11            | \$19            | \$40            |
| Other financial .....  | \$49            | \$109           | \$247           | \$525           | \$303           |
| <b>Published total.....</b>  | <b>\$16,949</b> | <b>\$18,830</b> | <b>\$19,640</b> | <b>\$18,987</b> | <b>\$13,641</b> |
| Volume accounted for.....  | \$11,045        | \$12,655        | \$15,347        | \$14,801        | \$10,152        |
| Percent accounted for .....  | 65.2            | 67.2            | 78.1            | 78.0            | 74.4            |
| Portfolio insurance: Percent of<br>publicly accounted for volume ... | 14.37           | 18.80           | 25.70           | 43.30           | 37.91           |

FIGURE 32.—CME LARGE TRADER PURCHASES

[Dollar amounts in millions]

|  | October 14 | October 15 | October 16 | October 19 | October 20 |
|--|------------|------------|------------|------------|------------|
| BUY  |            |            |            |            |            |
| Portfolio insurers.....  | \$71       | \$171      | \$109      | \$113      | \$505      |
| Arbitrageurs.....  | \$1,313    | \$717      | \$1,705    | \$1,582    | \$119      |
| Options .....  | \$594      | \$864      | \$1,254    | \$915      | \$544      |
| Locals .....   | \$7,301    | \$7,530    | \$7,125    | \$5,682    | \$2,689    |
| Other pension .....  | \$90       | \$76       | \$294      | \$447      | \$1,070    |
| Trading-oriented investors .....                                     | \$1,494    | \$2,236    | \$3,634    | \$4,510    | \$4,004    |
| Foreign.....   | \$240      | \$298      | \$443      | \$609      | \$418      |
| Mutual funds .....   | \$0        | \$27       | \$73       | \$143      | \$51       |
| Other financial .....  | \$155      | \$57       | \$126      | \$320      | \$517      |
| Published total.....   | \$16,949   | \$18,830   | \$19,640   | \$18,987   | \$13,641   |
| Volume accounted for.....  | \$11,259   | \$11,976   | \$14,763   | \$14,320   | \$9,915    |
| Percent accounted for .....  | 66.4       | 63.6       | 75.2       | 75.4       | 72.7       |
| Portfolio insurance: Percent of<br>publicly accounted for volume ... | 1.80       | 3.86       | 1.43       | 1.31       | 6.98       |

FIGURE 33.—CME LARGE TRADER CONTRACT VOLUME (SALES)

[In number of contracts]

|                                  | October 14 | October 15 | October 16 | October 19 | October 20 |
|----------------------------------|------------|------------|------------|------------|------------|
| SELL                             |            |            |            |            |            |
| Portfolio insurers.....          | 3,460      | 6,413      | 14,627     | 34,446     | 26,146     |
| Arbitrageurs.....                | 700        | 2,700      | 2,700      | 1,100      | 285        |
| Options .....                    | 3,589      | 6,618      | 9,643      | 7,667      | 5,890      |
| Locals .....                     | 47,426     | 49,773     | 48,847     | 46,753     | 25,214     |
| Other pension .....              | 238        | 1,122      | 1,615      | 5,387      | 4,770      |
| Trading-oriented investors ..... | 12,906     | 13,587     | 23,246     | 22,098     | 25,651     |
| Foreign.....                     | 2,575      | 2,927      | 3,301      | 4,212      | 3,050      |
| Mutual funds .....               | 300        | 19         | 77         | 160        | 375        |
| Other financial .....            | 317        | 720        | 1,705      | 4,478      | 2,808      |
| Published total.....             | 109,740    | 124,810    | 135,344    | 162,022    | 126,562    |
| Contracts accounted for.....     | 71,511     | 83,879     | 105,761    | 126,301    | 94,189     |
| Percent accounted for .....      | 65         | 67         | 78         | 78         | 74         |

FIGURE 34.—CME LARGE TRADER CONTRACT VOLUME (PURCHASES)

[In number of contracts]

|                                  | October 14 | October 15 | October 16 | October 19 | October 20 |
|----------------------------------|------------|------------|------------|------------|------------|
| BUY                              |            |            |            |            |            |
| Portfolio insurers.....          | 461        | 1,136      | 751        | 964        | 4,682      |
| Arbitrageurs.....                | 8,500      | 4,750      | 11,750     | 13,500     | 1,100      |
| Options .....                    | 3,848      | 5,725      | 8,639      | 7,804      | 5,049      |
| Locals .....                     | 47,272     | 49,911     | 49,098     | 48,487     | 24,945     |
| Other pension.....               | 582        | 504        | 2,029      | 3,816      | 9,931      |
| Trading-oriented investors ..... | 9,673      | 14,823     | 25,043     | 38,482     | 37,149     |
| Foreign.....                     | 1,553      | 1,972      | 3,051      | 5,199      | 3,874      |
| Mutual funds .....               | 0          | 179        | 505        | 1,217      | 473        |
| Other financial .....            | 1,006      | 378        | 867        | 2,727      | 4,793      |
| Published total.....             | 109,740    | 124,810    | 135,344    | 162,022    | 126,562    |
| Contracts accounted for.....     | 72,895     | 79,378     | 101,733    | 122,196    | 91,996     |
| Percent accounted for .....      | 66         | 64         | 75         | 75         | 73         |

# Chapter Five

## Market Performance

Market performance can be measured against a variety of quantitative and qualitative criteria, including the availability of the market, the liquidity and depth provided by the market makers, the orderliness and fairness of the market and the strength of the clearing and credit systems that support the market. The events of October 19 and 20 tested the capacity of the equity market to a degree that was not widely anticipated.

### Availability of Market

The most immediately striking fact about the performance of the equity market during the market break is that, in the face of selling pressure of unprecedented severity, it handled a record volume of transactions. A summary of the volumes traded in each marketplace follows:

#### PERCENTAGE OF DAILY AVERAGE TRADING VOLUME

|                  | NYSE <sup>1</sup> | NASDAQ <sup>1</sup> | S&P 500<br>futures <sup>2</sup> | S&P 100<br>option <sup>2</sup> |
|------------------|-------------------|---------------------|---------------------------------|--------------------------------|
| October 14 ..... | 115               | 97                  | 135                             | 162                            |
| October 15 ..... | 145               | 107                 | 153                             | 180                            |
| October 16 ..... | 188               | 131                 | 166                             | 133                            |
| October 19 ..... | 335               | 149                 | 199                             | 72                             |
| October 20 ..... | 337               | 189                 | 156                             | 42                             |

<sup>1</sup> Based on daily average trading volume from January 1 to September 30, 1987.

<sup>2</sup> Based on daily average trading volume from January 1 to October 31, 1987.

The extent to which trading in listed stocks and the S&P 500 futures contract was suspended during the critical days of October 19 and 20 was, in light of the pressures brought to bear, surprisingly limited. On the morning of October 19, eight percent of NYSE issues, or a total of 187 stocks, failed to open for trading at or near 9:30 a.m. By 11:30 a.m., 41 of these stocks remained unopened, and by noon all but 25 were trading. During the course of October 19, trading was halted in seven stocks. On the morning of October 20, 90 stocks failed to open promptly and by 11:30 a.m., all but 15 of these were trading. However, during the course of October 20, trading was halted in 175 stocks, including some of the most actively traded issues on the exchange. The S&P 500 futures market was open throughout the day on Monday and halted trading only between 12:15 p.m. and 1:05 p.m. on Tuesday.

While total NASDAQ trading volume increased during the market break, it declined dramatically as a percentage of NYSE volume. From a level of 83 percent of NYSE volume prior to the break, NASDAQ volume dropped to 37 percent of NYSE levels on October 19, and 47 percent on October 20.

The options market had great difficulty trading on both Monday and Tuesday. On October 19, the S&P 100 option went through two rotations before opening for free trading at 12:36 p.m. On October 20, the S&P 100 option again required two rotations to open and the CBOE halted trading for about one and one half hours. Thus, free trading did not begin until 3:23 p.m., which allowed just 52 minutes of free trading.



Thus, all marketplaces, except the options market and, to some extent, the over-the-counter market, remained reasonably available for trading on October 19 and October 20.

However, the performance of financial markets cannot be judged solely in terms of volumes traded. The terms on which trades were executed are equally important. Effective market making mechanisms should sustain fair and orderly trading in several critical respects. At best, market mechanisms should smooth out temporary fluctuations in market prices. At a minimum, they should not exacerbate price fluctuations. Also, trading should be conducted on an equitable basis. Similar orders entered under equal conditions should not be executed on widely different terms. In neither of these respects did market mechanisms perform effectively during the critical days of the October market break.

## Price Behavior

Throughout the week of October 12 to 16, market mechanisms for equity-related instruments coped reasonably well with heavy and gradually increasing selling pressure. Even on Friday, October 16, the major stock markets handled a record volume and a substantial selling imbalance without the kinds of extreme price deviations that occurred on the 19th and 20th. Compared to the events of the 19th and 20th, the stock indices also tracked their respective futures contracts reasonably.

In contrast, the price performance of market mechanisms on the 19th and 20th appears to have been notable both in terms of history and the immediately surrounding period of time. At critical times, prices of individual stocks, derivative instruments, and the equity market as a whole, experienced major fluctuations.

This is apparent in the behavior of the major NYSE stock indices during October 19 and 20. In the final hour of trading on Monday, October 19, the Dow fell by 220 points or 11.2 percent. At the open on Tuesday, October 20, most of these losses were made up as the Dow opened 12.1 percent higher, to just below the levels that had been in effect an hour before the close on Monday. By noon on Tuesday, the Dow had dropped back 11.4 percent almost exactly to the level of the close on Monday. When the Dow finally stabilized on subsequent trading days between 1,900 and 2,000, it had recovered all of these additional losses.

Price fluctuations in the futures market were often more violent. For example, in a period of one hour, beginning around 1:30 p.m. on Monday, October 19, the price of an S&P 500 futures contract fell by 12 percent despite a drop of only 7 percent in that hour in the S&P 500 Index. Similarly, on Tuesday, October 20, price fluctuations in the futures market were often more extreme than those of the underlying stock indices. Thus, the S&P 500 contract, which fell about 17 percent in the final two hours of Monday's trading, opened up 10 percent on Tuesday and quickly recovered the full 17 percent loss of the final hours of Monday. At the same time, the S&P 500 Index rallied 9 percent. However, in the next two hours, this entire gain, and more, disappeared as the S&P 500 futures contract fell by 25 percent until trading was halted. The Index dropped 12 percent in the same period. After several more gyrations during the week, the futures market finally stabilized in subsequent weeks near the level it had reached before the sharp midday decline on Monday, October 19.

This pattern of large, but transitory, price changes also characterized trading in individual stocks. For example, two large capitalization NYSE-listed stocks that failed to open on Monday morning until about 10:30 a.m., opened down 17 percent and 19 percent. Within the next hour, the Dow moved down 1.4 percent, and these two stocks rose by 13 percent and 16 percent respectively, recovering roughly 80 percent of their opening losses. On Tuesday

morning, four stocks (out of a sample of 50 large capitalization stocks studied in detail) opened at prices more than 25 percent higher than at their close on Monday. These openings occurred at various times between 9:50 a.m. and 10:50 a.m. and the four stocks opened up by an average of 27.8 percent. By 11:30 a.m., their prices had declined an average of 15.1 percent from the opening levels, eliminating about 55 percent of their opening gains. Patterns of sharp movements in individual stocks, which were rapidly reversed, were common on Tuesday, October 20.

Based on an examination of the average prices at which NASDAQ stocks traded within 15 minute intervals, the setting of prices by a large number of market makers appears to have smoothed out price trends. However, extreme disparities in prices at which individual trades were executed during these intervals were not uncommon. On Monday, October 19, and Tuesday, October 20, the highest reported price at which particular stocks changed hands was sometimes more than 10 percent higher than the lowest reported price of those stocks in the same 15 minute interval. In certain instances, price disparities of more than 20 percent occurred in essentially contemporaneous trades.

Price behavior in the S&P 100 options market is more difficult to assess. In contrast to the stock and futures markets, which handled volumes well in excess of normal, volume in the S&P 100 options market was down significantly on October 19 and 20. Also, as noted above, the S&P 100 option did not trade freely for extended periods of time, especially on Tuesday. Nevertheless, prices at which the S&P 100 options did trade exhibited discontinuous jumps. For a typical example, the S&P 100 November 305 put option traded at \$66 in the first rotation on Monday and \$58 in the second rotation, a 12 percent difference with no intervening trades (although the second rotation occurred roughly an hour later). Some prices were also disorderly. For example, on Tuesday, the S&P 100 November 250 put opened at 11:31 a.m. at a price of \$75. The S&P 100 November 185 put, which should have been substantially less valuable, opened at 11:54 a.m. with a price of \$81. In the intervening 13 minute period, the actual level of the S&P 100 Index had changed by less than 2 percent and the S&P 500 futures contract was unchanged.

## **Equal Access to Trading Opportunities**

The extreme volatility of market prices on October 19 and 20 subjected all market participants, and particularly small investors, to capriciously different treatment.

Price variations as large and erratic as those that occurred on October 19 and 20 can be inherently discriminatory. An investor selling stock, or futures contracts, near the close on Monday suffered a loss of 10 to 12 percent compared to investors who sold either an hour earlier or the next morning. In contrast, an investor who bought at or near the open on Tuesday morning paid from 10 to 20 percent more than one who bought either at the previous afternoon's close or two hours later.

In addition to these discrepancies, small investors were at an apparent disadvantage in speed of order execution. Part of the disadvantage stemmed from an understandable difficulty experienced by small investors in reaching retail brokers, which was widely reported but impossible to quantify after the fact. Another part of the problem was, however, attributable to delays and failures of the automated, small-order-oriented processing systems of both the NYSE and the OTC market. The orders of small investors are generally executed through these systems, and small investors tend to have less access to other means of executing orders than do larger investors.

Although the NYSE DOT system was originally designed for small orders, the permitted order size has increased to 30,099 shares for market orders and 99,999 shares for limit orders. Nevertheless, the DOT system remains the most important means of processing small investor orders.



On Monday, October 19, orders for 396 million shares were entered into the NYSE's DOT system. This unprecedented traffic at times overwhelmed the mechanical printers that print DOT orders at certain trading posts, resulting in significant delays in executing market orders and in entering limit orders. These delays meant that market orders were executed at prices often very different from those in effect when the orders were entered. The delays also meant that limit orders may not have been executed because of their limits having been passed by the time the order reached the trading post.

The SOES system, designed to execute trades in the OTC market of 1,000 shares or less, typically handles 12 to 15 percent of trades in OTC stocks traded in the National Market System—although less than 2 percent of share volume. In addition to SOES, some large full-service brokers and wholesalers have comparable proprietary computer systems, which typically execute more than one half of their orders.

On October 19 and 20, two factors limited execution of trades through the SOES and other automated execution systems. First, some large firms—four of the 50 largest on October 19 and 18 of the 50 largest on October 20—did not participate in the SOES system at all during those days, even though they had previously participated. Other firms withdrew for a portion of those days. Second, automatic protection features, designed to protect market makers against potential losses from executing orders where the ask price in the quotation system is not higher than the bid price, shut down trading in many stocks on SOES and the proprietary systems during much of the 19th and 20th. On October 19, these systems were incapable, on average, of trading each of the top 50 NASDAQ stocks 43 percent of the time. On Tuesday, October 20, this figure rose to about 53 percent.

During these shutdown periods, small orders in some of the proprietary systems backed up and, in some instances, were automatically executed in batches when the systems again began to function. Others were executed even later in the day.

These system failures, coupled with natural delays in processing orders at the retail level, meant that small investor orders were executed at random times and, therefore, at prices that varied widely from those in existence when purchase or sale decisions were made. The unequal speed at which trades were executed did not necessarily disadvantage small investors. In some cases, delays in execution—for example, of buy orders entered prior to the opening on Monday—might have been substantially beneficial to some small investors. However, the existence of unequal access would almost necessarily have created at least an appearance of unfairness.

In the futures and options marketplaces, differing levels of access to trading have a significantly different impact than in the various stock marketplaces. Non-institutional participants play only a limited role in the S&P 500 stock index futures market but play a significant role in the S&P 100 options market. The problem of the different treatment of large and small investors in these markets was a consequence of differences in response speeds and access to information. Non-professional participants, who lack access to continuous market information, expect to have continuous opportunities to withdraw from investments in a timely way. Obviously, on October 19 and 20, these expectations were unfulfilled. In the S&P 100 options market on October 19 and 20, everyone suffered from some inability to trade. Individual participants who wrote put options before October 19 and 20 often found themselves either locked into their positions or involuntarily liquidated during these critical two days. Individual participants in the futures market may have suffered substantial losses before becoming aware of what had happened, and even "normal" delays in executing retail orders may have exacerbated these losses.

## Market Maker Performance

The active market makers whose performance was analyzed based upon information available to the Task Force include the NYSE specialists, OTC and options market makers, and the "local" traders in the futures market, who play the analogous market maker role. Data was not available to enable the Task Force to analyze the performance of NYSE block traders, who also play an important market making role.

## New York Stock Exchange Specialists

The performance of NYSE specialists during the October market break period varied over time and from specialist to specialist. From October 14 through October 16, while the Dow was falling by 10.6 percent, specialists, on balance, purchased approximately \$286 million in stock. On October 19, specialists as a whole purchased just under \$486 million worth of stock. During the first hour and one half on October 19, specialists bought heavily in the face of unprecedented selling pressure. At this critical time, specialists were willing to lean against the dominant downward trend in the market at a significant cost to themselves. Also, in the price collapse which characterized the final hour of trading on October 19, most specialists again appear to have been net purchasers of stock, although their participation at this time was significantly less extensive, in the face of a greater price decline, than their intervention at the October 19 opening.

These figures, however, conceal marked differences in behavior among specialists. Fully 30 percent of specialists in a sample of 50 large capitalization stocks were net sellers of those stocks on October 19. Further, 10 percent of specialists in that sample finished the day with net short positions in those stocks. Finally, about 10 percent of the openings on October 19 that were down sharply from the closing prices on October 16 were followed by sharp rebounds that eliminated much of those initial losses.

On October 20, roughly one third of the specialists in the 50 stock sample set opening prices which were substantially higher than closing prices on October 19 and which declined rapidly to levels at or near their October 19 closes. These apparent misjudgments of opening prices may have aggravated an already uncertain atmosphere on Tuesday, October 20. On the whole, specialists sold over \$450 million in stock, and, in the sample of 50 large capitalization stocks, fully 82 percent of the specialists were net sellers on October 20.

An examination was made of the 31 stocks for which detailed trade data for October 19 and 20 were available. These stocks were classified into three groups: those for which specialists purchased stock in a way that generally tended to counterbalance market trends and smooth price fluctuations (even if they were not always successful); those for which specialists acted in a way that generally reinforced market trends; and those for which specialists took only limited net positions. [This classification was done by the Task Force and differs from the tests used by the NYSE to evaluate specialist performance (see Study VI).] The results of this examination are as follows:

### NYSE SPECIALIST PERFORMANCE <sup>1</sup>

|                 | Generally counterbalanced market trends | Generally reinforced market trends | Took limited net positions |
|-----------------|---|------------------------------------|----------------------------|
| October 19..... | 58% (18)                                | 26% ( 8)                           | 16% (5)                    |
| October 20..... | 39% (12)                                | 39% (12)                           | 22% (7)                    |

<sup>1</sup> Based on a sample of 31 NYSE stocks. Figures in parentheses represent the number of stocks from the sample in each category.

The limited nature of some specialists' contributions to price stability may have been due to the exhaustion of their purchasing power following attempts to stabilize markets at the open on October 19.

However, for other specialists, lack of purchasing power appears not to have been the determining factor in their behavior. It is understandable that specialists would not sacrifice large amounts of capital in what must have seemed a hopeless attempt to stem overwhelming waves of selling pressure. Nevertheless, from the final hours of trading on October 19 through October 20, a substantial number of NYSE specialists appear not to have been a significant force in counterbalancing market trends.

## **OTC Market Makers**

Unlike shares on the NYSE, each NASDAQ stock is served by a number of market makers, none of which has either an express or implied commitment to maintain an orderly market. Under these conditions, it is difficult to relate the performance of this market as a whole to the performance of individual market makers.

During the week of October 19, some market makers formally withdrew from making markets. In addition, some market makers ceased performing their function, merely by not answering their telephones during this period. However, it is impossible, on the basis of information available to the Task Force, to assess the extent and impact of this form of non-participation. Other market makers who were willing to trade were unreachable when they were overwhelmed by the volume of telephone orders, many of which normally would have been executed by the automated systems. There were also widespread reports that many market makers, who normally stand ready to buy and sell hundreds and sometimes thousands of shares at their quoted prices, were only willing to fulfill their minimum obligation by buying and selling 100 shares at the quoted price. Another indication of deterioration in market making performance is the withdrawal by some market makers from the SOES system, thus reducing from 1,000 to 100 the number of shares they were obligated to buy or sell.

In addition, bid-offer spreads also widened during this period. For example, on October 20, the larger NASDAQ securities, for which real-time quotations are disseminated, had quoted spreads of  $\frac{1}{8}$ ,  $\frac{1}{4}$  or  $\frac{3}{8}$  only 32.6 percent of the time, compared to such quoted spreads 42.8 percent of the time during the three weeks ending October 16.

## **"Locals" in the Futures Market**

Locals in the futures market, who, like OTC traders, have no formal commitment to stabilize prices, were as a group somewhat more aggressive than normal in taking net positions on October 19.

During the three day market decline from Wednesday, October 14, to Friday, October 16, gross purchases by locals averaged about 48,000 contracts per day or about 46 percent of total volume. The best available data indicates that locals were net sellers on October 14 and small net buyers on the subsequent two days. Over the three day decline, local net buys were 235 contracts worth about \$34 million or less than 0.1 percent of total volume. Thus, locals did not help offset the market decline during those days.

On Monday, October 19, locals purchased 48,487 contracts or 31.4 percent of total volume. Net buys were 1,743 contracts, worth \$221 million, representing about 1 percent of total volume. These net buys were generally concentrated in time periods when prices were falling. Only after 2:30 p.m.



did locals not enter the market as net buyers during periods of declining prices.

Moreover, like the stock market, the willingness of locals to lean against prevailing price trends was largely exhausted by the middle of the afternoon on October 19. From 2:30 p.m. to the close of business on October 20, gross local buys amounted to 35,325 contracts or 24.1 percent of total volume. Net buys were a negative 530 contracts, worth \$59 million.

In sum, while the locals as a group absorbed some selling pressure, they did not act uniformly and were not able to counterbalance the public selling pressure.

Since the locals do not, and have no responsibility to, absorb significant imbalances in order flow, the futures market functions as an efficient risk transfer mechanism only when the activity of locals is supplemented by market participants, such as speculators and index arbitrageurs. This is especially true with respect to imbalances of the magnitude exhibited during the October market break.

## **Options Market Makers**

The structure of the options marketplace is more important to an assessment of the performance of the options marketplace than is the performance of the options market makers. Options market makers were constrained from maintaining a stable, orderly market because options are inherently susceptible to the largest percentage price changes of all equity products; reliable data about underlying indices was not always available; the exchanges failed to add new strike prices in a timely fashion; extraordinary demands for additional margin were made, even on market makers with hedged positions; and the truncated periods of free trading may have justifiably affected the willingness of market makers to establish positions that they were unsure of being able to liquidate readily. Although the lack of free trading inhibited reasonable price continuity on October 19 and 20, the bid-ask spread in the S&P 100 market shifted frequently but generally remained reasonable during periods of free trading. However, there were numerous price disparities in the options market (see Study VI). On the whole, options market makers did not play an important role in stabilizing their own market, and through their hedging activities may have marginally added to the pressure in other markets.

## **Clearing and Credit**

Difficulties with the clearing and credit systems further exacerbated the difficulties of market makers and other market participants during the market break. Because of the five day settlement rule for stocks, these concerns were less immediate in the stock markets than in the futures and options markets, where settlement is made the next day. However, in the stock market, the unprecedented volume led to an unusually large number of questioned trades. Questioned trades affected 67,673 NYSE trades on October 19 and 62,564 NYSE trades on October 20. That represented 4.02 percent and 4.25 percent of transaction sides on those two days, respectively. As a percentage of transaction sides, these latter figures were 202 and 220 percent above normal, respectively. Uncertainties concerning the ultimate disposition of questioned trades added to other uncertainties regarding the financial condition of specialists and other broker-dealers on October 19 and 20.

Settlement problems in the futures and options markets also contributed to these uncertainties. During the day of October 19, the CME clearinghouse, which is responsible for setting margins on futures contracts, responded to the sharp price decline by making intraday variation margin calls for \$1.6 billion. Cash and cash-equivalents covering these margin calls were paid in by "losing" clearinghouse members during the day. According to clearinghouse

rules, these funds were not paid out to the "winners" until the next day. In addition, variation margin calls, which had been made on Monday morning to cover settlements of Friday's closing positions, were unusually high. Total variation margin calls on Monday morning and during the day on Monday were \$2.0 billion.

At the same time, OCC members also faced substantial morning and intraday margin calls to cover the deterioration in the positions of put options sellers, both proprietary and customer. On October 19, the OCC issued four intraday margin calls that collected \$1.0 billion from clearinghouse members. In many cases, the OCC clearing members, such as large investment banks, also belong to the CME. Like the CME clearinghouse, the OCC does not pay out excess margin funds on an intraday basis. Thus, OCC and CME clearing members were required to deposit \$3.0 billion on Monday, October 19. Some of these deposits were to cover options losses that were offset by futures profits, which resulted in further strains on liquidity.

After giving credit for Monday's intraday margin calls, Tuesday morning margin calls for Monday's trading activity were \$2.1 billion for the CME clearinghouse and \$0.9 billion for the OCC. Because clearinghouse members are required to meet these calls even before any compensating deposits are received either from customers or clearinghouses, the clearing members were compelled to increase their reliance on intraday credit from their commercial bankers. However, the bankers in question were already concerned about potential losses that their clearing member customers might have suffered in other lines of activity, such as risk arbitrage, block trading or foreign exchange trading. Bankers were also concerned that the clearinghouses would be unable to collect all their margin calls and would be unable to pay in full the balances owed to their clearinghouse members. These concerns apparently resulted in the withdrawal of uncommitted lines of credit to some market participants, restrictions on new loans to some clearinghouse members and a general concern on the part of bankers over extending credit to cover Tuesday morning margin calls.

In this atmosphere of uncertainty, the mere possibility that commercial banks might curtail lending to clearinghouse members was enough to raise questions and feed rumors about the viability of those firms and the clearinghouses. However, timely intervention by the Federal Reserve helped assure a continuing supply of credit to the clearinghouse members. At 8:15 a.m. on Tuesday morning, it was announced that:

The Federal Reserve Bank affirms its readiness to serve as a source of liquidity to support the economic and financial system.

Notwithstanding these assurances, there were continued difficulties on Tuesday. For example, because of delays in the CME clearing process, two major clearinghouse members with margin collections of \$1.5 billion due them on Tuesday did not receive their funds until after 3:00 p.m., many hours later than normal. Meanwhile, these clearinghouse members had already credited customers with balances from their profitable trades and, in many cases, the customers had already withdrawn these balances from the clearinghouse members. OCC's clearing process was also delayed on Tuesday and one of its major clearing members required an immediate capital infusion to meet margin calls.

Although the cash, credit and the timing demands of the current clearinghouse system raised the possibility of a default, none occurred. On the other hand, the mere possibility that a clearinghouse might default, or that liquidity would disappear, contributed to volatility on Tuesday in two important ways.

First, some market makers did curtail their market making activities, especially in the case of block trading where temporary commitments of capital were required, because they feared that loans or credit lines from their commercial bankers might be exhausted or withdrawn. Second, uncertainties about

the activities and viability of the clearinghouses, as well as major broker-dealers, appear to have increased investor uncertainty in the already turbulent atmosphere of October 20.

These uncertainties intensified market fluctuations and the sense of panic evident that day. Had decisive action not been taken by the Federal Reserve, it appears that far worse consequences would have been a very real possibility.

## Summary

The degree to which existing market mechanisms can be held responsible for what occurred during the October break depends upon the standards by which these mechanisms are measured. Ideally, the full transition from a Dow level of 2,500 on Wednesday, October 14, to a range between 1,900 and 2,000, where equity markets settled in late 1987, should have occurred in a rational way without sharp, transitory declines or rises.

From October 14 to 16, price movements, trading activity and market maker performance were generally consistent with any reasonable notion of orderly markets, despite a decline of about 7 percent in the major market indices. However, as the rate of decline accelerated on October 19, the efficiency with which the equity market functioned deteriorated markedly. By the late afternoon of October 19, market makers on the major stock exchanges appear to have largely abandoned serious attempts to stem the downward movement in prices. In the futures and options markets, market makers were not a significant factor during that time. As Study VI indicates, price changes and trading activity were highly erratic from late Monday afternoon through most of the day on Tuesday, October 20, as market makers were overwhelmed by selling.

Realistically, in the face of October's violent shifts in selling demand for equity-related securities, a rational downward transition in stock prices was not possible. Market makers possessed neither the resources nor the willingness to absorb the extraordinary volume of selling demand that materialized. Even under conceivable alternative arrangements, market makers would still face limited incentives and resources to manage an absolutely smooth transition in the face of the kind of demand fluctuations which confronted them on October 19 and 20.

The violence of the market movements, both upward and downward, threatened to undermine the integrity of the markets and may have substantially inhibited buyers' participation. At the same time, these market shifts created uncertainty about the solvency of major market making institutions, both directly and through the impact of these rapid price changes on the clearing and settlement systems of the futures and options markets. These factors, in turn, threatened the availability of credit to market makers which could have forced them, at a minimum, to curtail their market making activities and, at worst, to fail. By midday Tuesday, October 20, it appeared possible that a continuing steep decline could have reduced the capital of certain market makers to a level at which they could not obtain sufficient additional funds to continue their participation in the markets. At that point, the major exchanges might have decided to halt trading. The consequences of such a sequence of events, even without a failure of a major broker-dealer or a clearinghouse, could have been severe. Yet, at one point on October 20, such an outcome appeared to be conceivable.





## Chapter Six

# One Market: Stocks, Stock Index Futures, and Stock Options

Analysis of market behavior during the crucial days in mid-October makes clear an important conclusion. From an economic viewpoint, what have been traditionally seen as separate markets—the markets for stocks, stock index futures, and stock options—are in fact one market. Under ordinary circumstances these marketplaces move sympathetically, linked by a number of forces. The pathology which resulted when the linkages among these market segments failed underlay the market break of October.

Many mechanisms link these marketplaces. The instruments—stocks, stock index futures and stock options—are fundamentally driven by the same economic forces. The same major investment banks dominate the trading among all three segments, both in executing orders for others and for their own accounts. In addition, many of the same institutions are responsible for a large amount of the trading in all three instruments, and particularly in stocks and index futures.

Many of the trading strategies discussed in this Report also serve to link these marketplaces. Index arbitrage provides a direct linkage between the stock and index futures markets. Faced with increasingly chaotic markets in October, portfolio insurers, to the extent possible, abandoned their reliance on the futures markets to execute their strategies and switched to selling stocks directly, underlining the commonality among market function. Another link is the routine use of the futures markets by institutions investing in index funds as a fast and low-cost entry and exit vehicle to the stock market. And, of course, a host of hedging strategies for individual stock positions employ counterbalancing purchases and sales by market makers in these marketplaces.

Market makers in these markets routinely hedge their positions by trading in two markets. For example, market makers in the S&P 100 option hedge by using the S&P 500 futures contract, and some NYSE specialists also hedge their market making activities with futures contracts. Specialists and market makers in futures and options constantly monitor up-to-the-minute prices in other markets on electronic screens. Market makers tend to carry minimal positions from day-to-day, providing liquidity for normal market moves but not for the kind of abnormally large swings experienced in October 1987.

Clearing procedures in the several market segments produce further intertwining. While it is not yet possible to cross-margin positions, proceeds from sales in one market segment may provide funds needed to pay for purchases in another. Fears that a clearinghouse in one market segment might be unable to deliver funds owed to investors can ignite concern throughout the system, as it did in October.

In sum, what may appear superficially to be three separate markets—for stocks, stock options, and stock index futures—in fact behaves as one market.

As the data in Chapter Four make clear, the market's break was exacerbated by the failure of institutions employing portfolio insurance strategies to understand that the markets in which the various instruments trade are economically linked into one equity market. Portfolio insurance theory assumes that it would be infeasible to sell huge volumes of stock on the exchange in short periods of time with only a small price impact. These institutions came to believe that the futures market offered a separate haven of liquidity suffi-

cient to allow them to liquidate huge positions over short periods of time with minimal price displacement.

In October, this belief proved to be unrealistic. The futures market simply could not absorb such selling pressure without dramatic price declines. Moreover, reflecting the natural linkages among markets, the selling pressure washed across to the stock market, both through index arbitrage and direct portfolio insurance stock sales. Large amounts of selling, and the demand for liquidity associated with it, cannot be contained in a single market segment. It necessarily overflows into the other market segments, which are naturally linked. There are, however, natural limits to intermarket liquidity which were made evident on October 19 and 20.

Just as the failure of sellers to understand that they were trading in a single equity market exacerbated the market break, so, too, did the breakdown of certain structural mechanisms linking these separate market segments. Unopened stocks inhibited trading in the derivative instruments. The CME's temporary closing, and the difficulties the CBOE had in opening options trading, interfered with intermarket transactions. Transaction delays through the NYSE's DOT system, and the subsequent decision to prohibit proprietary index arbitrage through the system, also disconnected the market segments.

Under normal circumstances, index arbitrage acts as one of the primary bridges between stock and futures markets. By midday October 19, this arbitrage became difficult. First, transactions backed up in the DOT system, and then, on subsequent days, access to the system was denied to these traders. However, had the system functioned more effectively, this linkage would have been incapable of transmitting the full weight of the estimated \$25 billion of selling dictated by portfolio insurance strategies.

Even as direct arbitrage between stocks and futures failed, portfolio insurers provided some indirect arbitrage when they switched from selling futures to selling stocks. The amount of such indirect arbitrage was limited by, among other things, structural and regulatory rigidities. Many insurers were authorized to sell only futures, not stocks, for their clients, and so they continued to sell futures despite the large discount which confronted them. Many institutional stock investors are not authorized to purchase futures contracts, and therefore they could not supply buying support to the market despite the discount.

Differences in margin and clearinghouse mechanisms contributed further to the failure of linkages within the single equity market. Many investors, not fully understanding margin and clearing mechanisms in futures, responded to rumors of payment failures, and the reality of late payments, by the CME clearinghouse, by refusing to buy in the futures market.

The decisions of lenders were also influenced by concerns over inconsistencies among the several markets. The complexity of clearing massive volumes of stocks, options, and futures through separate clearinghouses caused some lenders to hesitate in extending credit. The consequent threat of financial gridlock posed the prospect of major financial system breakdown on October 20, prompting the Federal Reserve to boost investor confidence by promising to inject liquidity into the market.

A number of factors ultimately contributed to the failure of the stock and futures markets to function as one market. As the markets became disengaged, a near freefall developed in both markets. Sellers put direct downward pressure on both markets. As large discounts developed between futures and stocks, those investors who could, switched from selling futures to selling stocks. Those unable to switch continued to sell futures, driving these prices down further. Stock investors not authorized to purchase futures, or fearful of buying them, provided no offsetting buying support in the futures market.

The enormous futures discounts signalled to prospective stock buyers that further declines were imminent. At one point on October 20, for example, the

stock index futures price was “forecasting” a Dow of 1,400. This “billboard effect” inhibited some stock purchases. Moreover, the futures discount made stocks appear expensive, inhibiting buying support for the market.

The pathology of disconnected markets fed on itself. Faced with a surfeit of sellers and a scarcity of buyers, both markets—futures and stock—were at times on October 19 and 20 nearly in freefall.

The ability of the equity market to absorb the huge selling pressure to which it was subjected in mid-October depended on its liquidity. During periods of normal volume, the liquidity provided by market makers and specialists in the separate market segments is sufficient. When abnormal demands confront the equity market, the liquidity in each marketplace is unimportant. Specialists in the stock market and market makers in the futures market go home at the end of each day with, at most, relatively small positions. Investors must depend on the liquidity supplied by participants in the entire equity market. The ability to sell futures is linked to stock market liquidity and vice versa.

The liquidity apparent during periods of normal volume provided by the activities of market makers and active traders on both sides of the market is something of an illusion. Liquidity sufficient to absorb the selling demands of a limited number of investors becomes an illusion of liquidity when confronted by massive selling, as everyone shows up on the same side of the market at once. As with people in a theatre when someone yells “Fire!”, these sellers all ran for the exit in October, but it was large enough to accommodate only a few. For these sellers, it takes time to find buyers on the other side of the market. Potential buyers, such as value investors, do not operate by formula and must have adequate time to assemble data and make evaluations before they will commit to buy.

Certain important conclusions should be drawn from the behavior of the markets for stocks, stock index futures, and options in mid-October. First and foremost, these apparently separate markets are in an economic sense one market. They are linked by instruments, participants, trading strategies and clearing flows. Nonetheless, institutional and regulatory structures interfere with the linkages among them and hinder their smooth and efficient operation.

The illusion of liquidity in the futures, options and stock markets contrasts with the reality of the overall equity market’s liquidity—the finite capacity of this single, inextricably fused system of markets to absorb major selling or buying demands. Ironically, it was this illusion of liquidity which led some similarly motivated investors, such as portfolio insurers, to adopt strategies which call for liquidity far in excess of what the market could supply.

A number of failures of the one market system contributed to the violent break of the separate market segments in October and pushed the country to the brink of the financial system’s limits. It is not possible to prevent investors from being misinformed about the capabilities of markets or to prevent markets from adjusting to the demands put upon them. But it is only prudent to design mechanisms to protect investors, the market’s infrastructures, the financial system and the economy from the destructive consequence of violent market breaks.





# Chapter Seven

## Regulatory Implications

Stocks, stock index futures and stock options constitute one market, mandating a regulatory structure designed to be consistent with this economic reality.

The failure of these market segments to perform as one market contributed to the violence of the market break in October 1987, which brought the financial system near to a breakdown. To a large extent, the failure was rooted in institutional and regulatory rigidities as well as misconceptions of market participants. That this crisis was precipitated to a large extent by the activity of a few active institutions, illustrates the vulnerability of the financial system and the need for remedial action.

This failure is amenable to reform. To prevent future damage this inextricably interrelated system of markets needs to work smoothly and in harmony. The growth of intermarket trading activities is a phenomenon of the 1980's. The October 1987 experience illustrates that regulatory changes, derived from the one-market concept, are necessary both to reduce the possibility of destructive market breaks and to deal effectively with such episodes should they occur. The guiding objective should be to enhance the integrity and competitiveness of U.S. financial markets.

### **One Market Mandates One Agency for Intermarket Issues**

The analysis of the October market break demonstrates that one agency must have the authority to coordinate a few but critical intermarket regulatory issues, monitor intermarket activities and mediate intermarket concerns.

This "intermarket"—across markets—agency need not take responsibility for all "intramarket"—within one market—regulatory issues. Such matters as securities registration, tender offer rules, and regulation of stock and option trading practices should be left to the SEC, which has the required expertise in these areas. Intramarket issues in futures markets should remain within the purview of the CFTC, which has expertise in the design and regulation of futures contracts and markets.

However, there are a few important intermarket regulatory issues which must be considered jointly and simultaneously across market segments to ensure that the intermarket systems operate harmoniously. These are issues which cannot be decided from the perspective of a single marketplace. Doing so imposes pervasive, unavoidable and possibly destabilizing influences on other related marketplaces and on the interrelated market system as a whole.

Intermarket reform raises two fundamental questions. Who should have the responsibility for intermarket coordination? What are the few crucial intermarket issues which must be assigned to the intermarket agency? The choice of the agency follows from the requirements of the intermarket task.

The October experience demonstrates that the issues which have an impact across related markets, and throughout the financial system, include clearing and credit mechanisms, margin requirements, circuit breaker mechanisms, such as price limits and trading halts, and information systems for monitoring intermarket activities.

It is important to recognize that this approach does not involve imposing substantial new regulatory burdens. For the most part, it involves the reallocation of existing regulatory tasks in a manner designed to conform to the fundamental economic reality that stocks, stock index futures and options are one market.

## The Intermarket Agency

The October episode gives a clear view of the characteristics and expertise required to coordinate intermarket issues relating to stocks, stock index futures and options. The most fundamental requirement is broad and deep expertise in these market segments and instruments. However, expertise in individual instruments and market segments is not sufficient. The key requirement is expertise in the interaction of instruments and marketplaces as an integrated system.

Moreover, the October break illustrates that difficulties in stocks and derivative market segments produce dislocations in other financial markets. These, in turn, exacerbate the problem in stocks and derivative market segments. The market break profoundly affected bond and foreign exchange markets as well as the extension of credit by the banking system. Indeed, the confidence and liquidity of the entire financial system were at risk in October.

In addition, global markets were involved. The precipitous decline in the U.S. market was accompanied by a concurrent break in equity markets around the world. Cross-listing of stocks and cross-border investment have strengthened the linkages among global equity markets. During the October break, U.S. market participants were sellers of foreign stocks and U.S. stocks listed on foreign markets. Specialized transactions in U.S. securities and stock index futures were executed in London. United States bond futures markets in London were influenced by the Federal Reserve's injection of liquidity, as were foreign exchange markets. In short, the October market break had ramifications in a wide variety of global financial markets.

Expertise in individual market segments is, therefore, not sufficient for effective response to intermarket crises. The October experience demonstrates that the intermarket agency must consider the interactions among a wide variety of markets encompassing stocks, stock index futures, stock options, bonds, foreign exchange and the credit and banking system, in both domestic and foreign markets.

The critical requirement for the intermarket agency is broad expertise in the financial system as a whole because the greatest potential risk of intermarket failure is to the financial system as a whole, rather than to individual market segments. Financial system expertise is required to deal with a financial system crisis. This expertise is also critical for monitoring and responding to intermarket problems and thus avoiding a financial crisis.

In addition, this intermarket agency needs to serve a broad constituency. Since intermarket activities affect the health of the financial system, this constituency is not dominated by the active market participants so prominent in the October episode. Nor is this constituency limited to individual investors, the majority owners of U.S. equities. The intermarket agency serves the broader constituency of all those who have a stake in the financial system.

Because of its broad constituency, this agency needs the independence to resist demands of partisan political and economic interests, particularly those of active market participants. The stakes are simply too high, the potential adverse consequences of market failure too pervasive.

Independence must be balanced by responsiveness. The intermarket agency must respond to evolving needs of financial market participants. Competitive financial markets are a valuable national asset and the competition for their services is worldwide. Intermarket coordination must be sufficiently flexible to accommodate the innovation in instruments and markets necessary to maintain and strengthen the competitiveness of U.S. financial markets.

Therefore, an analysis of the October experience demonstrates the need for one regulatory body with responsibility for rationalizing intermarket issues.

The task requires broad expertise in the interaction of domestic and global financial markets, financial strength, prestige, independence and responsiveness. The Task Force compared these requirements with alternative regulatory structures.

**Self Regulatory Organizations.** Self Regulatory Organizations (“SROs”), such as securities and commodities exchanges, are uniquely qualified to regulate intramarket activities. Since they are closest to the action, SROs have the best view of the regulatory needs of their individual market segments. Furthermore, they are motivated by self-interest to preserve the integrity of their marketplace.

Nonetheless, SROs are not well suited for intermarket tasks. They lack the authority to coordinate issues across markets and the resources to deal with intermarket issues. Finally, it is not apparent that they possess either the expertise or the incentive to represent the broader constituencies within the domestic and global financial system.

**The Securities and Exchange Commission.** Centralizing responsibility for stocks, stock index futures and options within the SEC is attractive on several grounds. The SEC has responsibility for regulating stocks and stock options. Thus, it might seem logical to assign the SEC the responsibility for stocks and all derivative instruments. Moreover, the SEC is structured as an independent agency and has the prestige and influence required for effective regulation.

There are drawbacks to this solution to intermarket regulation. Extending SEC authority to stock index futures might require an investment in expertise necessary to regulate complex instruments new to its regulatory purview. This was necessary for the SEC’s regulation of stock options. The expertise needed to regulate stock index futures could be acquired by transferring personnel from the CFTC. Doing so might deplete the CFTC’s resources and interfere with its capacity to carry out its other regulatory duties.

Moreover, the SEC’s experience and expertise is focused primarily on regulating intramarket activities, not on rationalizing the interactions among markets. To be effective as an intermarket regulator the SEC might have to fund the acquisition of expertise in a wide variety of financial markets, in the credit and banking system, and in international markets.

**Joint SEC-CFTC Responsibility.** A single regulator, created through joint SEC-CFTC responsibility, could be achieved through a merger of the two agencies, a formal joint committee arrangement, or strict requirements for coordination of intermarket regulatory issues. This alternative would bring together the expertise of the SEC and CFTC with respect to specific types of instruments and intramarket regulatory issues. Nonetheless, combining two agencies with intramarket expertise in their respective market segments would not necessarily produce effective intermarket regulation.

This alternative might not provide the broad financial system expertise needed to oversee the interaction of domestic and global markets as well as the banking system.

Finally, the need for coordinating the few critical intermarket issues does not diminish the importance of detailed supervision of the much wider range of intramarket activities. The addition of intermarket responsibility risks draining resources from the important regulatory tasks that the SEC and CFTC must administer within their respective market segments.



**Joint Federal Reserve-SEC-CFTC Committee.** The addition of the Federal Reserve would supplement the intramarket expertise of the SEC and CFTC with the broad financial system expertise of the Federal Reserve.

Although this alternative has attractive aspects, there are drawbacks. The committee's effectiveness depends upon resisting the intramarket perspective and constituencies of committee representatives.

Moreover, the most important objective of intermarket regulation is to avoid an intermarket crisis. This requires clear responsibility for ongoing monitoring of intermarket activities and clear authority to act to avoid a crisis. A joint agency committee may not be well-suited for this task. Within a joint agency committee, responsibility and authority could become diffuse. In times of crisis, a committee structure could prove cumbersome, when immediate action would be imperative.

Although there are relatively few intermarket issues to be coordinated, the health of the financial system depends upon effective intermarket regulation. This argues for investing the responsibility in a single responsive agency with the authority to act promptly, rather than assembling a committee representing several agencies.

**The Federal Reserve.** In most countries, the central bank, as part of its broader responsibility for the health of a nation's financial system, is the intermarket regulator. The Federal Reserve has a primary responsibility for the health of the U.S. financial system. The Federal Reserve works closely with the Department of the Treasury to achieve this goal. This responsibility, and the Federal Reserve's accumulated expertise in discharging this responsibility, are arguments in its favor as the appropriate intermarket agency.

The intermarket crisis in October ultimately required the Federal Reserve to step in to inject liquidity and boost confidence. This rescue imposed costs and constraints on other economic policy objectives. Since intermarket failure and damage to the financial system ultimately fall upon the Federal Reserve, it could be argued that the Federal Reserve should possess the authority to prevent such an intermarket crisis.

Further, in a crisis, the liquidity of the financial system in general, and the banking system in particular, is affected. This is the Federal Reserve's central area of expertise.

The Federal Reserve, with its view of money flows, is experienced in assessing interactions and imbalances among marketplaces, as opposed to intramarket concerns. It has experience in international financial market coordination. The importance of these attributes is illustrated by the October break which involved not only stocks, futures and options but bonds, foreign exchange and international markets.

The Federal Reserve also possesses the other characteristics required of an effective intermarket agency. It has the ability, standing and influence to establish and coordinate consistent intermarket requirements and to inspire intermarket confidence.

Finally, there are precedents for the Federal Reserve as an intermarket agency. The Federal Reserve already has formal responsibility for margin requirements on stocks and stock options. Adding futures margins to the Federal Reserve's purview would be a logical extension of its current responsibilities and is not a major change. Also, the Federal Reserve regulates bank lending to securities market participants.

Despite these advantages, there are drawbacks to the Federal Reserve as the intermarket agency. Intermarket coordination would be a new responsibil-

ity, involving the burden of additional tasks. The Federal Reserve might need to build expertise in intramarket issues in order to carry out its intermarket oversight.

Another problem with the Federal Reserve as the intermarket agency is the danger that market participants may take on more risk in the expectation that the Federal Reserve will bail them out in a crisis. Intermarket responsibility could give the Federal Reserve a role to play before financial system crises develop. However, it would still have no requirement to guarantee the actions of any particular firm.

Balancing the advantage of independence is the need for responsiveness. Of all the major regulatory agencies, the Federal Reserve is perhaps the most independent. Therein lies the potential for a lack of responsiveness to legitimate needs for financial market evolution and innovation. If unresponsive, the Federal Reserve could impair the competitiveness of U.S. financial markets.

**The Department of the Treasury.** The Treasury Department possesses most of the advantages of the Federal Reserve. It has broad financial system perspective and expertise, international standing in a variety of markets, financial strength, prestige and influence.

However, unlike the Federal Reserve, the SEC, and the CFTC, which are structured as independent agencies, the Treasury is part of the executive branch. Because the Secretary of the Treasury and the Treasury staff serve at the pleasure of the President, it has less independence as a regulatory agency.

**A New Regulatory Body.** It would be possible to establish a new regulatory body designed to coordinate intermarket issues. This alternative appears to be more expensive than, and inferior to, harnessing the accumulated expertise and standing of an existing agency.

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Guided by the October experience, an analysis of the requirements for effective intermarket coordination demonstrates that expertise in the interaction of markets is the critical requirement. This does not require major restructuring of intramarket regulatory responsibilities. Instead, a few important intermarket issues need to be coordinated by one agency possessing intermarket perspective and expertise.

## **Intermarket Issues**

Intermarket issues are those which systematically and unavoidably impose influences on all markets. The few important intermarket issues which need to be harmonized by a single body include clearing and credit mechanisms, margin requirements, circuit breaker mechanisms such as price limits and trading halts, and information systems for monitoring intermarket activities.

These issues are not the separate concern of individual market segments. The October break illustrates that decisions in one marketplace profoundly affect other marketplaces and the financial system as a whole.

## Clearing and Credit Mechanisms

Clearing and credit mechanisms need to be unified. With separate clearinghouses for each market segment, no single clearing corporation has an overview of the intermarket positions of market participants. No clearinghouse is able to assess accurately intermarket exposure among its clearing members and among their customers. Separate clearing also hampers lenders in assessing the risk exposure of market participants and interferes with collateralization of intermarket positions. In the current system, margin flows are based on intramarket positions, and the timing of margin flows differs across clearinghouses. For the sort of intermarket transactions which are the mainstay of these markets, funds must be shuttled from clearinghouse to clearinghouse in the margin settlement process. This process creates imbalances in financing needs and increases demand for bank credit.

The complexity and fragmentation of the separate clearing mechanisms in stocks, futures and options—in conjunction with massive volume, violent price volatility, and staggering demands on bank credit—brought the financial system to the brink on Tuesday, October 20. Some clearinghouses were late in making payments. There were rumors concerning the viability of clearinghouses and market participants. This in turn affected the willingness of lenders to finance market participants under the uncommitted lending arrangements common in the industry. This crisis of confidence raised the spectre of a full-scale financial system breakdown and required the Federal Reserve to provide liquidity and confidence. The complexity of the clearing and credit mechanisms, rather than a substantive problem of solvency, was at fault.

What is needed is unified clearing with stocks, stock index futures and stock options, all cleared through a single mechanism. Unified clearing facilitates the smooth settlement of intermarket transactions, which is the linchpin of these markets. It clarifies the credit risk of lending to participants engaged in intermarket transactions. This would reduce the chance of financial gridlock and the attendant risk to the financial system.

## Margin Requirements

Since stocks, stock index futures and stock options compose, in an economic sense, one market, margins need to be rationalized across markets. While margins on stocks and options are already within the Federal Reserve's regulatory purview, futures margins are currently determined by futures exchanges, and thus are not subject to intermarket oversight. Futures margins should be consistent with effective stock margins for professional market participants such as broker-dealers, and cross-margining should be implemented.

Margins have two fundamental characteristics. First, margin requirements affect intramarket performance risk. Margins serve as a performance bond to secure the ability of market participants to meet their obligations. Second, margins represent collateral; thus, margin requirements control the leverage possible in the investment in any financial instrument.

On the first point—the intramarket financial performance control aspect of margin requirements—the concept of margins on futures differs fundamentally from that of margins on stock investments.<sup>1</sup> The daily process of marking-to-market the value of investments, in which futures losers must advance margin to pay futures winners, differs fundamentally from the stock market margin process of advancing payments against a lending formula. Despite low margin requirements, the financial performance control aspect of futures margins has operated in a sound and effective manner on an intramarket basis.

However, margins are more than a financial performance control mechanism. All margin requirements have one aspect in common; margins are

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<sup>1</sup> For simplicity, margins on stock options are not considered in detail in this section.



collateral and control the effective economic leverage achievable in any financial instrument.

Because margins on futures are lower than those on stocks, market participants can achieve much greater leverage by investing through futures. With a given initial investment, a market participant can control a much greater equity investment indirectly through futures than through a direct investment in stocks.<sup>2</sup>

The differing level of financial leverage inherent in differing margin requirements warrants concern for two reasons. First, constraints on leverage control the volume of speculative investment activity. Second, leverage translates into financial risk, which extends beyond the performance obligation of a specific transaction and a specific marketplace.

It has been long recognized that margin requirements, through leverage, affect the volume of speculative activity. Controlling speculative behavior is one approach to inhibiting overvaluation in stocks and reducing the potential for a precipitate price decline fueled by the involuntary selling that stems, for example, from margin calls.

The equity action achievable with low margin investment in futures has the potential to increase intermarket leverage for market participants. The resulting financial risk may affect their ability to meet obligations in other market segments. Because of the potentially wide-ranging consequences, the level of leverage within the financial system is a legitimate intermarket concern, rather than the narrow concern of a particular market segment.

The October experience illustrates how a relatively few, aggressive, professional market participants can produce dramatic swings in market prices. Moreover, the mid-October episode demonstrates that such pressures are transmitted from marketplace to marketplace and, at times, pressures concentrated in one market segment can have traumatic effects on the whole system. Low futures margins allow investors to control large positions with low initial investments. The clear implication is that margin requirements affect intermarket risk and are not the private concern of a single marketplace.

Nonetheless, it does not make sense to impose on all futures investors the stock margin requirement for individual investors. The stock index futures market is a professional market. Speculation by individual investors appears not to have been a serious problem in the October decline.

Speculation by professional market participants is, however, a realistic concern. In the stock market, professionals are not subject to the 50 percent margin requirement applicable to individuals. Professionals, such as broker-dealers, can invest in stocks on 20 percent to 25 percent margin. The same professionals can take equivalent positions in stock through the futures market on much lower margin.

To protect the intermarket system, margins on stock index futures need to be consistent with margins for professional market participants in the stock market. Such requirements need not produce equal margins on futures and stocks but should reflect the different structure of the two related market segments. However, similar margins resulting in roughly equivalent risk and leverage between the two market segments are necessary to enforce consistent intermarket public policy objectives concerning leverage and speculation.

Higher futures margins (in line with equivalent stock margins for professionals) need not hamper futures market makers and hedged futures participants. Consistent with the one-market concept, cross-margining should be

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<sup>2</sup> For example, on October 19, a professional market participant, who is classified as a hedger, could have taken a position in the equity market by purchasing an index futures contract with an underlying value of \$130,000 (500 times the index value of 260) by making an initial investment of \$7,500, or approximately 5.8 percent of the contract's value. In order to purchase \$130,000 worth of stock, such a participant would have to make an initial investment of about \$35,000, or about 25 percent of the value of the stock. Although the futures investor only has to come up with \$7,500, the entire \$130,000 stock equivalent may be transmitted into the stock market through index arbitrage. Similar leverage is possible on the short side of the market.

allowed. Market participants with an investment in futures should be allowed to receive credit for an offsetting, or hedged, investment in stocks or options. Cross-margining allows margin regulations to focus on the true intermarket risk exposure of participants, rather than focusing myopically on a single market segment.

In view of the October experience, the underlying logic of consistent margins for professional market participants in the one-market system is compelling. If, from a public policy viewpoint, a given margin level for investment in stocks makes sense, should lower margins and the potential for more financial leverage and speculative investment be allowed for market participants investing in stocks via derivative instruments? Should two margin requirements apply to what is, in effect, one market?

## **Circuit Breaker Mechanisms**

Circuit breaker mechanisms involve trading halts in the various market segments. Examples include price limits, position limits, volume limits, trading halts reflecting order imbalances, trading halts in derivatives associated with conditions in the primary marketplaces, and the like. To be effective, such mechanisms need to be coordinated across the markets for stocks, stock index futures and options. Circuit breakers need to be in place prior to a market crisis, and they need to be part of the economic and contractual landscape. The need for circuit breaker mechanisms reflects the natural limit to intermarket liquidity, the inherently limited capacity of markets to absorb massive, one-sided volume.

Circuit breakers have three benefits. First, they limit credit risks and loss of financial confidence by providing a “time-out” amid frenetic trading to settle up and ensure that everyone is solvent. Second, they facilitate price discovery by providing a “time-out” to pause, evaluate, inhibit panic, and publicize order imbalances to attract value traders to cushion violent movements in the market.

Finally, circuit breaker mechanisms counter the illusion of liquidity by formalizing the economic fact of life, so apparent in October, that markets have a limited capacity to absorb massive one-sided volume. Making circuit breakers part of the contractual landscape makes it far more difficult for some market participants—pension portfolio insurers, aggressive mutual funds—to mislead themselves into believing that it is possible to sell huge amounts in short time periods. This makes it less likely in the future that flawed trading strategies will be pursued to the point of disrupting markets and threatening the financial system.

Thus, circuit breakers cushion the impact of market movements, which would otherwise damage market infrastructures. They protect markets and investors.

There are perceived disadvantages to circuit breaker mechanisms. They may hinder trading and hedging strategies. Trading halts may lock investors in, preventing them from exiting the market. However, circuit breakers in a violent market are inevitable. The October market break produced its own circuit breakers: the clogging of the DOT system for NYSE order processing and OTC trading systems; ad hoc trading halts in individual stocks, in options and stock index futures; jammed communication systems; and some less than responsive specialists and market makers throughout markets.

These market disorders became, in effect, ad hoc circuit breakers, reflecting the natural limits to market liquidity. The October 1987 market break demonstrates that it is far better to design and implement coherent, coordinated circuit breaker mechanisms in advance, than to be left at the mercy of the unavoidable circuit breakers of chaos and system failure.

To be effective, circuit breaker mechanisms need to be rationalized across stocks, stock index futures and options markets. Coordination is necessary to

prevent intermarket failure of the kind experienced in October. The intermarket impact of trading halts was vividly illustrated in October. When the NYSE's automated stock order system, DOT, was rendered ineffective, index arbitrage became infeasible, robbing the index futures markets of much needed buying power. From the narrow perspective of the stock market, an inactive DOT system may have appeared beneficial, since it made program selling difficult. However, this contributed to the development of a futures discount which, in turn, put downward pressure on stock prices. Also, trading halts in NYSE stocks interfered with options and futures trading. Indeed, there are numerous examples in the October break of the impact of trading constraints in one marketplace on conditions in other marketplaces.

Trading halts such as price limits are not the private concerns of individual market segments. Because they affect trading throughout the intermarket system, circuit breakers need to be coordinated from a broader intermarket perspective. In a crisis, the need for intermarket information and coordination of trading halts is imperative to avoid intermarket failure. Closing one market segment can have a destabilizing impact throughout the market system. An intermarket perspective facilitates a timely and effective response to crisis.

## **Information Systems**

Intermarket information systems are currently insufficient to monitor the intermarket trading strategies that are so significant to the one-market system. Intermarket monitoring systems are necessary to assess market conditions and to diagnose developing problems.

The October experience illustrates the need for a trading information system incorporating the trade, time of the trade and the name of the ultimate customer in every major market segment. This is critical to assess the nature and cause of a market crisis to determine who bought and who sold. This information can be used to diagnose developing problems as well as to uncover potentially damaging abuses.

The futures clearinghouse and large trader information systems currently allow assessment of trading time by trading customers. The stock exchanges have no system which details trades and trading times by customer. Stock systems include only the broker-dealers involved and whether the broker-dealer acted as principal or agent. Customer information for all market segments is critical to assessing threats to the intermarket system, and all major exchanges should be required to maintain such an information system. The October experience illustrates the need for information systems capable of monitoring conditions throughout the one-market system.

## **Conclusion**

One intermarket system mandates one agency to coordinate the few critical intermarket regulatory issues—clearing and credit arrangements, margins, circuit breakers and information systems. This intermarket agency need not be involved in detailed intramarket regulatory issues in which the SEC, the CFTC and the self regulatory organizations have expertise. The expertise required of the intermarket agency is evident from the nature of the task.

In many respects, the problems associated with the October market break can be traced to intermarket failure. Institutional and regulatory structures designed for separate marketplaces were incapable of dealing with a precipitate intermarket decline which brought the financial system to the brink. Although exchanges may not be pleased with the prospect of intermarket regulation, the Task Force has concluded it is essential to ensure the integrity of financial markets.

It is important to note that, for the most part, this proposal does not involve substantial additional regulatory burdens. Rather, it involves the real-



location of existing responsibility to conform to new economic realities. Inter-market trading activities are an important innovation and contribute to the competitiveness of U.S. markets. These activities have evolved and grown rapidly during the past five years. The regulatory structure has not evolved in a corresponding manner and remains primarily an intramarket activity. This needs to be changed.

The pressing need for coordination of intermarket issues is the chief lesson to be learned from the October experience. Rationalizing intermarket issues is the key to avoiding future market crises and ensuring the efficiency and competitiveness of U.S. markets.

# Chapter Eight

## Conclusions

On Thursday, October 22, following the stock market break earlier that week, the President announced the formation of the Task Force on Market Mechanisms. Its mandate was, in 60 days, to determine what happened and why, and to provide guidance in helping to prevent such a break from occurring again.

The Task Force concludes that the precipitous decline in the stock market was characterized by large sales by a limited number of institutional investors throughout the interrelated system of markets—stocks, futures and stock options. The massive volume, violent price volatility, and staggering demands on clearing and credit raised the possibility of a full scale financial system breakdown.

The Task Force also concludes that stocks, stock index futures and options constitute one market, linked by financial instruments, trading strategies, market participants and clearing and credit mechanisms. To a large extent, the problems in mid-October can be traced to the failure of these market segments to act as one. Institutional and regulatory structures designed for separate marketplaces were incapable of effectively responding to intermarket pressures. The activities of some market participants, such as portfolio insurers, were driven by the misperception that they were trading in separate, not linked, marketplaces.

The simple conclusion is that the system grew geometrically with the technological and financial revolution of the 1980's. Many in government, industry and academia failed to understand fully that these separate marketplaces are in fact one market.

Nonetheless, that the market break was intensified by the activities of a few institutions illustrates the vulnerability of a market in which individuals directly own 60 percent of the equities. The experience underscores the need for immediate action to protect the equity market and financial system from the destructive consequences of violent market breaks.

Our understanding of these events leads directly to our recommendations. To help prevent a repetition of the events of mid-October and to provide an effective and coordinated response in the face of market disorder, we recommend that:

- One agency should coordinate the few, but critical, regulatory issues which have an impact across the related market segments and throughout the financial system.
- Clearing systems should be unified to reduce financial risk.
- Margins should be made consistent to control speculation and financial leverage.
- Circuit breaker mechanisms (such as price limits and coordinated trading halts) should be formulated and implemented to protect the market system.
- Information systems should be established to monitor transactions and conditions in related markets.

Analysis of the October episode also gives a clear view of the attributes required of an effective intermarket agency. These are: expertise in the interaction of markets, not simply experience in regulating distinct market segments; a broad perspective on the financial system as a whole, both foreign and domestic; independence; and responsiveness.

The Task Force has neither the mandate nor the time to consider the full range of issues necessary to support a definitive recommendation on the choice of the intermarket agency. We are, nevertheless, aware that the weight of the evidence suggests that the Federal Reserve is well qualified to fill the role of the intermarket agency.



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## APPENDIX

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# Appendix

## Other Regulatory Issues

Certain other issues have been discussed during the course of the work by the Task Force. Because of time limitations the Task Force has not studied these subjects in sufficient depth to reach definitive conclusions.

The issues identified by the Task Force as warranting review by the appropriate authorities are:

## Short Selling

SEC rules provide that short sales on an exchange may be executed only on a “plus-tick” or a “zero-plus-tick”—at a price higher than the price of the last different trade price preceding it. This rule is designed to prevent short sellers from further depressing prices in a declining market. The SEC rule is obviously inapplicable to the futures market and is generally not applicable to the options market. The sale of a futures contract ultimately resulting in the sale of stock in the stock market through index arbitrage, and other intermarket transactions, such as index substitution and exchange for physicals, may be viewed as inconsistent with the intent of the SEC rule. The subject of short selling should be reviewed from an intermarket perspective.

## Customer Versus Proprietary Trading

In the stock market, broker-dealers act as principal for their own account as well as executing customer orders. A futures market maker on the CME may both execute proprietary trades and trade on behalf of customers throughout a particular day. On the CBOE, the options market makers may trade only for their own account, and not for customers.

Potential problems associated with anticipatory trading and front running (market professionals trading in anticipation of, or in front of, customer orders) in the same or different marketplaces, should be reviewed from an intermarket perspective.

## NYSE Specialists

The required capital of specialists has not been revised since 1977, when it was decreased. We understand that the NYSE is currently studying the subject. While one can conclude that no realistic amount of capital could have stemmed the tide of the October break, and that there is no direct link between capital and performance, such a review is timely.

The NYSE has the primary responsibility for enforcing a specialist's obligation to maintain a fair and orderly market. While the performance of many specialists during the October break was good, the performance of some specialists was poor by any standard.

## NYSE Order Imbalance

In cases where there are serious imbalances of orders, consideration should be given to favoring public customers in execution over institutional and other proprietary orders through the DOT system. In addition, consideration should be given in those circumstances to making the specialist's book public in order to help attract the other side of the imbalance.





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Study I  
**The Global Bull Market**

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# Study I

## The Global Bull Market

### I. The Background

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All the major stock markets in the world were in a bull market for the better part of the period between August 1982 and October 1987. The precise start-up point of the bull market differed for each country, although for the most part, markets took off with vigor sometime in the late summer or early autumn of 1982. The rise in the market indices for the 19 largest markets in the world averaged 296 percent over the period under study. The rise for the U.S. was 195 percent. In the period between August 1982 and October 1987, the course of each country's market rise varied. For some it was a fairly uninterrupted rise, and for others it was a phased ascension (see Appendix I).

The forces supporting the strong share prices in each country have been divided into two categories: globalized forces, and particular, localized phenomena.

The globalized forces are a wide range of developments that impacted all markets. These include economic recovery, improvement in corporate earnings, increase in financial liquidity, burgeoning take-over activity, deregulation of financial markets, the relative appeal of financial versus fixed assets (disinflation) and the growth of derivative products. These phenomena affected each market differently. They also interacted with factors particular to the local marketplace that fostered the stock market rise. These included such factors as privatization, legislation providing tax incentives for equity investing, shifts in institutional investing patterns, the growth of pension fund assets and expansions in local money supply.

Many of the factors that accompanied the bull market in the U.S. occurred in other major markets. These include the rise in valuation levels to heights that appeared excessive by historic standards, the birth of sophisticated hedging strategies, the speculative nature of some trading and break-up or hidden asset valuations. One key distinction between this period under study and most other phases in the post-war period was the burgeoning of transnational financial flows. The amount of money available for investment in financial assets was grow-

ing. In addition, there was an ever-increasing propensity to shift capital around the globe to tap the benefits of a particular market, economy or type of security.

A number of phenomena contributed to the globalization of financial flows. These included the gradual relaxation of foreign exchange controls in most markets, the increased emphasis on diversification of investment assets by institutional money managers, the improvement in the flow of information about different economies and investment instruments through technology, the internationalization of securities trading houses and a premium for seeking the best investment vehicles worldwide. This globalization of financial flows was evident to Americans in the increased purchases by foreigners of U.S. securities (both bonds and equities). That trend had been underway for a number of years. It began picking up in 1985, more so in 1986, and reached unprecedented levels in 1987.

On the fixed income side it had become very apparent that foreign, particularly Japanese, investors played a vital role in purchasing increasingly large portions of the U.S. Treasury Bond auctions and consequently were crucial to financing the U.S. government budget deficit. On the equity side, the role of foreign investors was also growing. During the first three quarters of 1987, Japanese investors bought \$15 billion of U.S. equities. Put more graphically, in the first half of 1987, foreign institutions bought as large a volume of U.S. equities as did domestic institutions. In turn, U.S. institutional investors became increasingly active in buying foreign securities. The birth of 24-hour markets made all markets functionally and psychologically interlocked.

As a result of this increased interdependence of capital, there was a heightened awareness in all economies of the external factors that could affect the flows of funds into the marketplace. In the U.S., this took the form of a heightened awareness of the factors that would attract or deter the participation of foreign investors, such as the level of interest rates and the value, or anticipated future value, of the dollar.

## The Beginning: August 13, 1982

The United States bull market emerged on August 13, 1982 from a mire of extreme fear. The world financial markets were deeply worried about the spectre of possible Mexican defaults and shaken by the Penn Square Bank and Drysdale Securities crises. The bull market emerged as a result of the Federal Reserve's easing of credit that had an almost immediate impact on a credit-starved U.S. economy. Tight credit since 1979 had caused great pent-up demand for a wide range of consumer durables. By November 1982, the recession was officially over.

Investors faced a more positive environment where disinflation continued even in a rapidly expanding economy. In 1982, real interest rates [nominal 30-year government bond yields minus the change in the Consumer Price Index ("CPI")] were at historic levels reflecting the ravages of the last few years' war on inflation.

As rates declined over the next few years, the impact was significant and continued to have an immediate effect on the level of the stock market's price/earnings ("p/e") multiples. Market multiples in general appear to hit their peak potential when real interest rates are at 2.5 percent to 4.5 percent. If rates fall below that level, as was the case during the late 1970's, inflation worries undermine the investors' willingness to hold financial assets. Above that level, bonds, with their risk-free rate of return, become increasingly and overwhelmingly enticing, thereby limiting p/e multiples.

The year 1982 ended on a high note and the opportunities carried over into 1983. However, the strength of the economy led the Federal Reserve to put the brakes back on the credit market starting in 1984. The stock and bond markets began to labor under the weight of tight credit. Real interest rates approached the astronomical 10 percent level. Relief, in a manner of speaking, was only a disaster away. So when the Federal Reserve came to the aid of the stricken Continental Illinois Bank, another major phase of the bull market began on July 27, 1984. Aside from market activity, 1984 began a trend that is absolutely essential to understanding the reasons for the extent of the bull market and how it unraveled so quickly. Only twice in this century has equity issuance declined over an extended period. The "rationalization of American industry" from 1899 to 1905 by such giants as Morgan, Harri-man, Rockefeller and Schiff was repeated in the 1984 to 1987 period (see Appendix 2). Corporations are normally net issuers of equity. During these two periods, they bought far more equity securities than they issued because of merger, acquisition, leverage buyout, recapitalization, restructuring, and share repurchase activity. Why? Because stock prices were cheap and gave a higher return than

new capital assets that corporations could create themselves.

Liquidity was an essential—possibly "the" essential—element for the length and height of this stock market climb. Central to the liquidity increase in the United States was the negative net equity issuance year after year. The combination of low inflation and steady growth made stocks an attractive investment, aside from acquisition activity. Then the system took the singularly most attractive investment instrument and reduced its availability; the only answer was higher prices. If the assets were gold or oil this phenomenon would be called inflation. In stocks, it is called wealth. In every market, supply/demand imbalances were created for different reasons; however, each led to higher prices.

## January to October, 1987

From the beginning of 1987 until the October crash, the speed of the U.S. stock market rise accelerated. A number of markets rose even more swiftly, valuations grew even more excessive and the pace of international capital flows grew even more rapidly. Also, and perhaps more importantly, the awareness of the interdependence of financial markets increased, and with that there grew a heightened sense of vulnerability.

What may have appeared strictly a "Wall Street" collapse was the result of the cumulative impact of several developments occurring simultaneously in several other financial centers. Just as the factors which led to the bull market in the United States were being paralleled in other world markets, so, too, the factors which set in motion a correction in the United States were evolving on a global basis. Among these factors were the rise in p/e levels and the decline in dividend yields (see Appendix 3).

## II. The United States

Throughout 1987, several key factors would weave through the market: diminishing supply of equity, takeover valuation concepts and high liquidity levels. On a fundamental basis what gave the market confidence throughout the year was the strength of the economy. The U.S. was experiencing the longest non-war boom in history and the boom had no end in sight.

Many other world markets were doing at least as well as those of the U.S., so the U.S. markets did not seem overpriced compared to others.

Valuation levels had not yet begun to test credibility. At the start of 1987, the S&P 500 was selling at a market multiple of 16 times 1986 earnings. If it were assumed that earnings would grow by 20 percent in 1987, then the market would be on a prospective multiple of 13.3 times 1986 earnings. The 10-year government bond hovered in the region of



7.0 percent to 7.3 percent for the first four months of the year. The market yield began the year at 3.6 percent and moved to 3.0 percent by the end of April.

The tone and the trend of 1987 was set by certain events at the end of 1986. In late November, the Ivan Boesky insider trading revelations came to light and caused the fifth bull market correction in 1986. Volatility had become a way of life. But the broad averages came back in December, and so did deals. Deal stocks were fueled by the need to close before year-end tax law changes did away with net operating loss advantages. December 1986 was also marked by individual selling for tax reasons, exacerbated this year by changes in the capital gains tax levels. Large stocks were sold for gains. Smaller stocks, which had performed poorly since 1984, were sold down to very low levels for losses.

The New Year started with a bargain basement grab bag led by smaller capitalization technology stocks. For two weeks they led the market, and then the New Year flow of institutional funds rolled back into the larger capitalized stocks. This trend marked the continuation of the move by pension fund plan sponsors toward indexation. The averages increased due to the investment of large cash positions built by year-end merger closings, tax selling and other new monies.

The market's overall strength, and the low level of interest rates, made laggard stocks vulnerable to takeover speculation. The February to March period saw a major new round of mergers and leveraged buyouts announced. With it came further activity in recapitalizations and stock repurchases for defensive purposes. These actions took more shares out of the market and gave equity investors cash. Stocks were being purchased by corporations at high valuations and the cash put back into the market pushed the existing pool of shares to higher and higher levels.

As the cliché goes, success breeds success. Because the stock market was strong, the flow of IRA money helped push it further. This flow of money, along with takeover evaluation thinking, probably caused the abrupt recovery of the market from the first of a quick series of dollar scares in March.

The Louvre agreement to stabilize the dollar was signed in late February, but it was not widely known to the securities markets until late March. The end result was obvious—higher rates were the only way to make it work. April and May saw the dollar decline versus the Deutschmark from 1.87DM=\$1.00 to 1.77DM=\$1.00. Rates rose violently from 7.50 percent on long U.S. government bonds to over 9.00 percent. The shock to the bond market (and to some leading Wall Street firms which suffered heavy losses) was tremendous. The S&P 500 fell from 301.95 on April 6 to 279.16 on April 14, a loss of 8 percent.

The bond market collapse was a very real test for the stock market, but it was clearly not prepared yet to believe the worst. To the surprise of many of Wall Street's veterans, this correction was followed by a revival of the market back to within a whisker of its highs in the first weeks of May. This marked the beginning of a rough period in the market. April and May were tough months, both in terms of volatility and lack of direction.

One of the real problems was valuation. By the end of May, it was becoming clear that on a valuation basis, there was diminishing justification for continued stock price increases. In the view of most of those who use traditional valuation criteria, the trend in three common valuation measures told the whole story. First, shares were overvalued relative to current interest rates. As bond yields had risen this had become more and more obvious. The S&P 500, according to various analyses on the street, was about 25 percent to 40 percent overvalued.

Second, a decline in bond yields that would relieve the valuation misalignment was nowhere in sight. The bond market psychology was terrible and did not look likely to improve unless one or all of three events took place: an alleviation of inflation fears, stability in the dollar or slower economic growth. None of these developments seemed imminent.

Third, shares were overvalued relative to asset value. On the basis of the then current price-to-book-value, the S&P 400 was at a ratio of 2.4. On the basis of price-to-inflation-adjusted-book-value the ratio was 0.97. This was the highest level since 1973. On the basis of quality adjusted earnings divided by replacement book value, the market was also expensive.

The market recovery, starting in late May, favored large internationally-oriented stocks. These companies would benefit from the lower dollar both on an income and balance sheet basis and could better compete against foreign competition. Among them were the drug companies, the large technology stocks and the autos—all large capitalization stocks that had a major effect on the averages. The market was once again favoring the stocks that weigh heavily in the stock indexes as well as the derivative products of the indexes. The major stock averages (the DJIA, the S&P 100 and the S&P 500) outperformed the broader market. The major stock averages were helped by the movement within the pension fund business towards more indexation—a move promoted by the fact that active managers had failed to equal the overall market's performance since 1984. Big stock averages were further aided by the significant leverage created by derivative securities, most prominently the S&P 100 Index Option and the S&P 500 Index Future. On a notional basis (the full value of the option or future), nearly four



times the value of the New York Stock Exchange ("NYSE") trades daily in these instruments.

Another force that became increasingly important was the role of foreign investors. Approximately \$15 billion of U.S. equities were purchased by Japanese investors in the first three quarters of 1987. This buying was concentrated in high quality, visible stocks which further reinforced the trend for the big capitalization and index stocks to move ahead.

Thus, even though valuations were high by historical standards this was not enough to create a bear market. For a bear market to ensue, the high valuations had to be accompanied by tighter money, sharply rising short term interest rates, some indication of impending recession and a large issuance of new equity. None of these appeared likely. In fact, the opposite was true.

The Federal Reserve ("the Fed") continued to provide ample liquidity to accumulate financial assets. M2 was still growing at a significantly greater rate than nominal Gross National Product ("GNP"). Bull markets normally do not end with the Fed as accommodating as it was.

Short term rates were still at acceptable levels. Since January, three-month T-Bills had hovered in the range of 5.4 percent to 6.1 percent. The ends to previous bull markets were normally preceded by an average 25 percent to 30 percent rise in T-Bill rates from their troughs. Short term rates had risen about 10 percent from their recent trough of 5.15 percent. This is one variable that was to change come September. Few people expected the Fed to tighten short term rates, largely because the economy was not overheating.

The economy was expected to grow by 2.5 percent to 3.0 percent in 1987 and at least as well in 1988. There was simply not enough evidence to indicate a recession, which had traditionally been on the horizon before a bear market. Earnings estimates on the Street were still very positive. Most of the major houses on the Street were still predicting double digit growth for the year.

In short, monetary policy, economic activity, earnings and demand were all at striking odds with the assumption that a bear market was imminent, no matter what the valuation models said.

### **The Levitating Stock Market: Defying Natural Forces**

The market's final run to above 2,700 in August 1987, was accomplished through the combination of strength in the big capitalization stocks and continuing merger and acquisition activity.

Theoretically, there are two broad ways to evaluate equities. Traditionally, equity investors buy on the basis of a future flow of returns, whether earnings, cash flow, or dividends. Those flows are discounted by a risk-free rate and a risk factor. The

risk factor takes into effect the stability of the future flows and the inflation-adjusted quality of those future returns. Alternatively, the price of a stock can be derived from its liquidation value, which acts as a safety net to all markets when fear, economic chaos or inflation make future flow analysis impossible. Rarely does this liquidation concept provide higher valuation levels than the future flow analysis. The early 1900's, the late 1960's and the middle 1980's may be exceptions. This became a dominant concept in the summer.

Takeover activity was a mainstay of the market. It was strong and was expected to continue. High takeover valuation methods supported a broad range of stocks well above traditional valuation levels. Large pools of leveraged buyout, bridge and other takeover activity funds were raised or added to in 1987. These funds aggregated over \$23 billion for the first eight months. These funds had the ability to buy \$150 billion of corporate stock. The availability of these funds reinforced the use of takeover evaluation methods in the public market. The substantial corporate repurchases and recapitalizations were an alternative method of increasing dividend payout. Therefore, although dividend yields seemed low on a return-of-capital basis it was easy to rationalize away this shortfall. The \$90 billion reduction in corporate equity had to be reinvested. The vast majority of this money was labelled for equity investment and found its way back into the stock market or reserves earmarked for the stock market.

### **End of August to October 19: Living on Borrowed Time**

The reality of another attack on the dollar and higher interest rates became obvious in late August. The trade figures were a disappointment. A combination of increasing imports, an overheated economy and rising commodity prices paved the way.

On September 3, the Federal Reserve raised the discount rate from 5.5 percent to 6 percent. The prime rose from 8.25 percent to 8.75 percent. On September 22, the Dow rose 75.23 points. This was the biggest one-day rise in history. It closed that day at 2,568.

Why didn't the market correct in an orderly fashion as it had in the April to May period? For one, the market was caught up in the final spate of takeover bids. Many of these were poorly conceived, poorly financed and grossly overpriced. Typically, not only principal payments, but interest payments as well, were dependent on asset sales. Then, too, hedging strategies gave investors more incentive to hang on. Many investors felt they had a safety net that enabled them to take greater risks and have a higher equity exposure than they may have normally accepted. Plan sponsors had an asset allocation that

may have favored equities despite the high absolute level of the market because of defensive hedging techniques—broadly called portfolio insurance. Moreover, selling in the bull market had hurt too many people. Those who had sold on the basis of valuation considerations had seemingly been proved wrong too many times in the course of the bull market. There had been 11 corrections of between 8 percent and 12 percent in the last 18 months. Almost every sale was regretted.

Many of these explanations for stock rises may appear as simple rationalizations for continuing a pleasant course of events. Inertia often can cause a market to overshoot proper valuations. One only has to look at the currency markets of the 1980's to see a U.S. dollar that was grossly overvalued or a pound sterling that was undervalued for months—perhaps even a year—before the trends were righted. Stocks, which had become highly overvalued by the third quarter of 1987, now are nearly as cheap relative to their fundamentals as at any time since 1982 (see Appendix 4).

### III. The United Kingdom

From August 1982 until September 1987, the U.K. market rose 262 percent. Strong stock markets were not news to the U.K. For all intents and purposes, the U.K. had been in a bull market since the end of 1974. In fact, between October 1974 and the beginning of 1987, the market had risen 1,446 percent. That made it the second-best performing market in the world over that period. Gains in the market had averaged 27 percent annually since 1975. The only unimpressive year had been 1976, when the market declined by 3.9 percent. Also, the worst correction in the market was a 26 percent decline over eight months from October 1976 to June 1977.

The length and the strength of the bull market suggests that there were a wide variety of factors providing momentum to U.K. equities. The gradual improvement in the economy, which accelerated after 1979, was one factor. Others were structural, having to do with the growth of liquidity in the market due to the expansion of the pension fund asset base and the influx of foreign monies to be managed (notably Middle Eastern and American). Some factors were technical, such as the improvement in the sophistication and efficiency of the U.K. institutional market.

From the beginning of 1987, there was a strong pickup in the pace of the bull market. From January until the peak on July 16, the market increased 48 percent (see Appendix 5-a).

A rich variety of forces propelled the U.K. market. The weight of fundamental arguments was compelling, with the economy proving a lot stronger than expected. The U.K. economy had clearly recovered

and was showing its liveliest growth since the 1960's. Real GNP growth reached 3.0 percent in 1986, and was expected to reach 3.5 percent to 4.0 percent in 1987 and 2.5 percent in 1988. In the first half of 1987 the economy grew at a rate of 5 percent per annum, which was double the OECD average. In fact, the U.K. was emerging as one of the fastest-growing economies within the industrial world. There were other positive signs: the government had its costs under control (with public sector borrowing requirements trending down), interest rates had come way off their early 1980 highs of 20 percent to 25 percent and the days of double digit inflation were fading into the past.

The corporate profit outlook appeared very good. When 1987 started, the U.K. was looking at its seventh successive year of double digit earnings growth. Earnings for the industrial sector grew at a rate of 10 percent in 1985, 22 percent in 1986 and were (as late as April of this year) expected to grow by 16 percent to 20 percent in 1987. The outlook for 1988 was also good. In short, in the 1980's there had been something of a mild revolution in the U.K. economy and the corporate sector was the major beneficiary. Most of the strength in earnings can be attributed to the combination of lower costs due to productivity improvements and also to growth in volume. Volume growth was in part due to the voracious appetite of the high-spending British consumer and to the growth in market share by U.K. companies overseas. The latter was attributable to the depreciation in sterling versus the Deutsche-mark.

Dividend growth looked exceptionally strong. The track record on dividend growth was excellent. Real dividends had grown on average 10 percent per year since 1983 and were expected to grow by about 11 percent to 14 percent in 1987.

As the British economy improved, sterling stabilized (see Appendix 5-b). The pound sterling entered a period of relative stability in the end of 1986 and looked to be headed for a rare patch of strengthening. This was in large part connected to the stabilization of oil prices. The pound/dollar rate stayed in the 1.54 to 1.68 range from February to mid-July.

Interest rates were trending down. This was a key factor in the first half of the year. Long term rates had peaked in 1986 at 11.4 percent in November (see Appendix 5-c) and short term rates had peaked in November at about the same level. The general expectation was that they would continue lower. This assumption was based on two positive developments in the U.K. economy. The stabilization of sterling made the need for high rates to support the pound less imperative. Also, the U.K. government looked as though it would be less of a factor in the debt market. The autumn statement by the Chancel-



lor of the Exchequer gave very positive news on the conditions of the Public Sector Borrowing Requirement, which was trending downward at a very rapid pace. Rates did in fact move down as the market expected. Short term rates fell from 11 percent in January to 8.6 percent in May and hovered in that region into mid-June. Ten-year treasury bond yields fell from 10.3 percent to 8.65 percent over the same period.

Equities were not particularly expensive. The valuation case depended a lot on prospective earnings projections. In January 1987, the U.K. market, as measured by the FTA 483 Index, was selling on a trailing multiple of 15.5 times 1986 earnings. If one assumed that earnings were going to grow by 18 percent in 1987, that put the market at 13 times 1987 earnings. The U.K. market had seen an average p/e range of 12 to 18 times over the last decade. This was clearly at the low end of the range.

The U.K. market was not expensive on a comparative international basis. Cross-border multiple comparisons are grossly inaccurate because of the differences in accounting procedures; nonetheless, the exercise in comparisons is widely practiced, even if not fully accepted. Most managers make mental adjustments in earnings to account for the differences; almost all engage in some loose form of multiple comparison. The U.K. multiple in January of 15.5 compared to one of 17 in the U.S., 50 in Japan, 14 in Germany, 19 in France.

In fact, a compelling argument in the first quarter of 1987 was that the U.K. market, on the basis of simple measures like p/e, earnings momentum and dividend potential, was a relatively better value than almost any other major industrialized country's market.

Takeover activity continued unabated. In 1986, the value of takeovers increased significantly. Most analysts expected the pace of takeover activity to keep up in 1987, and it did. On a net basis this pumped a lot of new money into the market. Liquidity was booming. M3 for the better part of 1987 was growing at a rate of 18 percent to 20 percent per annum.

In the early part of 1987, a general election was expected at some point during the succeeding 12 months and the Tory government was widely expected to retain its majority. Seldom in pre-election polling did it appear likely that Labour could narrow the Tory lead, let alone come in with a majority. The conservative government of Margaret Thatcher had overseen the resurgence of the British economy and stock market and continued to hold the confidence of the market.

As a result of these factors, the market sailed through expected target levels. Many had expected a sell-off after the general election, but it never materialized. Instead, the market jumped another 10

percent after the Tory victory in the June 11 General Election. What's more, foreign investors—notably Japanese and U.S.—started to take a part.

As summer got underway, however, the market began to come unraveled. In July, the market peaked for the year, and began a slide downward over the summer. The reasons for the London slump were straightforward. Economic worries made a continued strong rise in share prices unsustainable. More negative news filtered in. There were several developments that began to undermine the validity of the bulls' case.

The balance of payments worsened sooner than anticipated. Most analysts had been predicting a deterioration of the payments situation later in the year. On July 22, the government reported a deficit on visible trade of 1.16 billion pounds (\$1.9 billion) for May, more than double the April figure. The May figures came as a shock and carried with them the implicit threat of higher interest rates.

Interest rates began to rise. This was the first sign of an impending break in the momentum. It was in mid-June that the rise began, first gently, and then taking off with a vengeance. In the two-month period between June 6 and August 6, long term government bond yields rose from 8.6 percent to 10.4 percent. On August 6, the Bank of England raised the bill clearing rate, forcing base lending rates higher.

The quality of profits began to deteriorate. Companies were using dubious devices to inflate the bottom line. Pension holdings were as much as 10 percent of earnings.

The supply/demand situation became unwieldy. By mid-summer, it became apparent that the number of initial public offerings ("IPOs"), rights offerings and privatization issues due to come to market in autumn would create a combined pool of paper that would exceed anything that the market had been forced to absorb in the past. It was estimated at one point that the amount of paper the market would see in the last half of 1987 would be close to 16 billion pounds, far exceeding the 12 billion pounds in all of 1986. The market began to experience digestion problems as early as August. Some of the subsequent under-writings began to go wrong; several large issues were only partially subscribed, leaving the underwriter with large long positions.

Fears of "economic overheating" began to grip the market. An attitude gathered force in London that the economy was being run too hard. Consumer spending was sustained on the back of ever-expanding credit. Bank lending levels were at unusually high levels.

The valuation methods often used in the U.K. turned exceedingly bearish. The yield gap by August was above 6 percent. The yield ratio was

exploring new high ground above 300. Both reflected the difference between the euphoric attitude toward equities and the cynical attitude toward gilts. It was something of a surprise, then, that the market rallied in September. The All Share Index began rising on August 28 and rose to 1,222 on October 5, putting it within one percent of its July high.

Most analysts and strategists have difficulty explaining the strength of the market over this period. It is interesting to note that a very large number of the most influential houses in the U.K. were quite aware of the negatives. Many were very bearish on their own market over this period. Explanations of this market performance generally point to six factors:

- A few items of positive economic news put a temporary positive gloss on the market. On September 18, the bank lending figures for the preceding month were reported and they turned out to be much better than expected. On the 24th, the trade figures for July and August were reported and they too showed some better than expected trends;

- There was a series of announcements of very impressive company results;

- Forecasts for 1988 earnings were exceptionally good, and there was an increasing tendency to look forward to 1989 earnings with the confidence that they too would be good;

- Bank lending figures for August showed that lending had been contained at acceptable levels, and thus dispelled fears of further rate rises;

- Despite the deterioration in some economic numbers, some of the main arguments for preferring U.K. equities were intact: economic growth, strong earnings, and ratings that were not unacceptable by world standards;

- A certain detached confidence, if not hubris, began to dominate in London. For one thing, the reports on business activity from the CBI were still very positive. For another, there was a sense of endless demand for stock. The indications of sustained Japanese investment (and this had become very real in the high profile alpha stocks) injected London with an air of omnipotence.

But the market arithmetic was clearly not favorable. The valuation numbers should have led to a conclusion to underweight equities. Yet few were willing to go so far in the face of what seemed to be an inexorably rising equity market. There was an undercurrent of belief not often articulated—but probably implied—that forces were at work of a nature unlike those that had determined the course of equities in the past and at work in a way that seemed to guarantee a strong market. Veteran U.K. investors showed little of the caution that their experience should have indicated.

On October 5, the FT 483 was at a historic multiple of 19.2 times with a yield of 2.7 percent. Even assuming the most bullish case for 1988 of 18 percent growth, that still put the market at a multiple of future earnings of 16.7—a prospective multiple intolerably high even when bonds were yielding more than 10 percent.

## IV. Japan

The Japanese market did extremely well in the bull cycle, with the Tokyo Stock Exchange Index rising 301 percent from August 1982 until the end of September 1987. The ascent, however, was not a steady one, the market took off with the rest of the world in late summer 1982 and gained 43 percent by year end 1983. It corrected sharply in 1984 and was stagnant for much of 1985 as corporate profit performance deteriorated due to weak domestic demand and a worsening export outlook. The stock market ascent began again in 1986 due to swelling financial liquidity, with the market gaining 50 percent that year.

The year 1987 clearly saw the most striking acceleration in the pace of increase in equity prices. The market had one of its sharpest ascents in its history. Between January and the peak in mid-June, the Tokyo Stock Market Exchange Index rose 45 percent (see Appendix 6-a). Needless to say, valuation levels, as perceived from those outside Japan, lost all contact with reality.

### Japanese Valuation Levels

Much has been made of the inflated Japanese p/e levels. At the time of the crash the first section of the Tokyo Stock Exchange was selling at an historic multiple of 71.9 times 1986 earnings. Many observers had expected to see a crash in the Japanese stock market long before there was one in the U.S.

Valuation levels in Japan are excessive by any standard and have been such for the better part of the last decade. It should be remembered that when the Japanese market was first “discovered” by foreign investors in the 1960’s, one of the attractions was its relative “cheapness,” selling at about 5 times earnings in 1962. The multiple hovered in the 12 to 15 range in the early 1970’s. It was not until 1980 that p/e ratios moved above 20, and not until 1986 that they surged to the stratospheric levels over 50 seen in 1987.

Most experienced investors in the Japanese market are well aware that comparisons of multiples with U.S. benchmarks are essentially irrelevant to the investment decision-making process. Typically, this multiple divergence is attributed to differences in accounting practices, relative bond yields or a difference in the mentality and/or objectives of the Japanese investor. A detailed analysis of this is



beyond the scope of this report. But a cursory glance can shed light on why the Tokyo market diverges so from the accepted norms in other markets.

In the first place, differences in accounting practices (which understate earnings) and the structural differences in Japanese companies make them unsuitable to unadjusted multiple comparisons. About half the shares of companies listed on the Tokyo Stock Exchange are cross-held by other listed companies. Double counting as a result of extensive cross-holdings greatly distorts the traditional yardsticks for measuring values. Most large Japanese companies are essentially a combination of a commercial business, an investment trust and a property company. It is widely recognized that p/e multiples are an inappropriate method for comparing the fundamental value of investment trusts or property companies, thus, without adjustment, p/e multiples are an equally unsuitable measure of the fundamental value of many Japanese companies. The overwhelming bulk of cross-holdings are not consolidated for earnings purposes, but only with regard to dividend receipts. Yields are low in Japan and dividend rates are infrequently raised. The flow of revenue is therefore indefinitely postponed so that the benefit to shareholders is reflected in the increased value of assets, which does not flow through the profit and loss account.

On another front, the standards, habits, and objectives of the investing public in Japan are different from those of U.S. investors. Individual investors are a large force in the market and they are active and risk-oriented traders. In Japan, in stark contrast to the U.S., the single most active trading participant in the market is the individual. Individuals own but 22 percent of the market but account for nearly 30 percent of the average daily trading volume. Financial institutions (banks, insurance companies and trust banks) account for 40 percent of market ownership but they make up only 18.5 percent of trading volume. The other most active participants are the securities houses themselves, which are often involved in aggressive trading of stock portfolios for short term gains.

Households in Japan use stock investments as aggressive capital gains-oriented accounts. Households hold only about 8 percent of their total net worth in equity accounts. They have traditionally viewed this stock portion of their savings as an account designated for the pursuit of short term gains. Their risk parameters tend to be quite wide. They are very much inclined to trade on the basis of rumors, tips, and themes.

The "theme" tradition in the Japanese market has long been responsible for the periodic swings and surges in certain sectors. The oligopolistic nature of the Japanese market—where the four largest brokers account for 80 percent of daily trading volume—

makes the market susceptible to maneuverings. This goes a long way towards explaining the strength of "hidden asset" stocks which dominated the market for much of 1985 and 1986, when earnings growth was negligible.

Most Japanese equity trading is aimed at short term gains and Japanese tax laws favor this. For individuals, there are no capital gains taxes on the first 50 transactions in a year as long as the total number of shares traded is under 200 thousand. As a consequence, market activity has a very short term trading orientation. The short term orientation in part explains the irrelevancy of multiple comparisons to Japanese investors. The whole concept of multiples is connected to the calculation of how long to hold a stock in order to get back in earnings what was paid for the stock. Those pursuing active equity strategies rarely make purchases for a long term investment horizon.

The Japanese market is actually much smaller than the market capitalization figures imply. Although the current market capitalization is Y 352 trillion (\$2.65 trillion) only about 30 percent to 35 percent of the shares outstanding in Japan could be called "free floating". Huge cross-holdings actually make the market look larger due to a sort of double counting. The bulk of shares is held in implicitly long term accounts by major banks and insurance companies. They hold shares in client companies more as a sign of support and for the purpose of maintaining amicable business relations than anything else. So the free floating market could more accurately be said to amount to about Y 114 trillion or \$861 billion.

The supply/demand situation in the market has been very tight. As the amount of money available to the average household has expanded in the last decade and as new "speculative investors" have entered the market (such as Tokkin funds), demand for equity has increased at a time when the supply of new equity was not rising as fast; therefore, prices have been pressed to extremes.

Only a very limited range of investment instruments are available in Japan. The Japanese financial system remains highly regulated. There has been no burst of new or innovative derivative products—such as futures or options—or even standard U.S. vehicles like money market accounts. Investors thus are faced with a simple menu—real estate, bonds, equities, gold and very little else.

Valuation analysis as we know it has never been an explicit part of the Japanese investment process. Investments are made with the expectation that share prices will rise not because of the inherent asset value of a company but rather because of the expectation of continued earnings growth. If a linkage can be made between earnings and price it is in



the perceived rate of growth of each, not in the intrinsic value of each.

These facts more than anything else explain the divergence of the Tokyo market from accepted norms in other markets.

## The Growth of Financial Liquidity in Japan

In 1987, the strength of the Japanese market resulted from one dominant factor—liquidity—as well as a few subordinate factors: the improvement in the corporate earnings outlook and the resurgence of the domestic economy. Structural economic changes and demographic developments—things not well understood outside Japan—were forcing a huge build-up in long term financial assets in the country. The build-up of institutional assets and the shift in asset preference toward equity formed the underpinnings of optimism in the beginning of the year.

It is almost a truism to say that the stock market was propelled by the force of the burgeoning liquidity in the financial system. Cash levels in both the household and the corporate sectors in Japan were extremely high. This was because of:

- The high savings ratio in the household sector, which averaged 20 percent to 25 percent per annum;
- The high net cash level of corporations in Japan;
- The huge surplus of imported cash due to the current account surplus, which was running at \$85 billion a year.

The usual outlets for accumulated cash—consumer spending and capital expenditure—had not been available for the better part of 1986 and the first half of 1987 because of the uncertain economic outlook. Put another way, the normal cycle of investment in real assets had been supplanted by a prolonged period of investment in financial assets. Reports from the major research houses (both Japanese and foreign) in the first quarter of the year went to great pains to document the volume of new money likely to flow into equities in 1987. Several major sources of additional funds for investment were expected to develop in 1987.

Redeployment of assets from tax-exempt time deposit accounts (Maruyu accounts) was expected to be the primary source of new funds. The tax exempt status of most deposit accounts was abolished beginning in October 1987. At the beginning of 1987, an estimated 60 percent of all Personal Sector Financial Assets were invested in tax exempt accounts. The Y 300 trillion (\$2.1 trillion) value of these investments almost equaled the value of the equity market's capitalization. Maturing time deposits would very likely be redeployed to other investments. Over Y 23 trillion (\$158 billion) of deposit

accounts were set to mature in 1987. A significant portion was likely to be shifted into equity funds.

Corporate pension fund growth remained strong. In 1987, corporate pension funds were expected to grow about 17 percent to 18 percent, having averaged 20 percent for the previous decade. This growth was linked to demographic shifts in Japan. The incremental funds would amount to Y 13.3 trillion in 1987. Equity still made up only 9 percent to 10 percent of pension funds. But the direction was very much toward greater equity exposure.

Individual pension schemes were also increasing. Individual pension contracts were growing at a very fast pace: 95 percent in 1982, 29 percent in 1983, 30 percent in 1984 and 24 percent in 1985. As a result, life insurance company assets grew from Y 51 trillion at year end 1985 to Y 70 trillion by the first half of 1987. Bank trust accounts hit Y 108 trillion in October 1986, up 31 percent from the year before.

Bank and insurance company investments would channel funds to equities. In periods when the general demand for credit was low, banks and insurance companies normally increased equity investment for their own account. With the slack capital expenditure outlook, there was every reason to expect the banks and insurance companies to put their own money to work in the stock market as they traditionally did.

Corporate Japan was raising a significant amount of cash in overseas markets and redeploying it in Japan, not in investments in real assets but in financial assets. Corporations in Japan throughout 1986 and 1987 had become very adept at taking advantage of falling interest rates to raise money in the Euromarkets. In 1986, the bulk of corporate financings had been in the form of convertibles in the Euromarkets. In 1987, it was through the issuance of bonds with warrants.

It was estimated that 70 percent to 80 percent of this money was invested in interest bearing securities (such as bank deposits, gensaki and repos) and the remainder in stocks and bonds. The use of these investments to increase recurring earnings became known in Japan as Zaimu (financial management) techniques or Zai-tech. They brought with them their own set of problems but for at least the first eight months of the year they added fuel to the flames of the bull market. In short, there was a widespread belief in the first half of 1987 that the supply/demand situation was very favorable to the stock market.

## Improving Fundamentals

Support for equities began to come from fundamental sources as well. By the third quarter of 1987, there were emerging indications that the potential profitability of Japanese companies was improving.

This came on the back of two years of poor earnings. In fiscal 1985, earnings had grown 0.8 percent and, in 1986, 2.3 percent. The earnings for industrial companies had been much worse. In 1985 they had fallen by 9 percent and in 1986 by 22 percent.

By the late spring, brokers began reevaluating the earnings outlook. There were signs of a sharp turnaround for the domestic economy. The linchpin was continued higher spending by the central government and the emerging growth in consumer spending. The improvement in the earnings of industrial companies was the spark to the market. Although the poor performance of the utilities sector tended to depress the earnings outlook for the market as a whole, the outlook for manufacturing companies was extremely positive. For the fiscal year ending March 1988, earnings for industrial companies were expected to grow by at least 10 percent.

### Market Trends in 1987

The market went through several distinct phases in the course of 1987. From about January through April it was still a "liquidity driven market." The net inflow of new funds to the market was as strong as could be expected. This was the period of a strengthening yen, declining oil prices and falling interest rates (see Appendix 6-b). The yen/\$ rate fell sharply in January from 159 to 150. Following the Baker-Miyazawa accord, it stabilized briefly in the 152 range in February and the first half of March, but then continued its downward spiral falling to 137 in April. The benchmark #89 10-year government bond yield dropped from 4 percent at the beginning of the year down to 2.5 percent in May. These events were perceived positively by the market, which moved up briskly. The Tokyo Stock Exchange Index reached a high at the end of April of 2,174, up 39 percent since the year began.

The market was dominated by the "triple merits" theme: lower oil prices, falling interest rates and a stronger yen. All through this period the stocks that benefited most were the financials—the banks and insurance and securities companies. The lower rates also contributed to increases in the prices of housing and construction company stocks. At the same time, "domestic demand" related stocks—the expected beneficiaries of Prime Minister Nakasone's fiscal stimulation packages—also soared.

From the end of April to the middle of July, the market entered a volatile and nervous period. The Tokyo market suffered an initial setback in late April, rose to record highs in May and corrected again in sympathy with the bond market before reaching a new high of 2,258 on June 11. It then faced the summer crash which knocked 16 percent off the Tokyo Stock Exchange Index.

Problems in the bond market troubled the stock market (see Appendix 6-c). Rates had dropped rap-

idly during the spring, with the 10-year bond touching unusually low levels. This by most accounts should have triggered another discount rate cut. A clear discrepancy developed between the long bond yield close of 2 percent and the discount rate of 3 percent. The market was clearly anticipating a reduction in rates.

However, the Bank of Japan clearly had its own set of concerns. In a few swift strokes, the Bank took most of the drive out of the market. In May, contrary to expectations, the Bank started to guide rates higher. In a two-week period the #89 bond went from 2.5 percent back up to 3.5 percent. This was one of the worst collapses in the Japanese bond market in recent history, and it triggered a significant correction in the stock market. The uncertainty in the market was not made easier by the expectation of a respite in rate increases suggested by the Venice summit in June. In the wake of Nakasone's statements lending some renewed support to the idea that bolstering the dollar would mean lower rates in Japan, the Japanese government #89 bond trended downward slightly. But it rebounded quickly, rising again to 5.5 percent by mid-July.

The Bank of Japan was clearly concerned about inflation and speculative excesses in its markets, attempting to balance the positive stimulative effects of a loose monetary policy against the pitfalls of excessive growth in the money supply. The money supply, as measured by M2 plus CD's, had been growing at an annualized rate of 8.5 percent since the beginning of the year. This was, by Bank standards, uncomfortably fast-paced growth, but it was a level they had been rationalizing under the Louvre accord goals of keeping rates low to support the dollar. The authorities were clearly concerned about the high level of speculation, most of all in the real estate market, made possible by the easy money policy. By late spring the need to curb lending in this area was an imperative. The government imposed certain administrative guidelines on bank lending, demanding new reporting requirements on loans. It also began demanding submission of foreign exchange trading activity. Corporate speculation in the financial markets was also a worry, and margin requirements were raised.

The resulting shock to the bond market was traumatic. The stock market that followed in the May to July period was listless, themeless, and characterized by very low volume.

With tighter policy by the Bank of Japan over this period, the view emerged that the "liquidity driven" market was over. And there was a clear sell-off in those sectors of the market expected to be beneficiaries under this liquidity scenario—the banks, the insurance companies. It should be noted, though, that the net inflow of new funds into investment



trust and Tokkin funds did continue at a very high level, although the growth rate had peaked in April.

Midway through the summer it became obvious that the economy was moving back into a recovery. The government and private forecasters were beginning to talk of 3.0 percent to 3.5 percent growth in real GNP in 1987. The remarkable shift in the structure of the economy meant that the new growth would come primarily from domestic demand. And more importantly, corporate profit estimates were being sharply revised upwards. Something akin to a euphoric return of self confidence emerged.

This ushered in the third stage of the Tokyo bull market, lasting from the middle of July until the Crash. The market reasserted its positive trend. There was a renewed focus on fundamentals, with earnings the driving force. The sector that led the market were the high technology stocks. The electrical machinery and appliance blue chips had a sustained rally and the stocks of many companies that were perceived to be beneficiaries of the stronger domestic economy took off. Many of these companies were coming off a very low earnings base and the rebound was, in percentage terms, quite sharp.

There were a number of other positive indicators for the market, including strong days on Wall Street through July and August and steadier oil prices (despite the tensions in the Gulf). The market also got a boost from a downward dip in interest rates in mid-August (the benchmark #89 bond dropped down to 4.3 percent). In the first week of September, the Nikkei Dow reached a new high of 26,118.

Short term rates had stayed quite low (still in the 3.9 percent to 4.0 percent range through June, July and August), and the money supply began to bulge again during the month of August. Money, as measured by M2 and CD's, was again growing at 10 percent, marking a new surge of liquidity that was again propelling the market.

The market suffered a short-lived (two-week long) correction of 6 percent in September following the discount rate increase in the U.S. and the Tateho Chemical Company scandal. Tateho suffered large losses from its speculation in the bond futures market, touching off fears that other such scandals would follow. This was also a period when the bond markets began to get out of line again. Long term rates were rising. The rise in rates was almost inevitable because as the recovery got underway, loan demand spiralled. Corporate borrowers were determined to lock in the then current low long term rates and the yield curve steepened sharply.

The yen started to weaken, and eventually short term rates started to rise—a clear indication that the Bank of Japan was no longer accommodating an easy money policy. This rise in short term rates was the important differential. Then on September 24, the Japanese government took the unexpected step

of raising bank lending requirements, again in order to curb the potential overheating.

What was interesting about the market at this point—the end of September to the first two weeks of October—was that for the first time in the year, the market was continuing to rise despite the fact that both short and long term rates were rising. At no other point in 1987 had the market been able to hold on to momentum in the face of rising interest rates. The week before the crash, the Nikkei Index peaked again at 26,646, while long term bonds were yielding 6 percent.

## V. Bursting the Bubble: October 1987

Eventually all things, good or bad, must come to an end, and the worldwide bull market did so with a vengeance in October 1987. In the U.S., stock market collapsed under the combined weight of fundamental, technical, and socio-political problems.

It is important to understand the sequence of events and the financial backdrop against which they occurred in the weeks leading up to the market crash. It is obvious that a number of events in world financial markets laid the groundwork for a significant correction. The six that appear to be most relevant are: the issue of the deficits (or, more precisely, who would pay for them), uncertainty over the outlook for the dollar, the rise in global interest rates, the threat to the economic viability of leveraged takeovers, a build-up of overhangs in overseas equity offerings and changes in political leadership around the world.

### The "Deficits" Issue

The issue of the "deficits" emerged as a more relevant factor in the market's behavior in 1987. It was widely known that the deficits—trade, current account, and budget—were large and had been growing larger for a number of years. The U.S. had become a debtor nation (loosely defined) as far back as 1985 when the Net International Investment Position ("NIIP") had turned negative. The current account had been in a deficit since 1982, and there had been many deficits in the 1960's and 1970's. The trade deficit was not a new problem, either, although the size and apparently endless nature of these deficits was. The budget deficit had clearly been the unwanted and unpleasant step-child of Reaganomics: a constant object of criticism and consternation for market economists.

Periodically the subject of the deficits had unnerved the markets; but they had yet to undermine them. The qualitative difference in 1987 was the concern not so much over the existing size, or even the seemingly endless trend, of the deficits, but over

who would finance them. A disproportionately large share of U.S. government debt securities had been purchased by non-residents. There was a clear risk that the dollar would deteriorate too far, too fast, and in fact undermine what reason there was for further foreign purchases of U.S. debt. Japanese investors had continued to buy U.S. government debt issues in spite of the fact that the underlying currency of the debt had deteriorated. There was real concern over how much longer that could continue.

### **Instability in Currency Markets**

Until the second quarter of 1987, the decline of the dollar had been a welcome and well-deserved event in the eyes of financial markets and had clearly fueled the bull market. Since the Plaza agreement in September 1985, the dollar's fall had been perceived as an orderly and orchestrated event under the guidance of the Group of Seven in what seemed to be the common pursuit of greater good: killing protectionism, stabilizing markets and fostering economic growth.

After the Louvre accord, which placed an implicit floor under the dollar, there was a qualitatively different attitude towards the direction of the dollar. Any further weakening of the dollar was seen as an indication of two negatives: that international control of the situation had diminished and that rates would rise in the U.S. to support the dollar.

U.S. rates rose dramatically in the spring, with the long bond rising from 7.5 percent to 9.0 percent from March 25 to May 25 (short term rates traded in a narrower range of 5.6 percent to 6.1 percent). Rates also rose in Japan, sending markets in both countries into a tailspin.

The worst fears came to fruition. Even with the Louvre accords in place, the dollar was still falling. It fell from Y 154 to Y 139 (a 10 percent decline from the date of the Louvre agreement to the end of April). The weakness in the dollar was due to the combined effects of no improvement in the trade balance and a lack of support for the dollar in foreign markets. Concern grew that the U.S. had lost control of the direction of the dollar.

From the end of May through early August, something of a much-needed respite occurred in the foreign markets. This was partly induced by Federal Reserve Chairman Volcker's statements, partly by some better than expected trade figures and partly by a dip in Japanese rates. In any event, the dollar strengthened over that period. The bond market grew a little better, and the stock market breathed a sigh of relief and got considerably stronger.

The two months preceding the crash—from mid-August until October 19—were particularly volatile times in the currency markets. The dollar weakened all through August, losing about 7 percent of its value, strengthened again in September and then

fell throughout early October before rallying just before October 19.

The volatility in the dollar clearly reflected the uncertainty of those who watched the bond markets, the skepticism of those who watched the trade data, the nervousness of those in the foreign exchange market and the fear of those who watched all three. The value of the dollar had become a linchpin on which so much depended. A weaker dollar was the only way to improve the trade balance yet a weaker dollar would command higher interest rates (see Appendix 7).

### **The Rise in Interest Rates**

Interest rates had begun to ratchet up in almost every market in the world in the months just before the stock market crash (see Appendix 8).

In the U.S., rates began rising again in late summer. The long bond rose nearly 200 basis points from August to mid-October, going from 8.4 percent to 10.3 percent.

In Germany, rates had been rising for several months, but rose most sharply in October. Long term government bonds were yielding 7.25 percent on October 15, compared to 6.6 percent five weeks before. Short term rates had risen from 4.06 percent to 4.95 percent over the same period. In addition, on October 8 the German government put forward the extraordinary and totally unexpected proposal of imposing a withholding tax on bonds. This carried the implicit threat that interest rates would have to rise accordingly. Then, on Wednesday, October 14, the German government raised the rate on its refinancings from 3.80 percent to 3.85 percent. Not only were market taking rates higher, but the government was consciously guiding them in that direction.

In the U.K., the interest rate trend had also turned generally upward. On August 6, the Bank of England announced that it was raising its bill dealing rates by a full percentage point, immediately prompting a rise in base lending rates to 10 percent. The Bank's action was unusual in that it came without significant pressure from the money markets. The economic debate in the U.K. continued to focus on "overheating." There were fears that the sustained rapid growth in bank lending and inflationary pressures, due to imported inflation and the pressure of higher wage demands, would feed through the system. Thus, there was a well-entrenched feeling that interest rates would continue to rise.

In Japan, the authorities had also begun to tighten that country's monetary policy. On September 24, the Bank of Japan announced a shift in monetary policy away from accommodation, putting forward new guidelines for bank lending which implied a very sharp credit squeeze. Long term rates had



risen from 4.95 percent to 5.87 percent in the period from September 3 to October 15, while short term rates had risen from 4.25 percent to 5.0 percent.

In France, the pressure on interest rates had been upward since the late spring, with the increase in the rates accelerating in the five weeks before the crash. Long term government bonds were yielding 11.29 percent up from 10.0 percent, and short term rates were at 8.81 percent up from 8.25 percent.

In Japan and Germany, the central bank authorities basically believed that the previous year's policy of keeping rates low to maintain the necessary differential with the U.S. in an effort to "support the dollar" had left them with bloated money supply bases. The broad money measurements were growing by about 8 percent in Germany and 10 percent in Japan (see Appendix 9). By the summer, Germany and Japan were showing signs that they were less willing to let their money supplies continue to expand in pursuit of the ever-elusive "stable dollar."

Each central bank had its own set of reasons for tightening credit. Incipient signs of rising prices fueled fears of inflation. To oversimplify the situation, the U.S. was concerned about imported inflation due to the weaker dollar and, to some extent, wage inflation; Germany was concerned about its growing money supply; Japan feared the consequences of commodity price inflation; and the U.K. was suffering from the expansionary credit boom, wage cost inflation and high money supply growth.

It is meaningless whether or not these inflation fears were justified, for it is clear that for as long as financial authorities were responding to the inflation threat—whether real or imagined—rates could be expected to rise. The threat may not have been real but the concerns were. They led to a global rate ratcheting. If one country raised rates, others were forced to as well.

When the U.S. long bond pierced the 10 percent level (which it did on October 14), stock investors finally realized that yields were dangerously high and would only go higher because of the Yen/D-Mark/Dollar lock step action condoned by all three governments. Based on a 10.375 percent 30-year government bond yield, the DJIA should have theoretically been valued at approximately 2,200 instead of over 2,500.

### Threatened End to Takeovers

The House Ways & Means Committee proposed new legislation on October 13, 1987 that would have significantly reduced the value of companies in the merger and acquisition context by eliminating the tax deductibility of certain interest expense incurred in leveraged acquisitions as well as by taxing greenmail.

In effect, the Ways and Means proposal undermined the viability of the takeover or break-up method of equity valuation. Consequently, investors fell back on more traditional valuation techniques, primarily on the basis of discounted cash flow returns. This focused market attention on the overvaluation of stocks under this valuation methodology, which would imply a level of around 2,200 on the DJIA.

### Excess Supply of Stock Overseas

Even as the month of October got underway, investors in all markets were aware of the large amount of stock that was due to come to the market from privatization, IPO's, and rights offering. Most markets were looking at a final quarter of 1987 in which the amount of new stock being brought to market and hence the weight of cash calls on institutional investors would reach unprecedented levels.

In the U.S., there was a parallel development. During the first two weeks of October, at least three very large pension funds instituted the sale of over \$3 billion of equities to buy fixed income securities or guaranteed investment annuities. The significance of this is that one underlying support system for the market—the availability of institutional cash flows—was in a very weak position.

### Changes in Political Leadership

All this took place against an unsettled political background. Two domestic events impacted the market. First, public discussion of a lower dollar created unease in the credit markets. The second factor was the lack of progress made on the U.S. budget deficit. It is worth pointing out that in almost all the major economies (with the exception of the U.K.) there was some fragmentation of financial policy-making in the period prior to the market break. In the U.S., there was the transition from Volcker to Greenspan at the Fed, as well as the appointment of Ruder as Chairman of the SEC. In Japan, Nakasone's term was ending and the transition beginning to Takeshita. In Germany, there were problems in the coalition government and divisions within the Bundesbank. In France, there was the spectre of presidential elections.

### Living on Borrowed Time

The world economy was caught at an awkward moment with interest rates ratcheting up, unstable currencies and volatile markets magnified by the growing interrelationship of world economies. To the extent that the financial markets and particularly the U.S. stock market were aware of the ultimate consequences of this currency/interest rate connection, the way that markets behaved in the first two weeks of October was a relatively logical reaction to worldwide



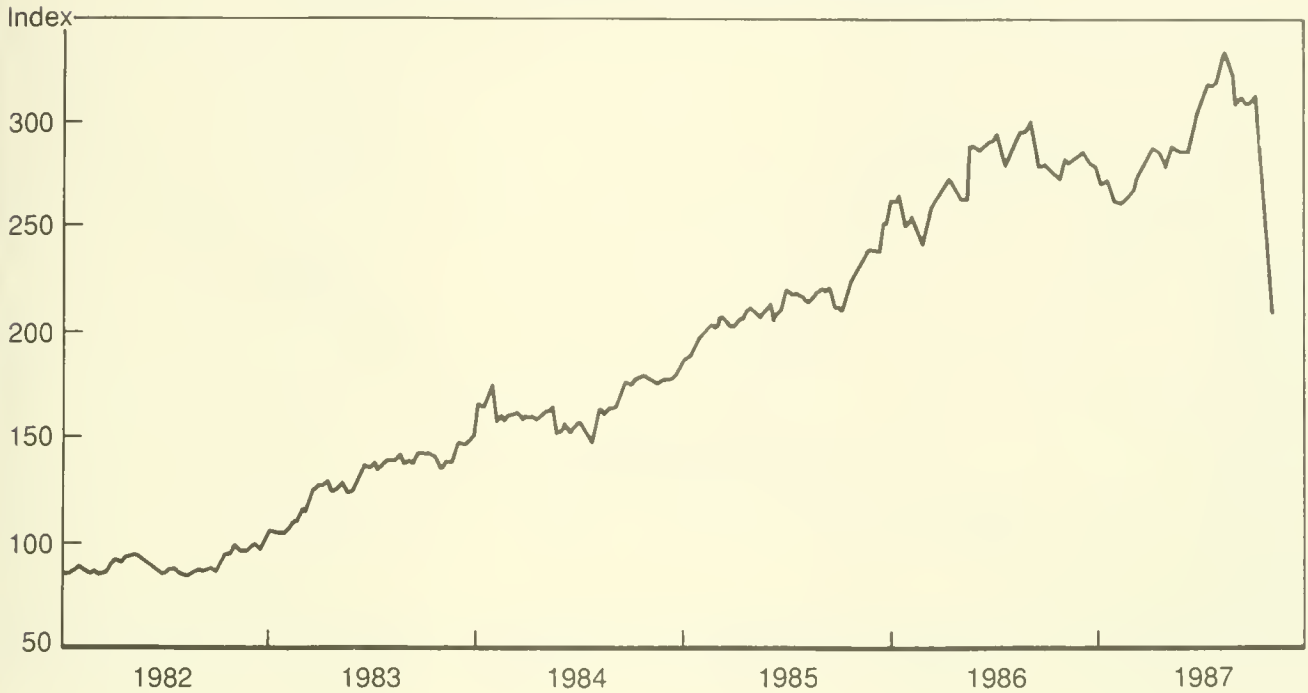
economic events. The markets put together the pieces of the puzzle and responded accordingly.

On October 14, two events occurred in rapid succession. The German government raised interest rates and the U.S. trade figures for August were released indicating a \$15.68 billion deficit—much higher than expected. In short, even with the weaker dollar it was clear that little progress was being made in reducing the trade imbalance, which implied that the dollar would have to fall further. The only way to induce foreigners to continue to invest in debt securities denominated in a deterio-

rating currency was to offer them a higher interest rate. But with rates rising abroad and the interest rate differential narrowing (see Appendix 10), that could only be done with a net effect of significantly higher rates in the U.S. This touched the vulnerabilities of the market. It brought into graphic relief the overvaluation of stocks. But perhaps a more important vulnerability of the stock market was the fear of a recession induced by tighter credit. The imminent arrival of higher rates made that an ever-greater possibility.

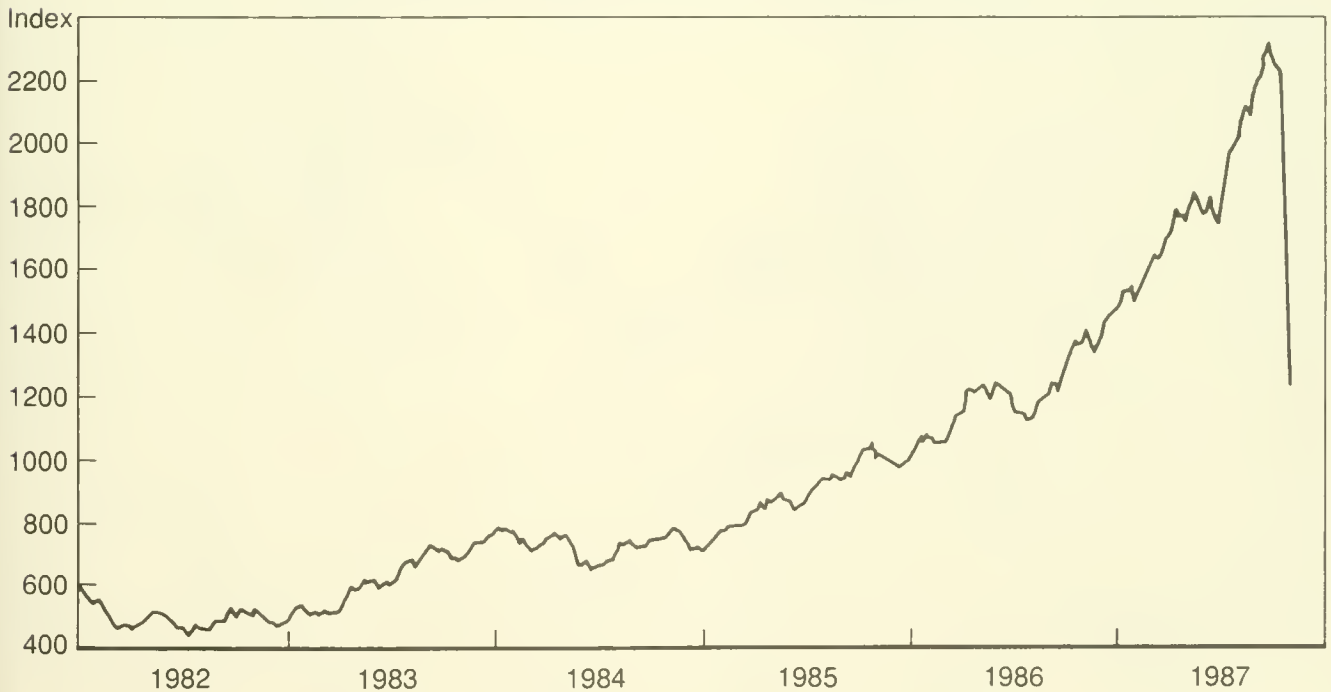
### AMSTERDAM ANP/CBS GENERAL INDEX - PRICE INDEX

From January 1, 1982 to November 12, 1987 (Weekly)



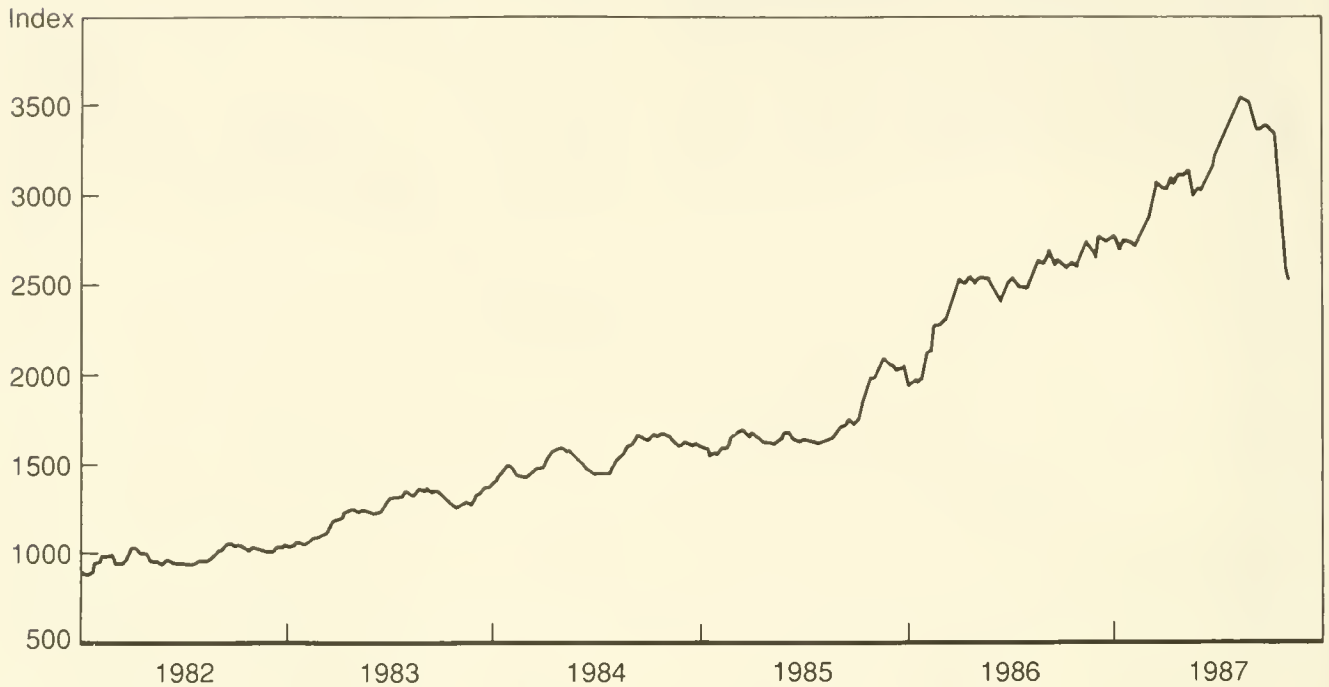
### AUSTRALIA JOINT ALL ORDINARY - PRICE INDEX

From January 1, 1982 to November 12, 1987 (Weekly)



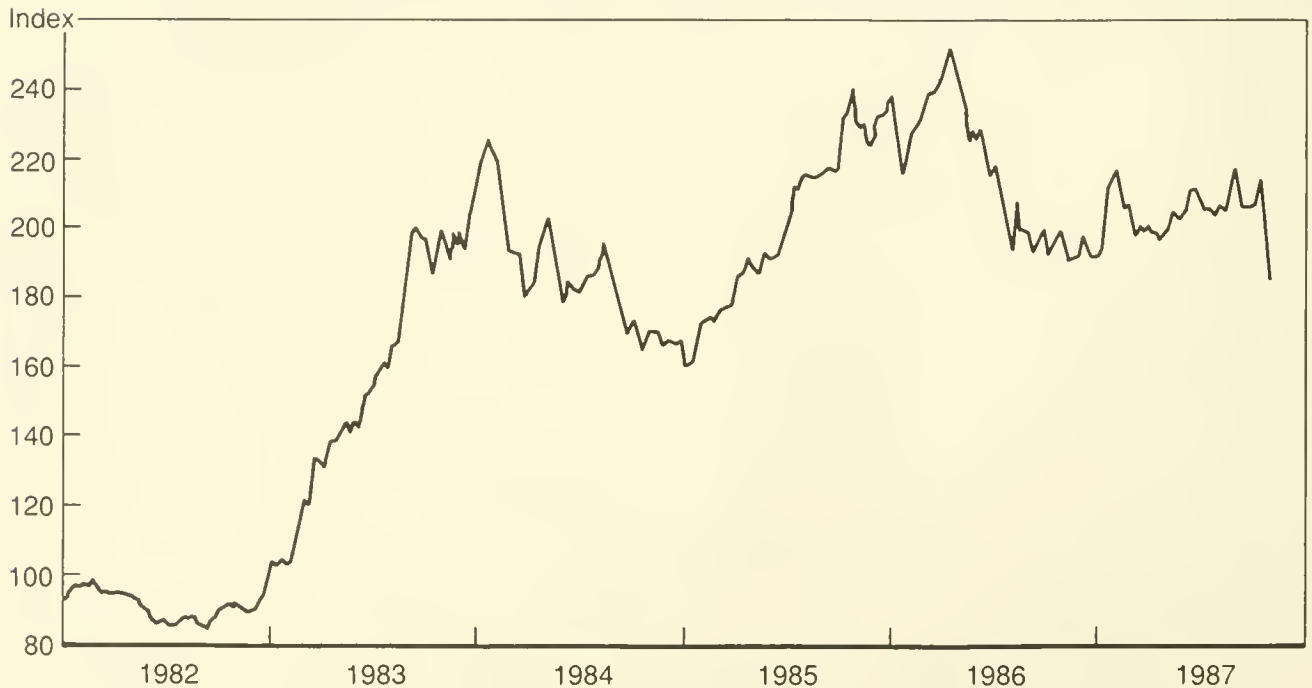
### BRUSSELS SE GENERAL - PRICE INDEX

From January 1, 1982 to November 12, 1987 (Weekly)



### COPENHAGEN STOCK EXCHANGE - PRICE INDEX

From January 1, 1982 to November 12, 1987 (Weekly)



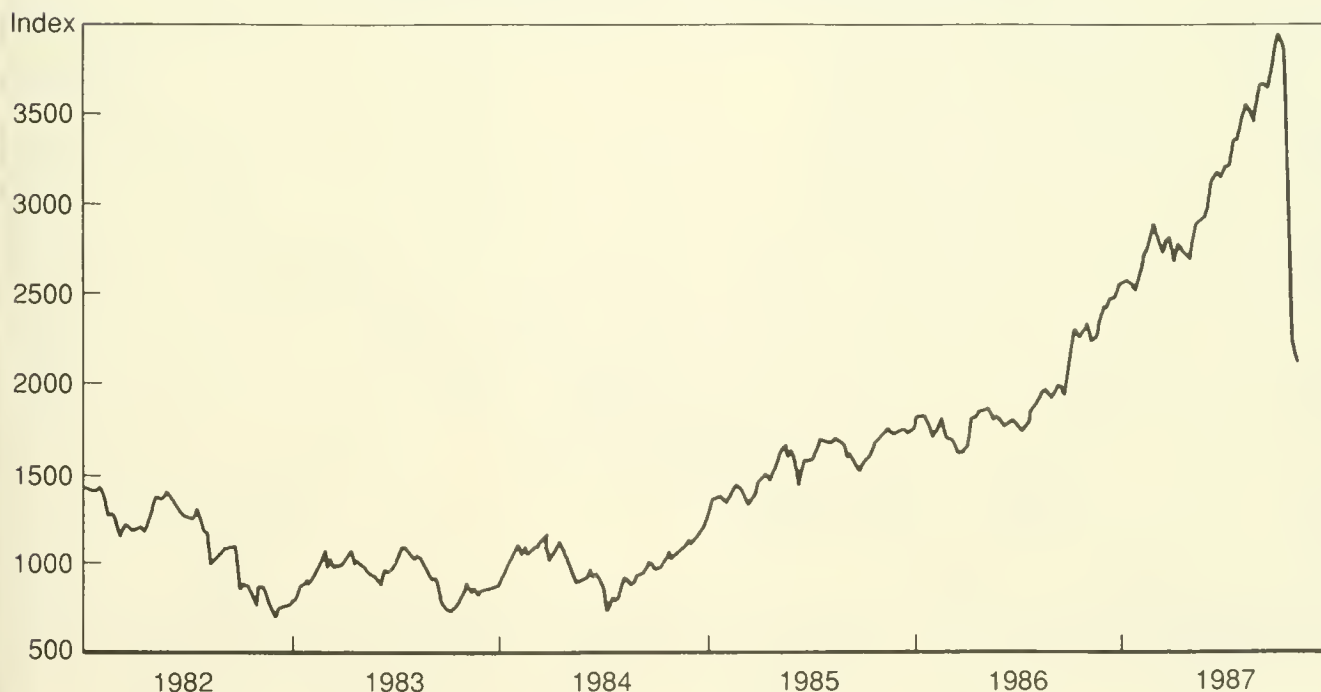
### FRANKFURT FAZ GENERAL - PRICE INDEX

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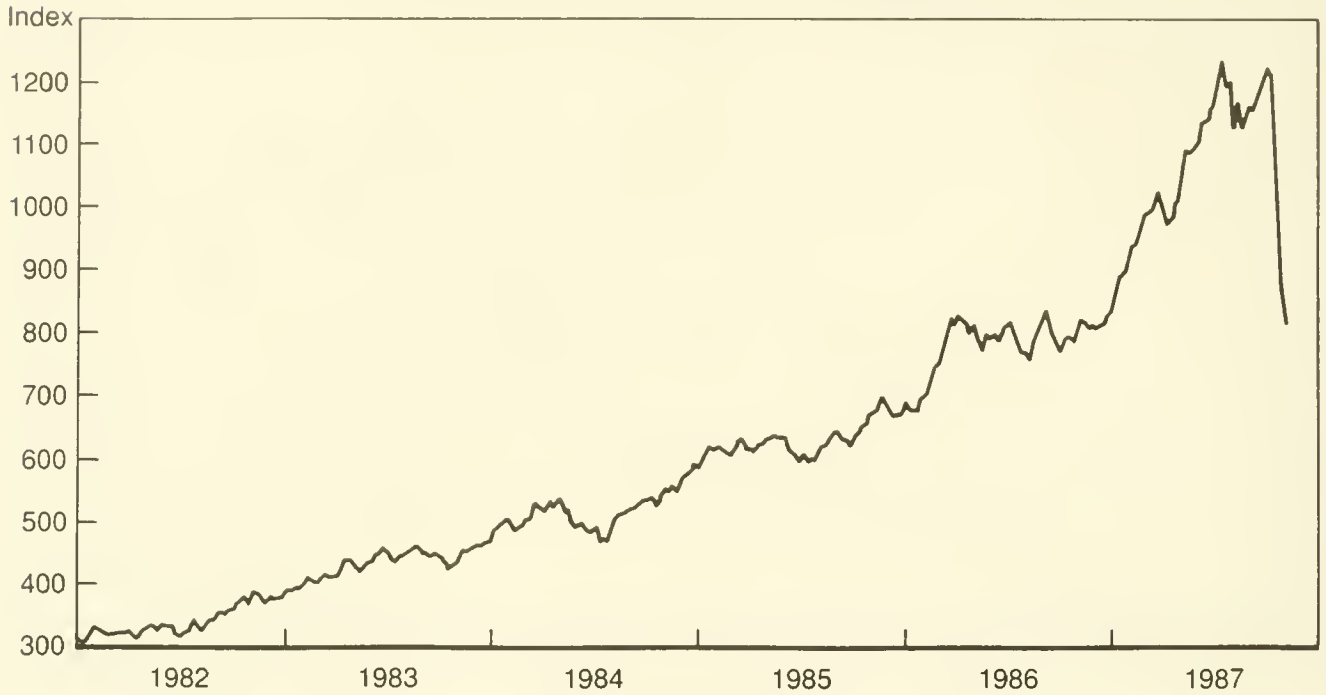


### HONG KONG HANG SENG BANK - PRICE INDEX

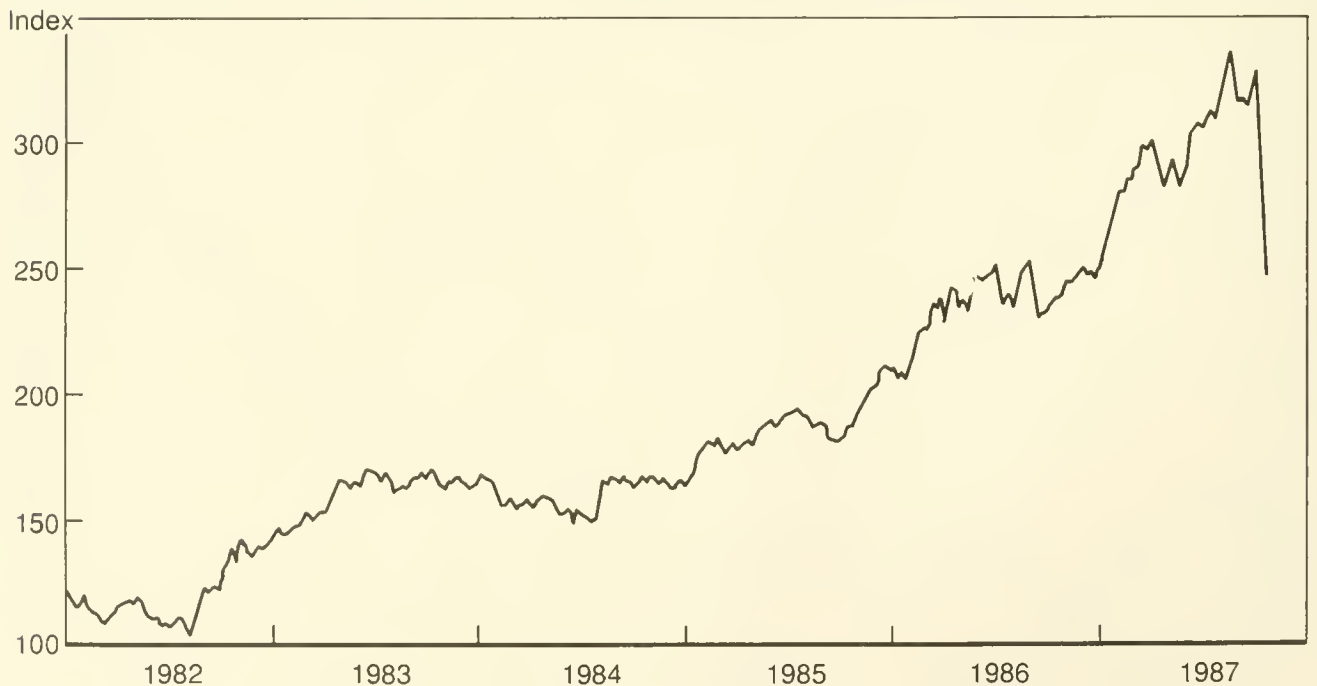
From January 1, 1982 to November 12, 1987 (Weekly)



### LONDON F.T.A. ALL SHARE - PRICE INDEX From January 1, 1982 to November 12, 1987 (Weekly)



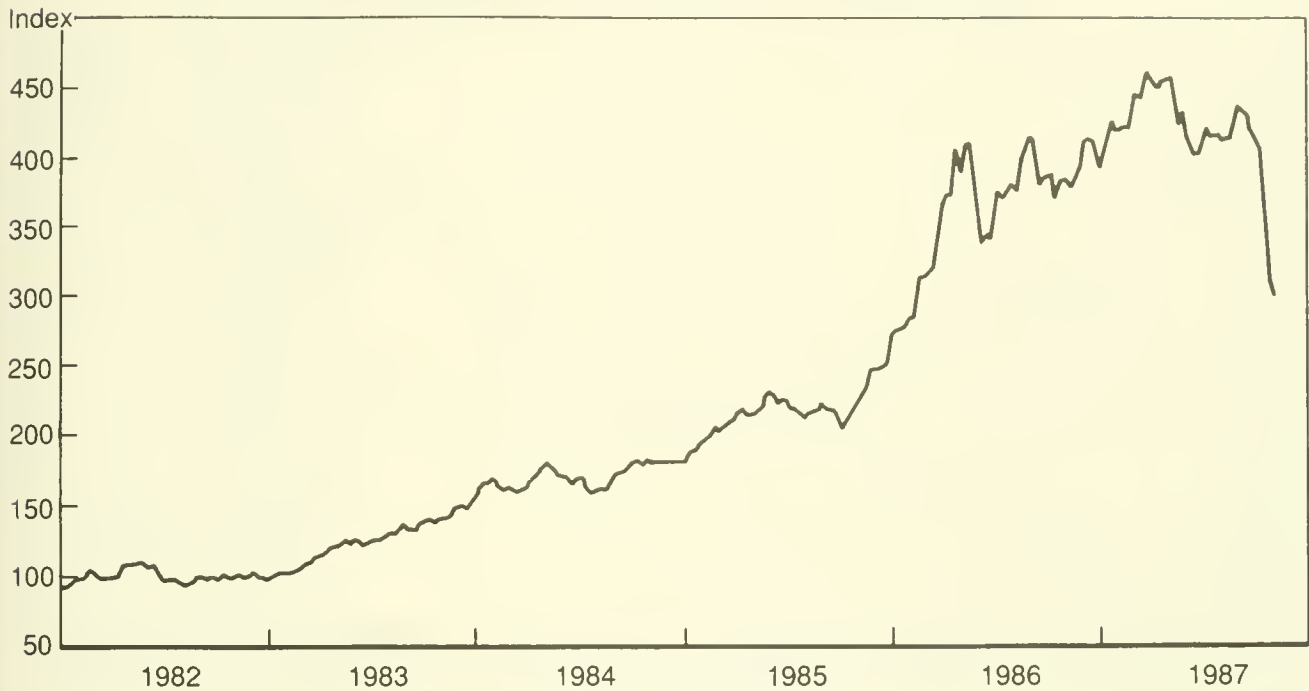
### NEW YORK S&P COMPOSITE - PRICE INDEX From January 1, 1982 to November 12, 1987 (Weekly)





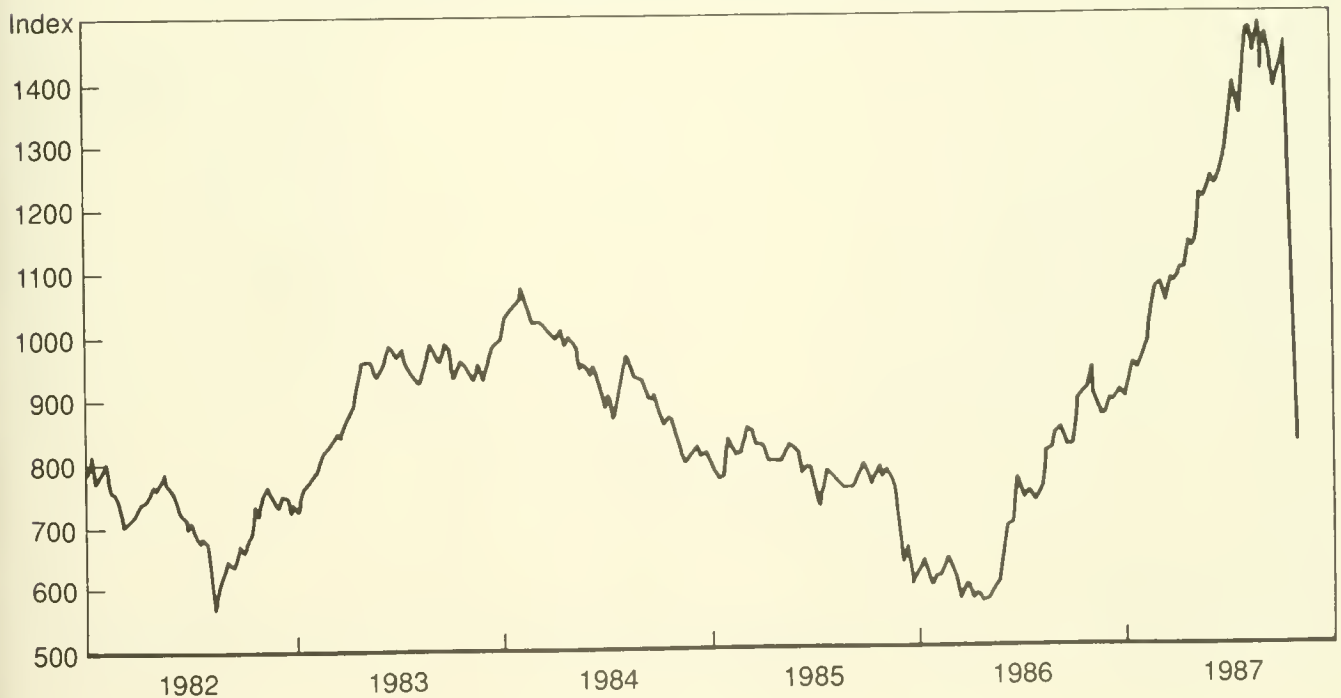
## PARIS CAC GENERAL - PRICE INDEX

From January 1, 1982 to November 12, 1987 (Weekly)



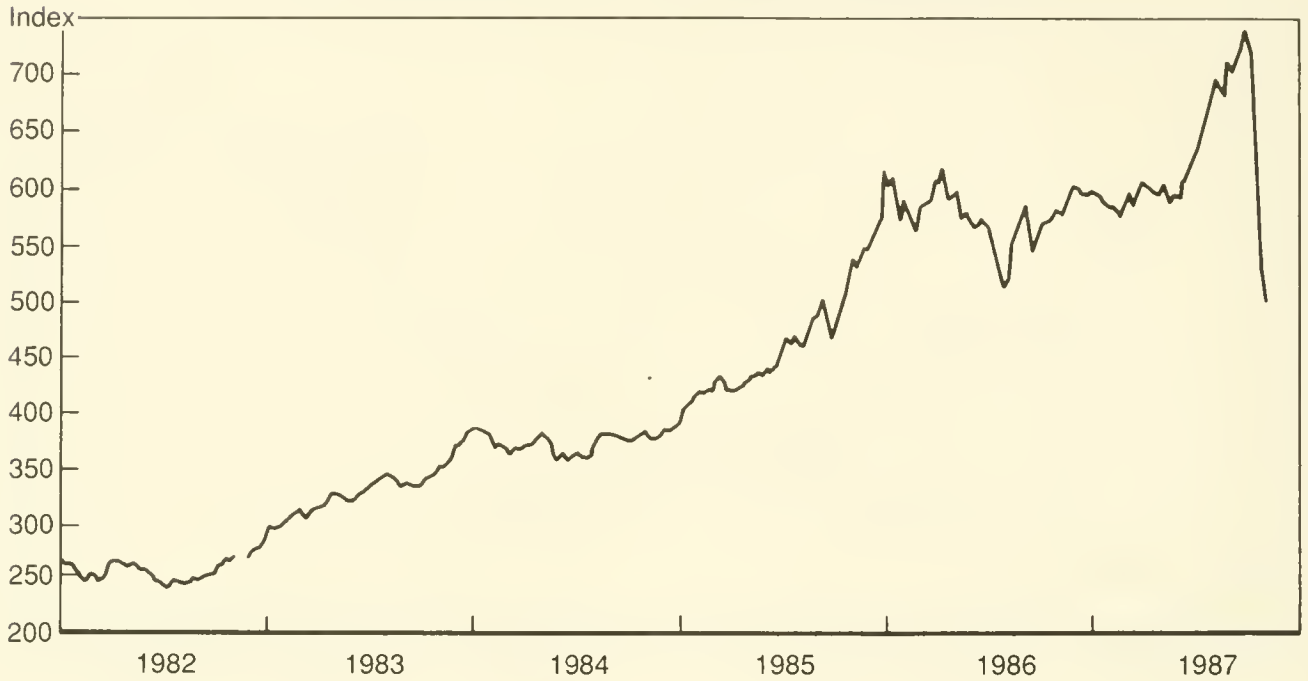
## SINGAPORE STRAITS T. INDUSTRIAL - PRICE INDEX

From January 1, 1982 to November 12, 1987 (Weekly)



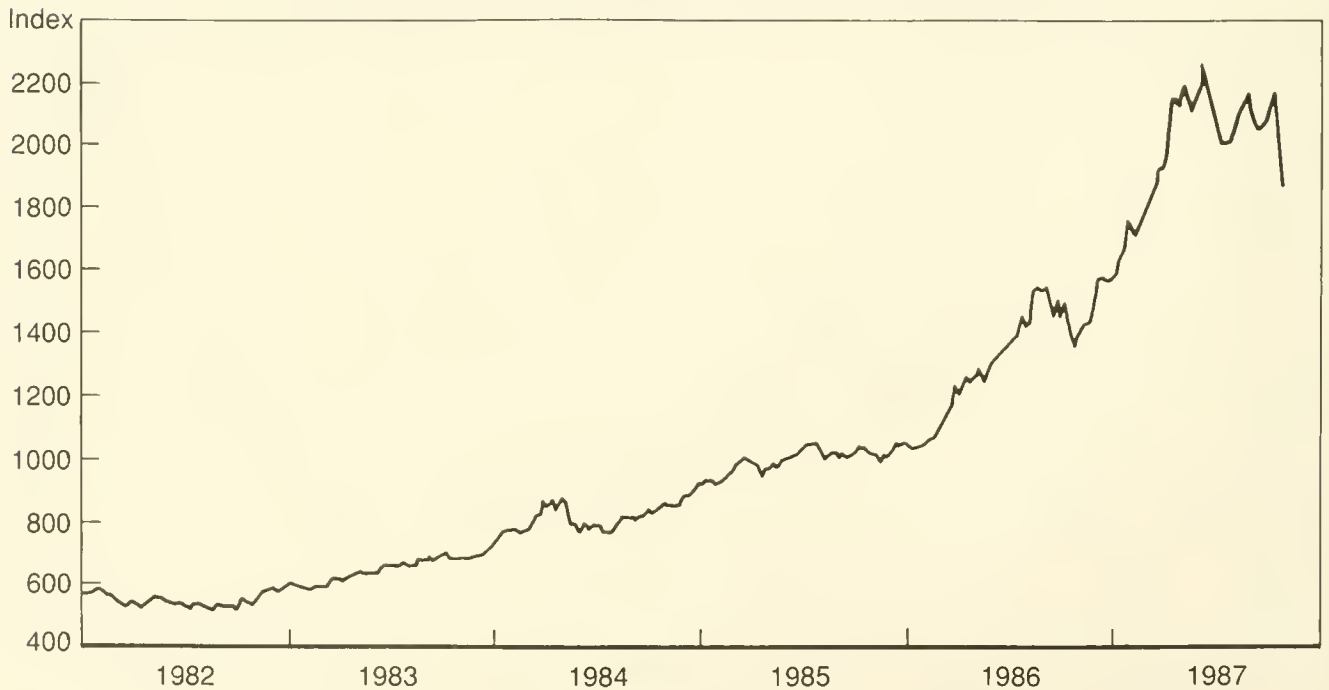
### SWITZERLAND SWISS BK CORP. INDUSTRIALS - PRICE INDEX

From January 1, 1982 to November 12, 1987 (Weekly)



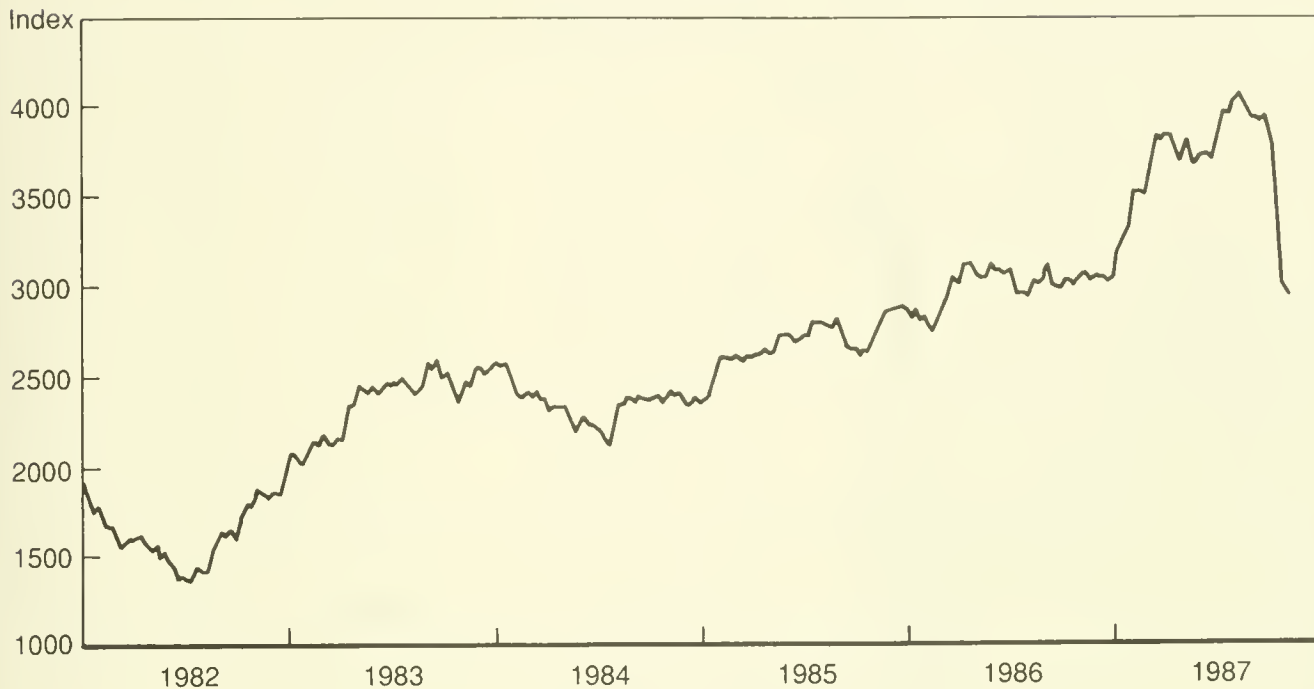
### TOKYO S.E. (NEW) ORDINARY SHARE - PRICE INDEX

From January 1, 1982 to November 12, 1987 (Weekly)



# TORONTO SE COMPOSITE - PRICE INDEX

From January 1, 1982 to November 12, 1987 (Weekly)



**Net Issuance of Equity in U.S. Markets by Non-financial Corporations  
(\$ in billions)**

|                       | 1980  | 1981   | 1982   | 1983   | 1984   | 1985    | 1986(r) | 87(q1) | 87(q2)  | 87(q3)  |
|-----------------------|-------|--------|--------|--------|--------|---------|---------|--------|---------|---------|
| Gross Issues          | 21.1  | 21.5   | 28.9   | 40.0   | 18.0   | 24.9    | 37.8    | 41.0   | 52.0    | 37.0    |
| Estimated Retirements | (8.2) | (33.0) | (17.5) | (11.7) | (92.5) | (106.5) | (118.6) | (98.0) | (135.0) | (115.0) |
| Net Equity Change     | 12.9  | (11.5) | 11.4   | 28.3   | (74.5) | (81.6)  | (80.8)  | (57.0) | (83.0)  | (78.0)  |

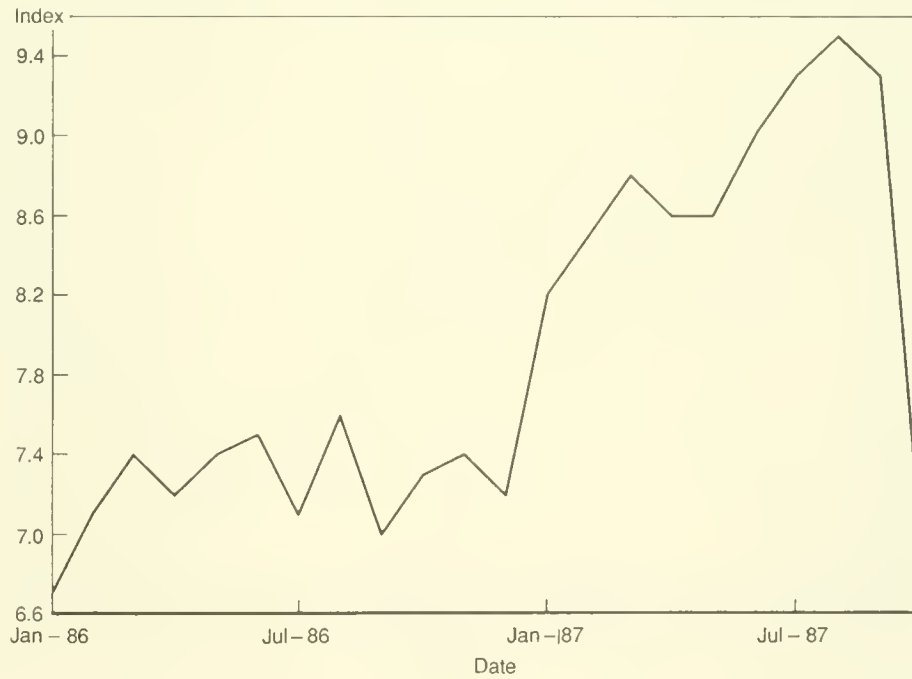
(r) Revised year-end 1986 data.

Source: Flow of Funds, Federal Reserve.

**USA - PRICE/EARNINGS RATIO (P/E)**

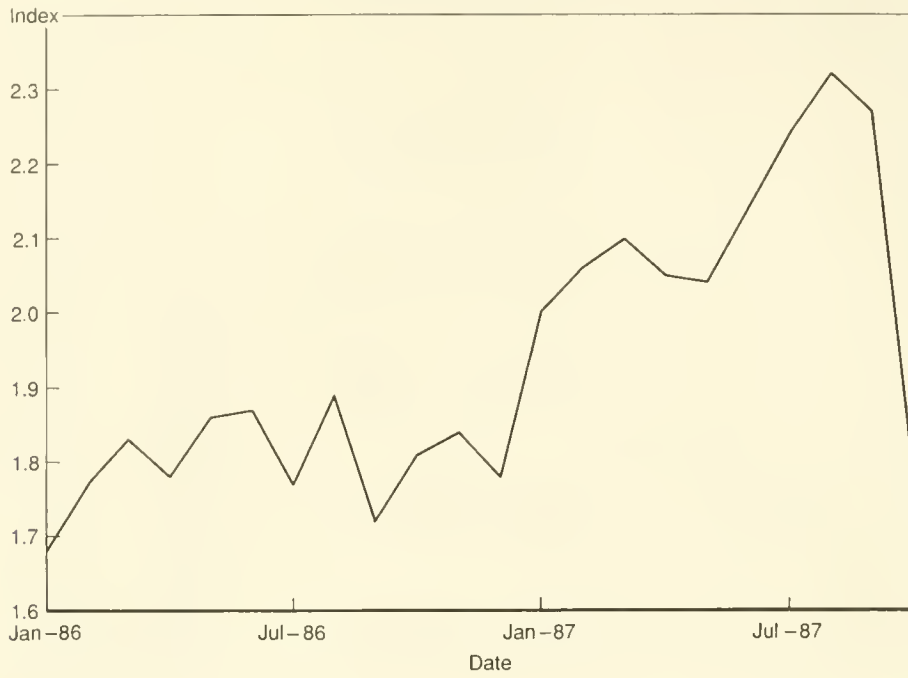


**USA - PRICE/CASH EARNINGS RATIO (P/CE)**



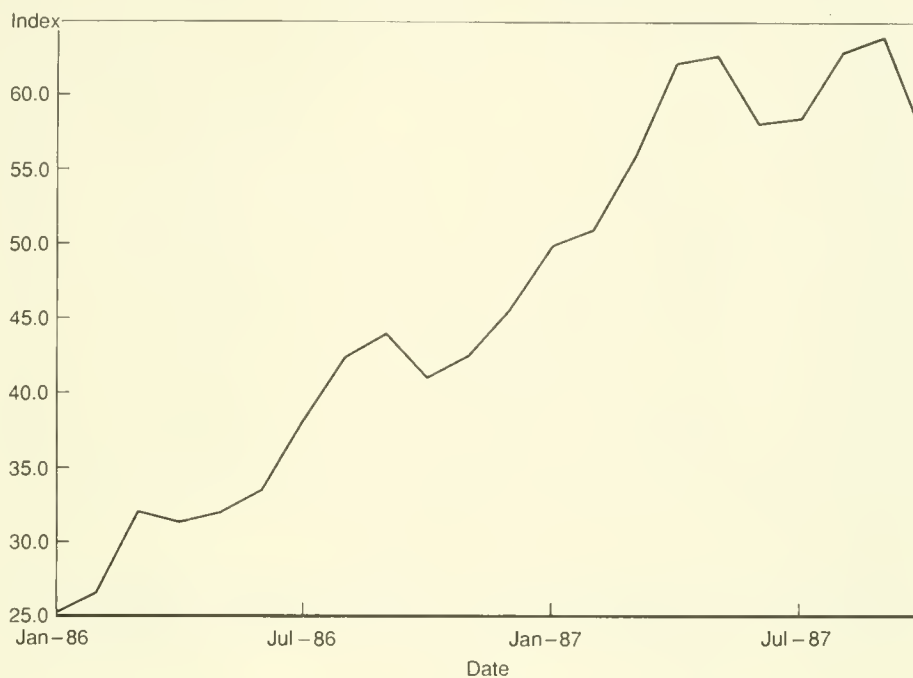
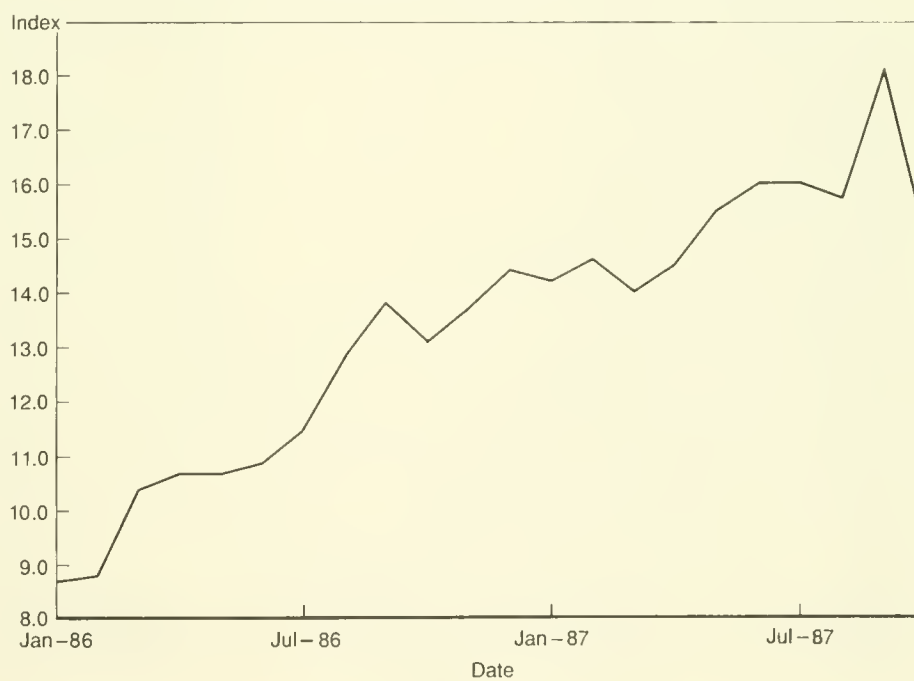


### USA - PRICE/BOOK VALUE RATIO (P/BV)

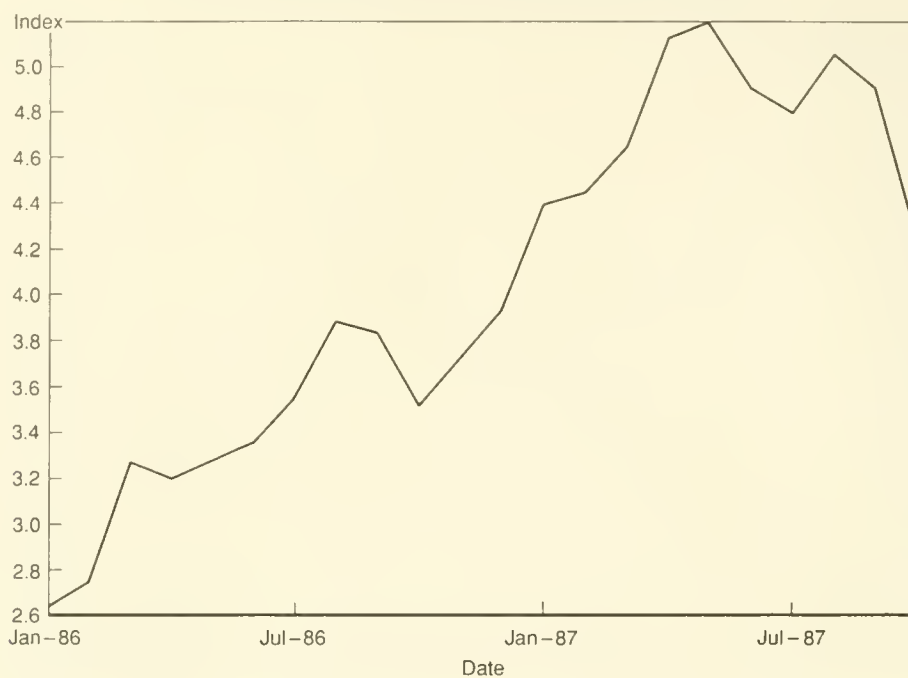


### USA - YIELD

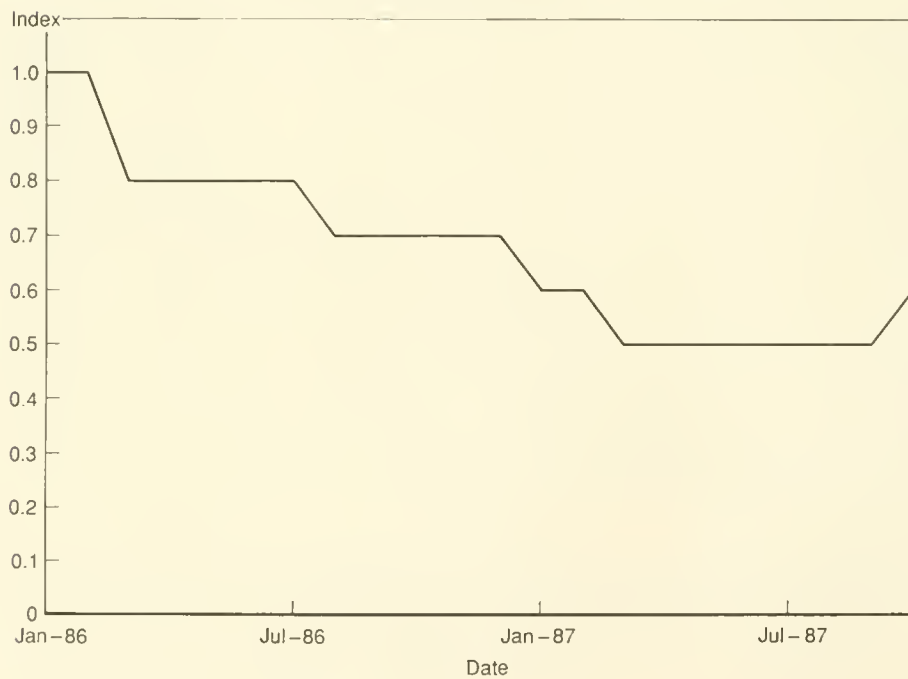


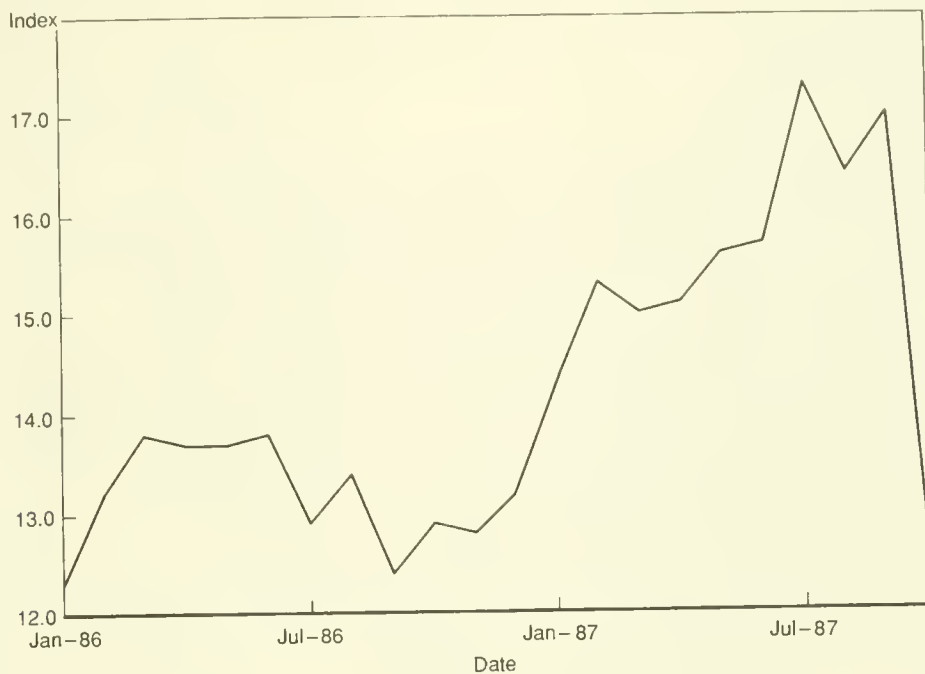
**JAPAN - PRICE/EARNINGS RATIO (P/E)****JAPAN - PRICE/CASH EARNINGS RATIO (P/CE)**

### JAPAN - PRICE/BOOK VALUE RATIO (P/BV)

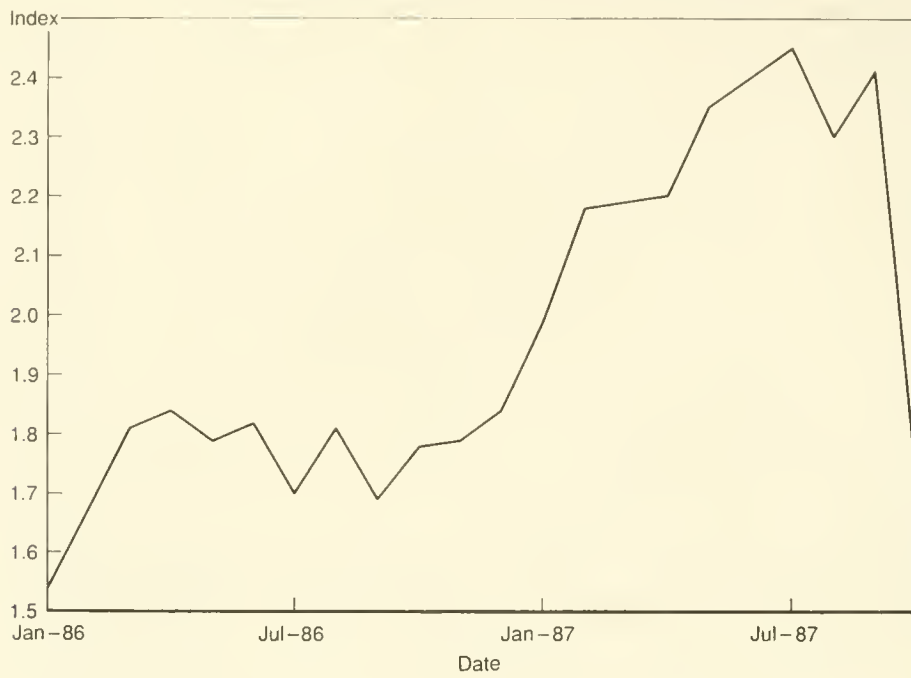


### JAPAN - YIELD

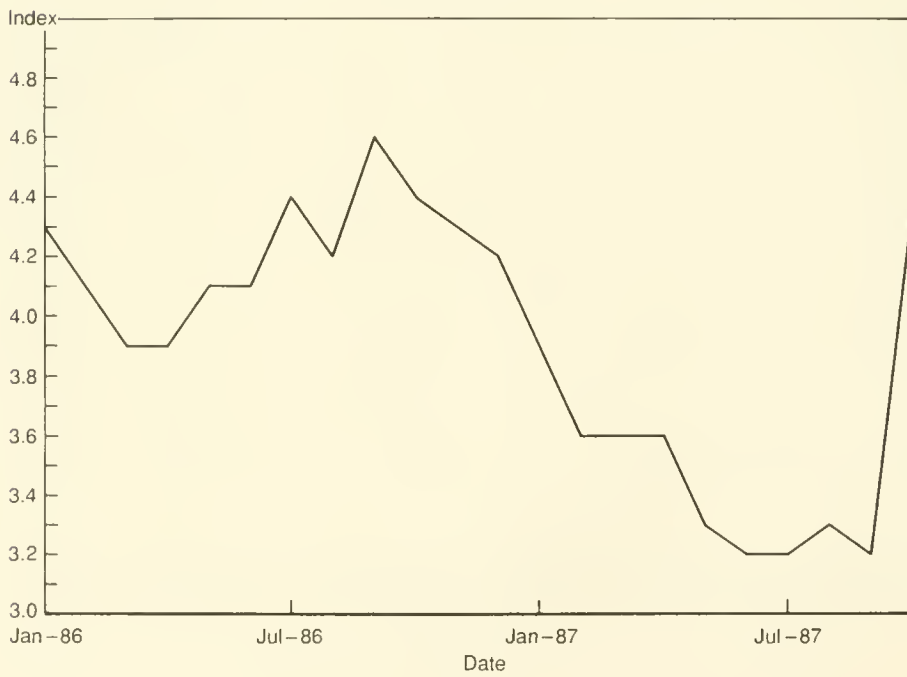


**U.K. - PRICE/EARNINGS RATIO (P/E)****U.K. - PRICE/CASH EARNINGS RATIO (P/CE)**

### U.K. - PRICE/BOOK VALUE RATIO (P/BV)



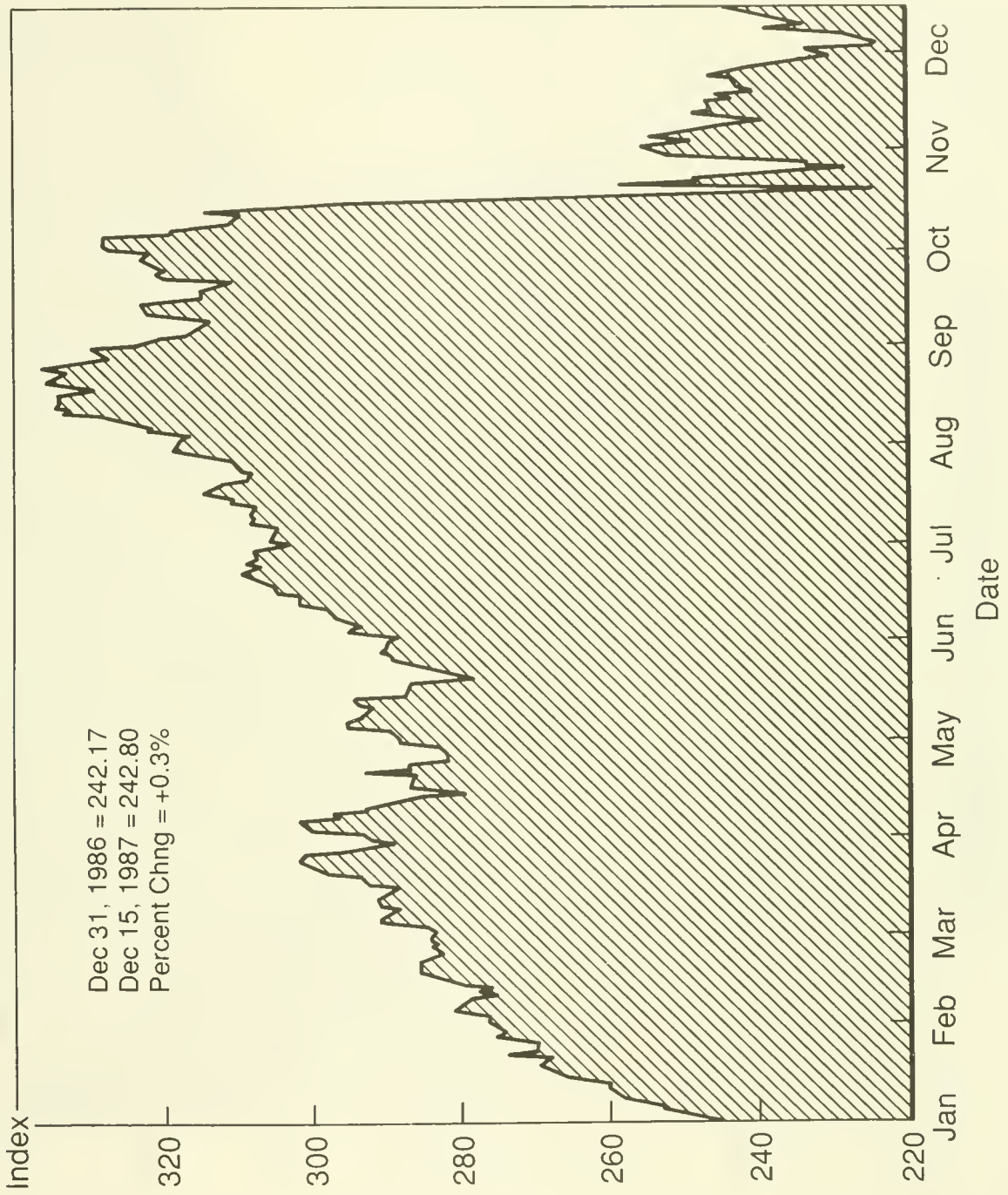
### U.K. - YIELD





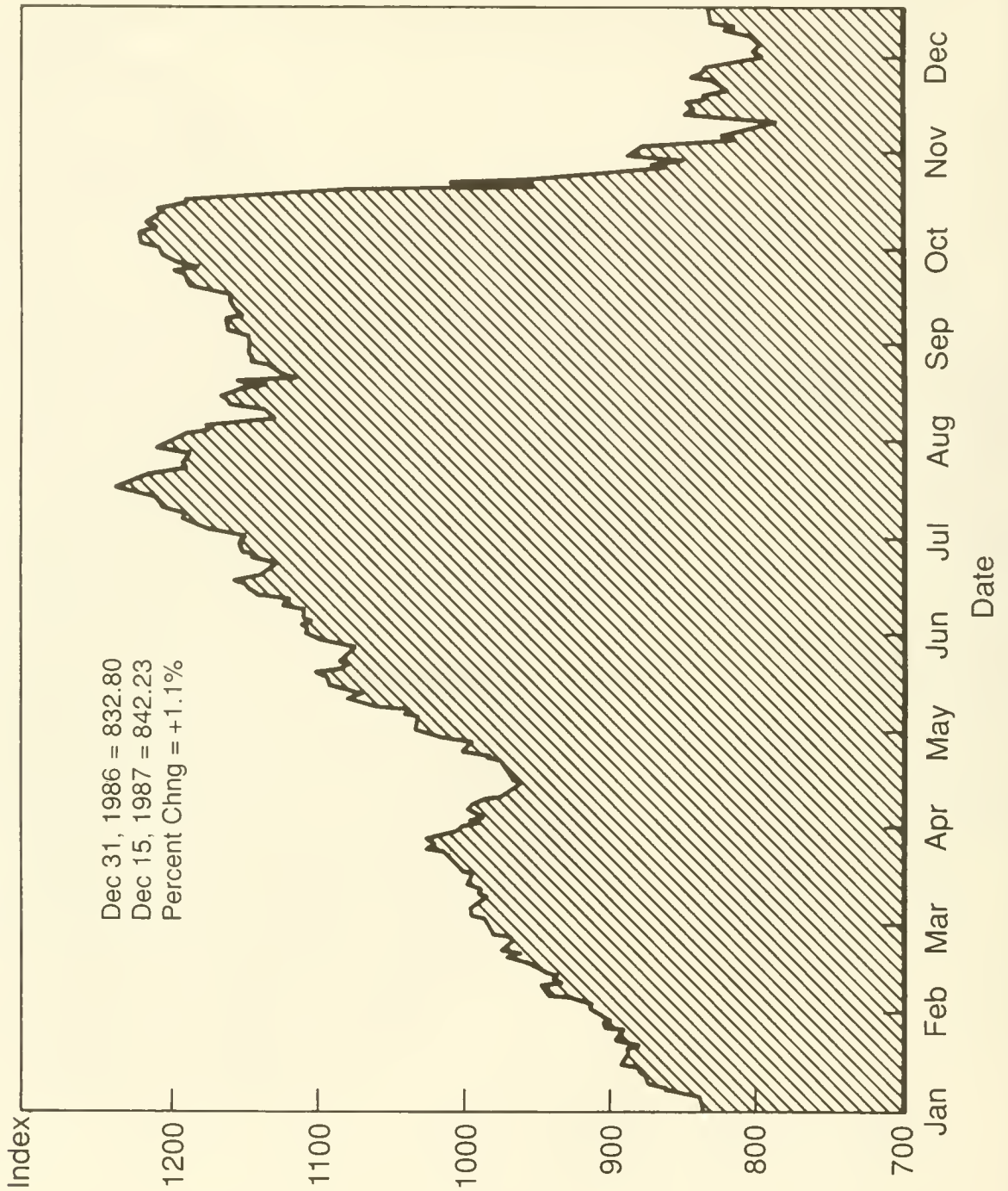
# U.S. S&P 500 INDEX

Performance from Dec 31, 1986 to Dec 15, 1987



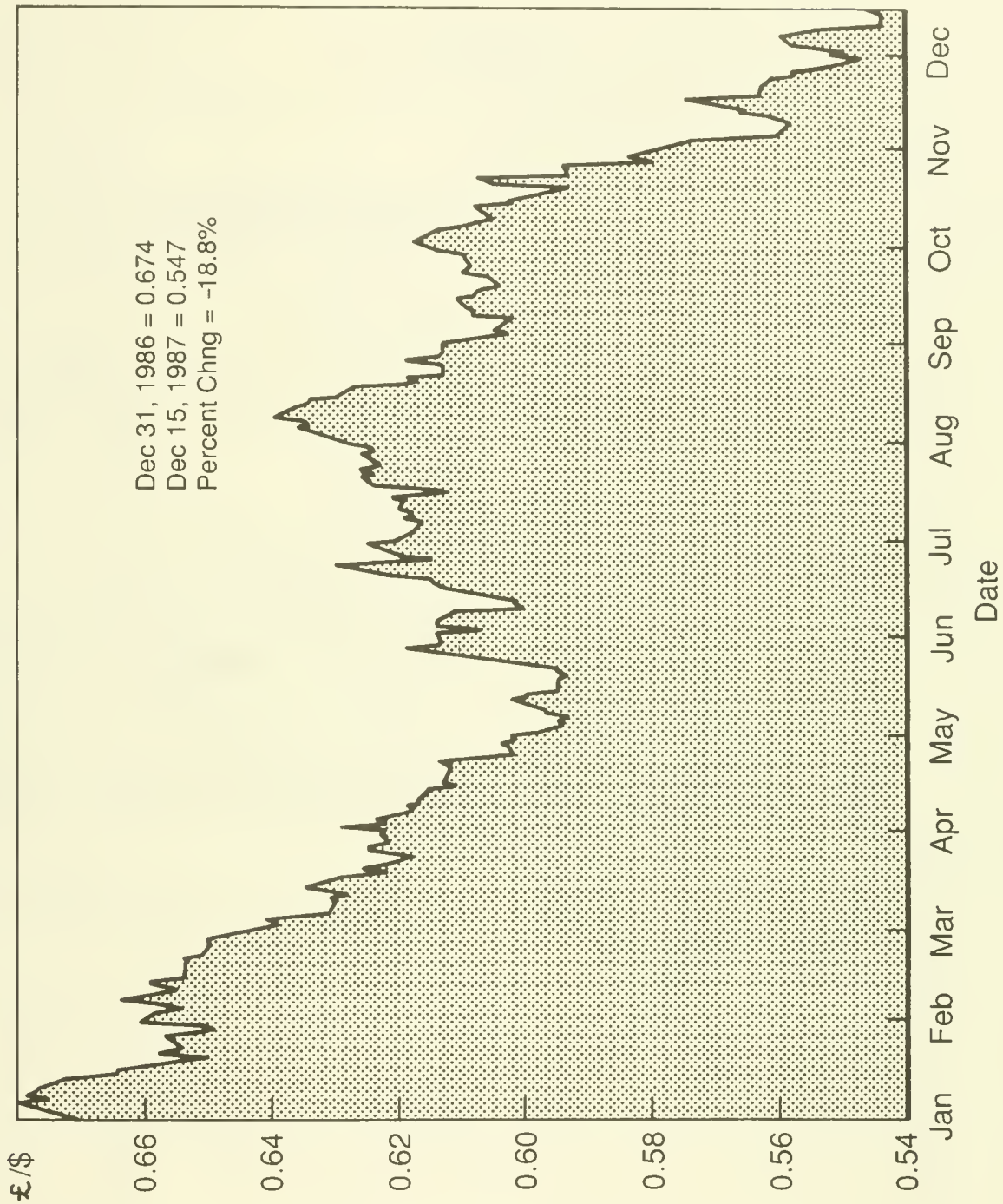
# LONDON FT ALL SHARE INDEX

Performance from Dec 31, 1986 to Dec 15, 1987



# BRITISH POUND STERLING PER U.S. DOLLAR

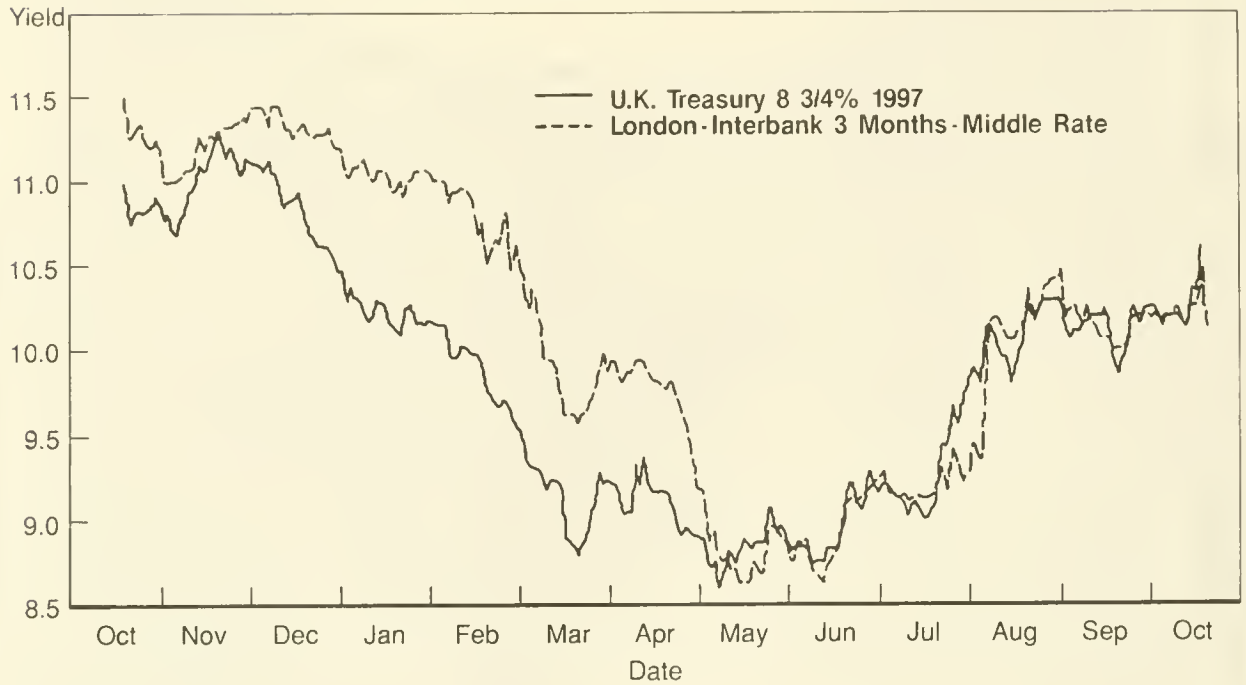
Performance from Dec 31, 1986 to Dec 15, 1987





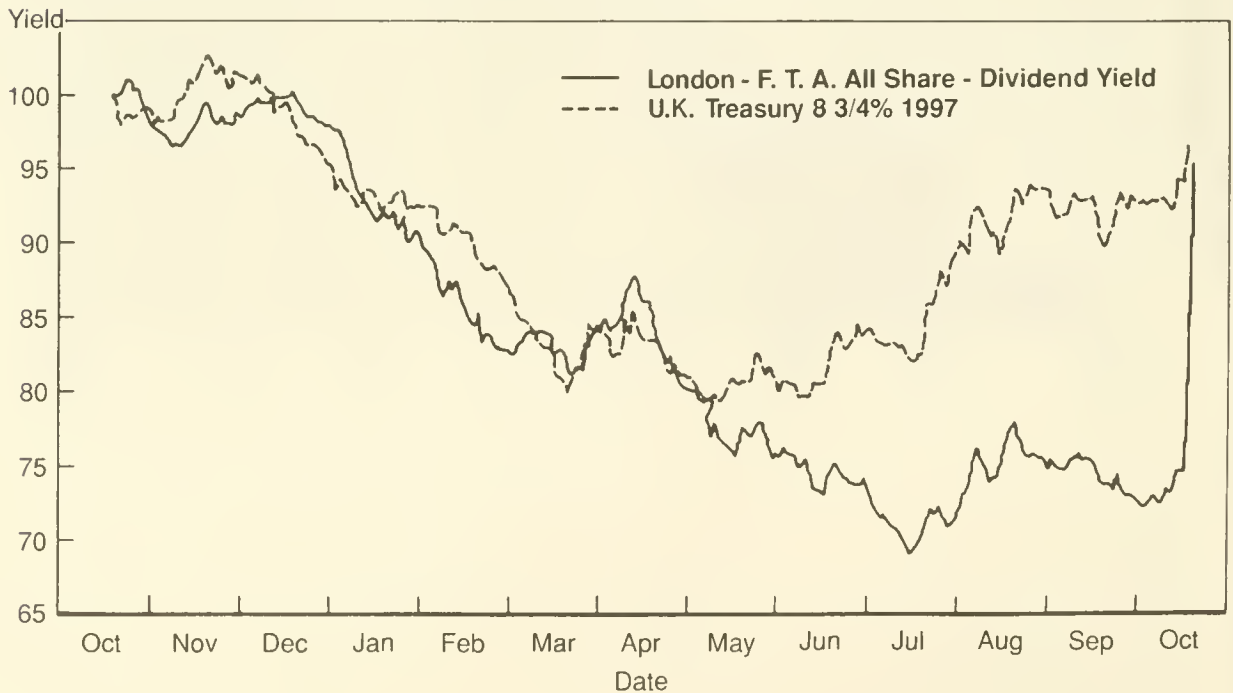
## UK BOND YIELDS

From January 20, 1986 to October 20, 1987 (Daily)



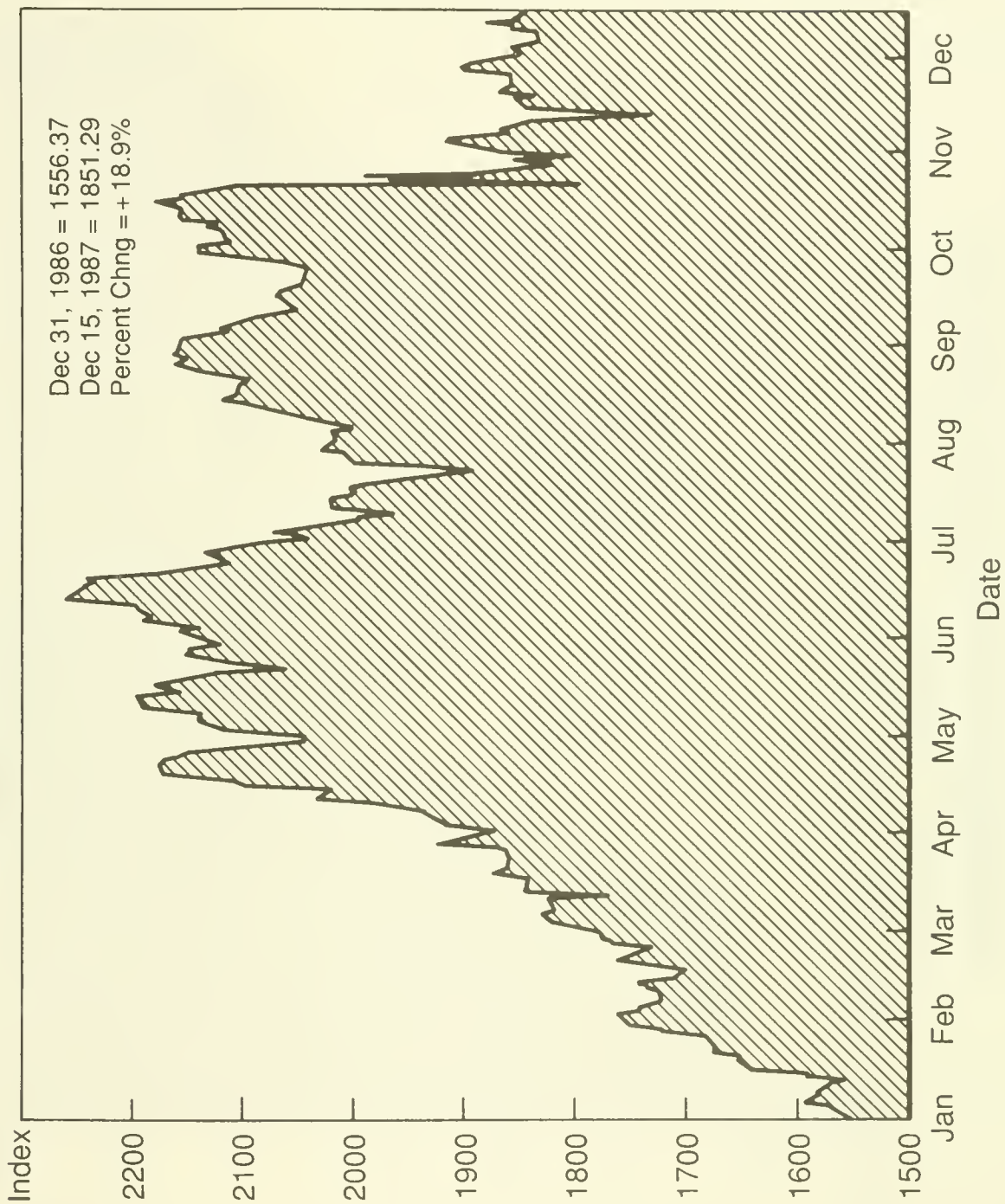
## FT ALL SHARE YIELD VS. U.K. 10-YR. GOV'T BOND

From October 20, 1986 to October 20, 1987 (Daily)



# TOKYO STOCK EXCHANGE NEW INDEX

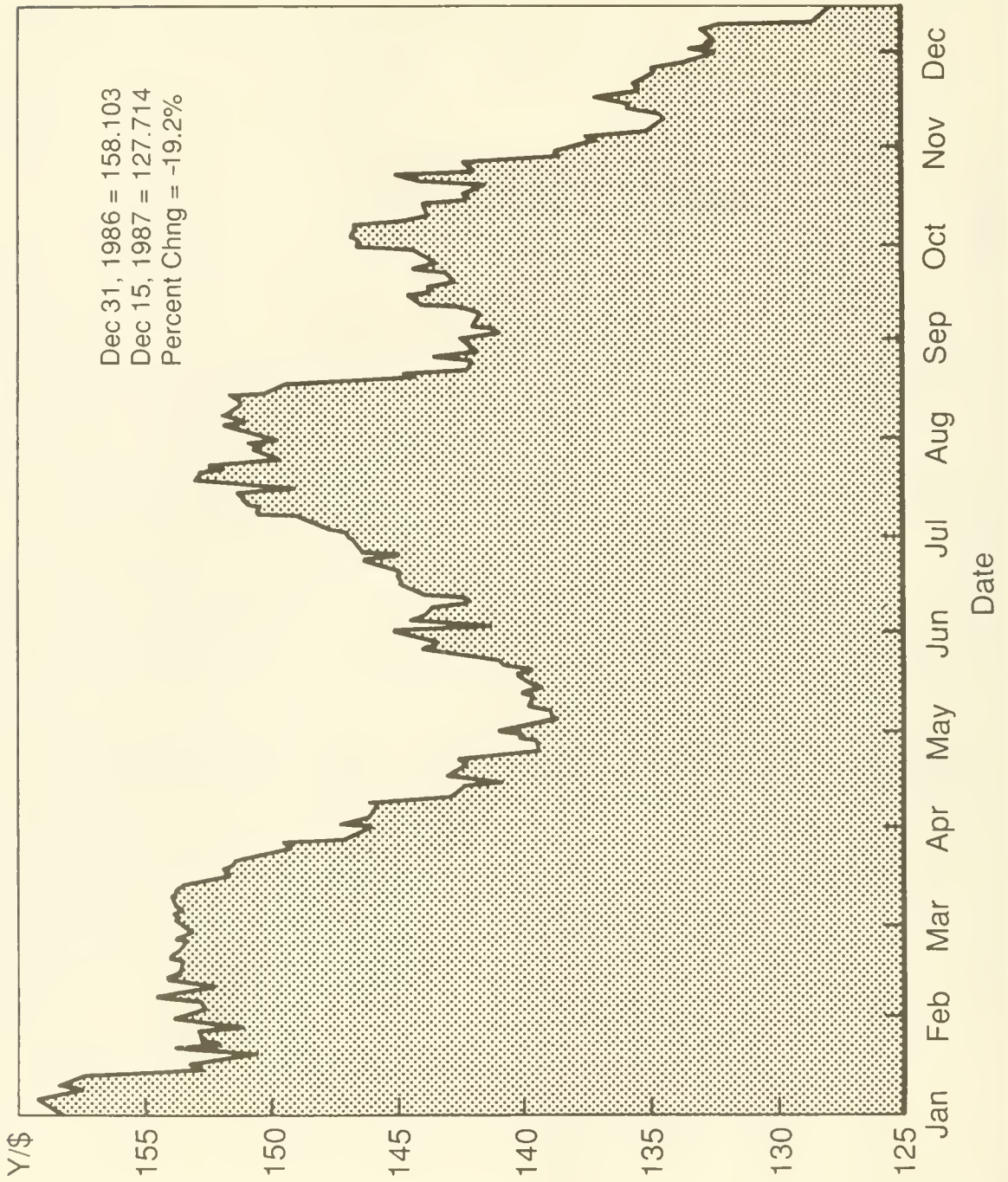
Performance from Dec 31, 1986 to Dec 15, 1987





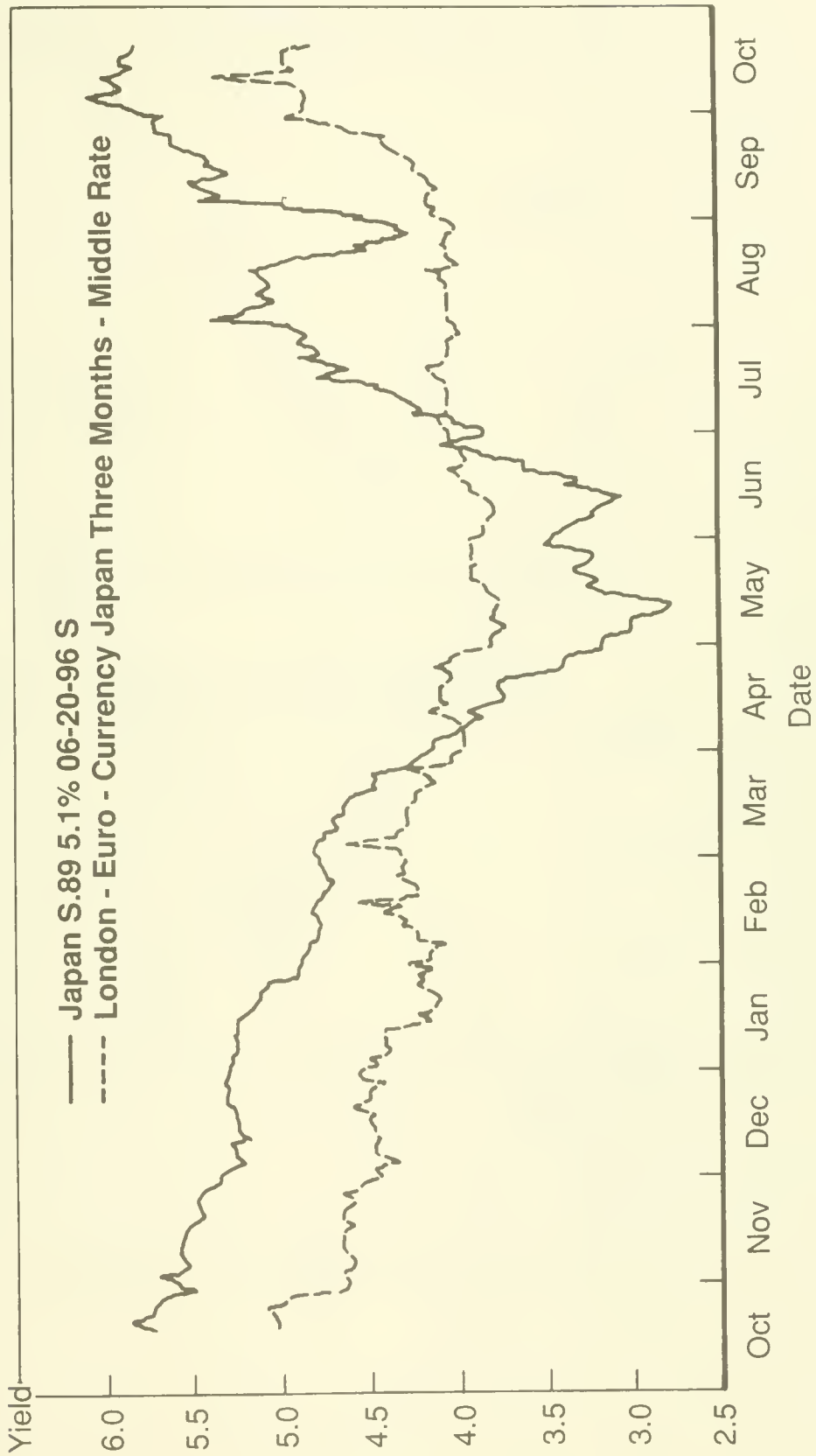
# JAPANESE YEN PER U.S. DOLLAR

Performance from Dec 31, 1986 to Dec 15, 1987



# JAPANESE BOND YIELDS

From October 20, 1986 to October 20, 1987 (Daily)



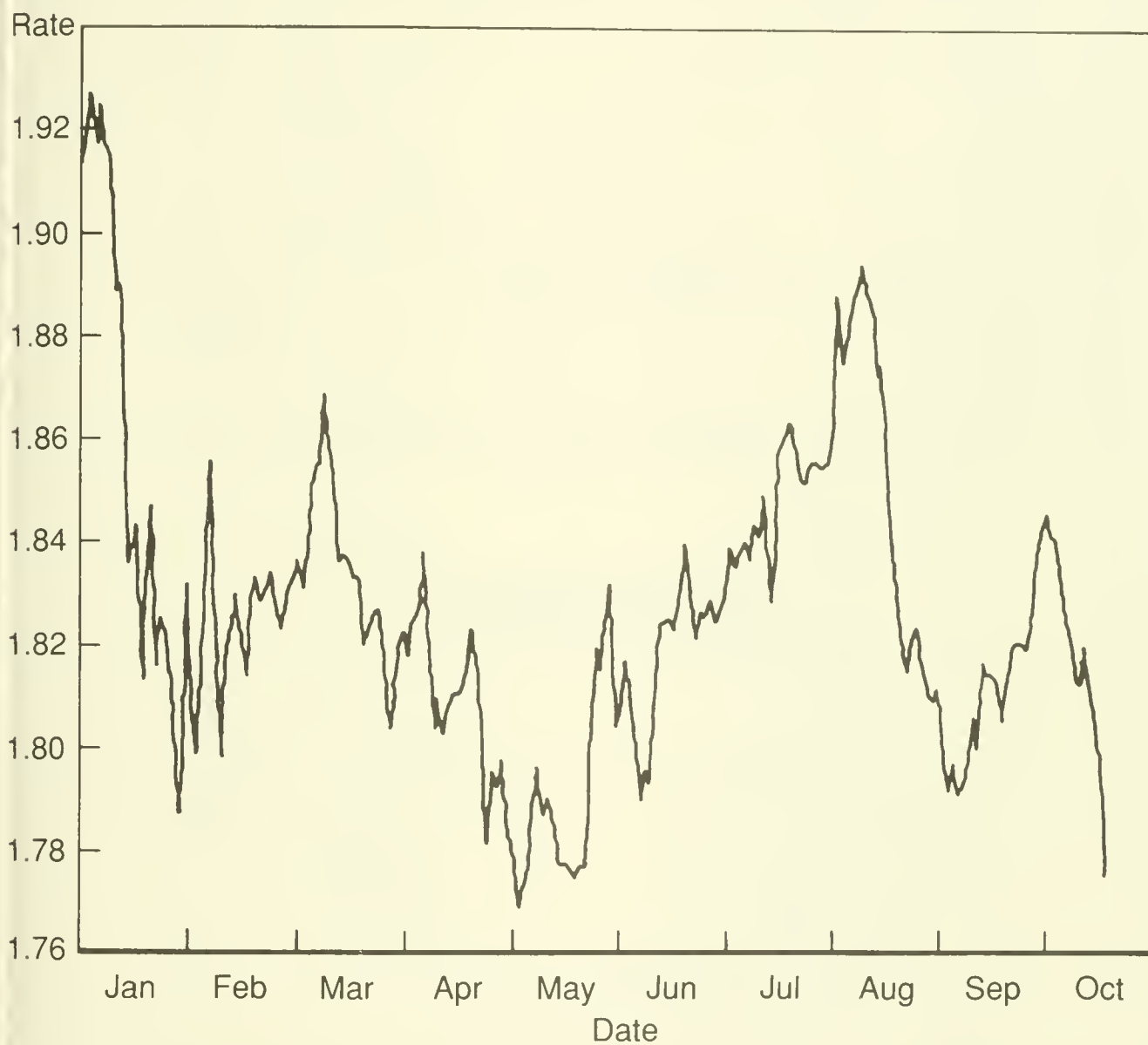
### YEN/\$ EXCHANGE RATE - 1987



### \$/STERLING EXCHANGE RATE - 1987

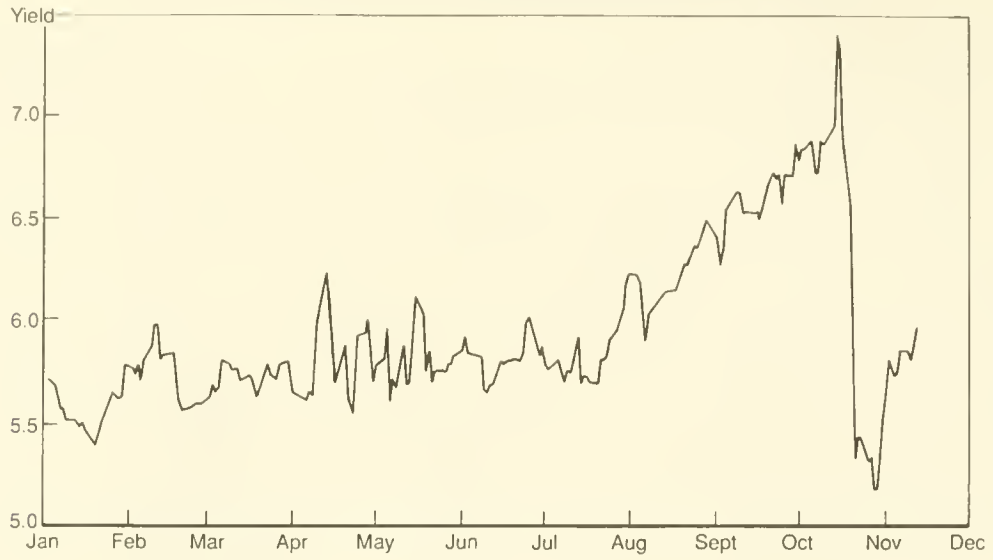


## DM/\$ EXCHANGE RATE - 1987



### 3 - MONTH U.S. TREASURY BILL

January 2, 1987 to November 12, 1987



Yield to Maturity T-Bill 3 Mo B.E.Y

### 10-YEAR U.S. TREASURY YIELD

January 2, 1986 to November 12, 1987

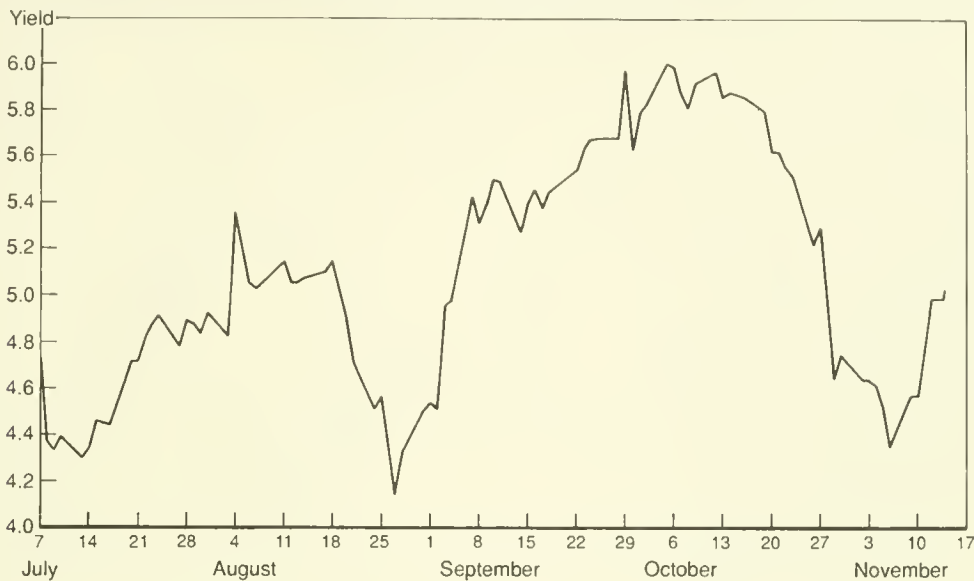


Yield to Maturity 10-Year TSY



### JAPAN 10-YEAR BOND YIELDS

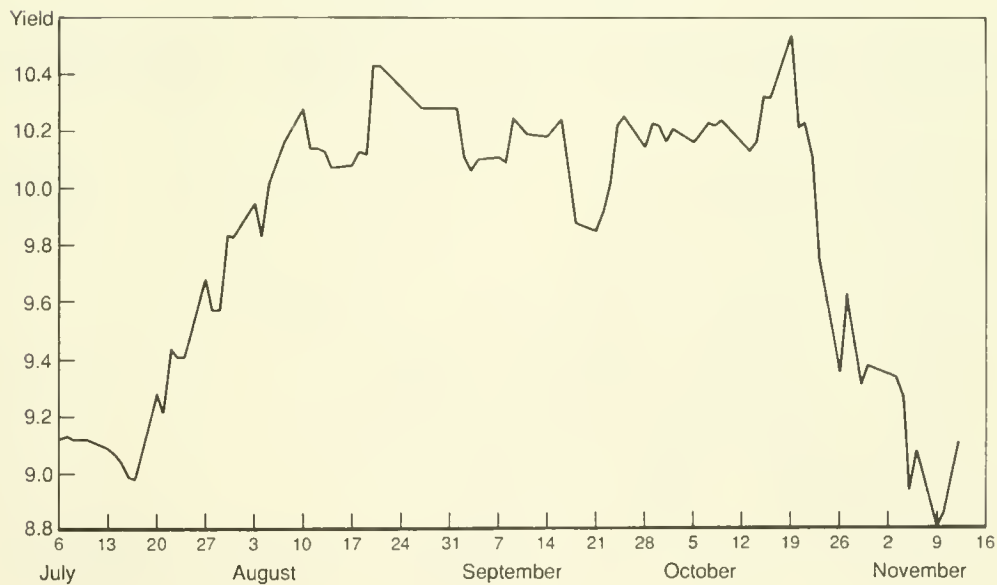
July 7, 1987 to November 12, 1987



Yield to Maturity 10-Yr Japan Govt

### U.K. 10-YEAR BOND YIELDS

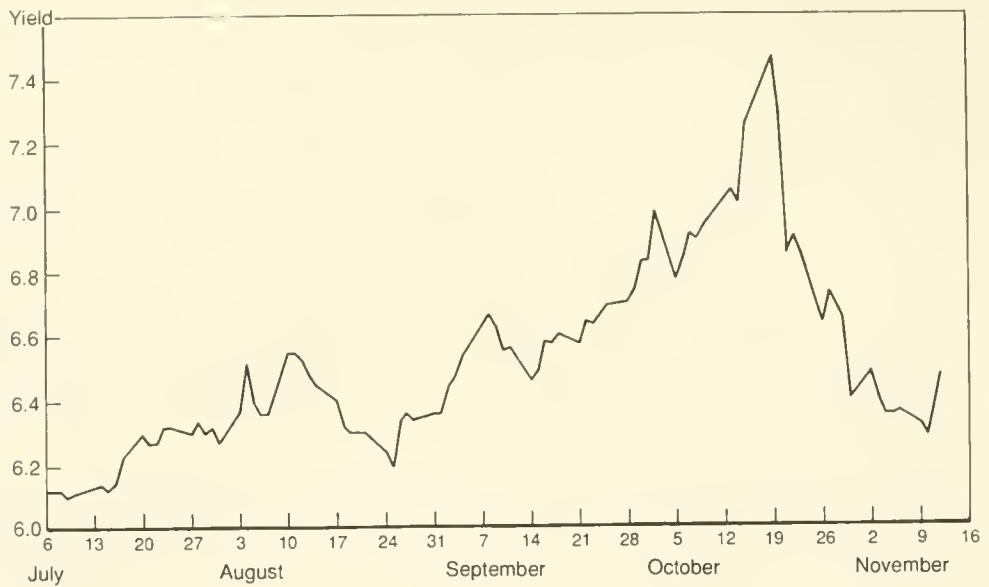
July 6, 1987 to November 12, 1987



Yield to Maturity 10-Yr UK Govt

### GERMANY 10-YEAR BOND YIELDS

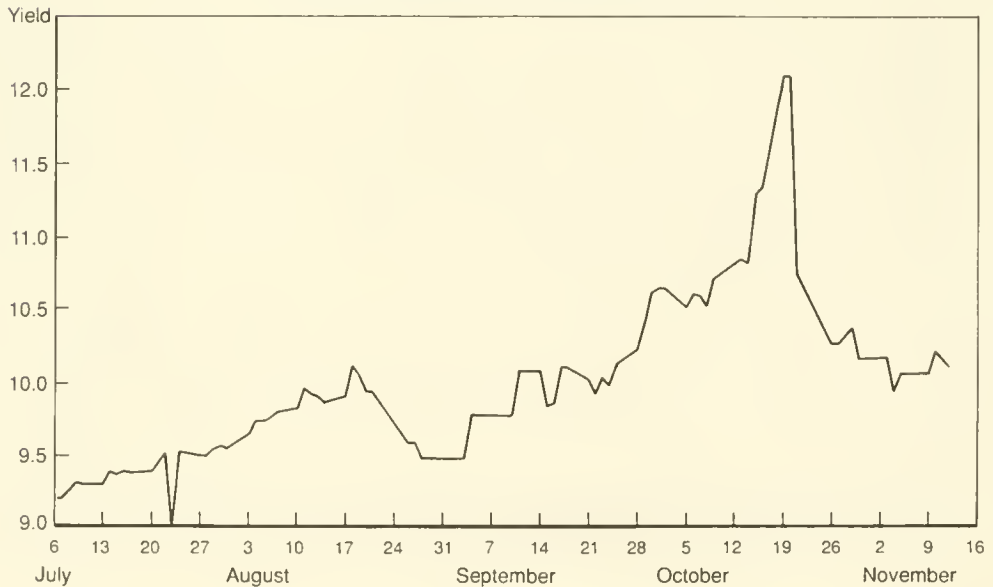
July 6, 1987 to November 12, 1987



Yield to Maturity B.R.D. 10-Year

### FRANCE 10-YEAR BOND YIELDS

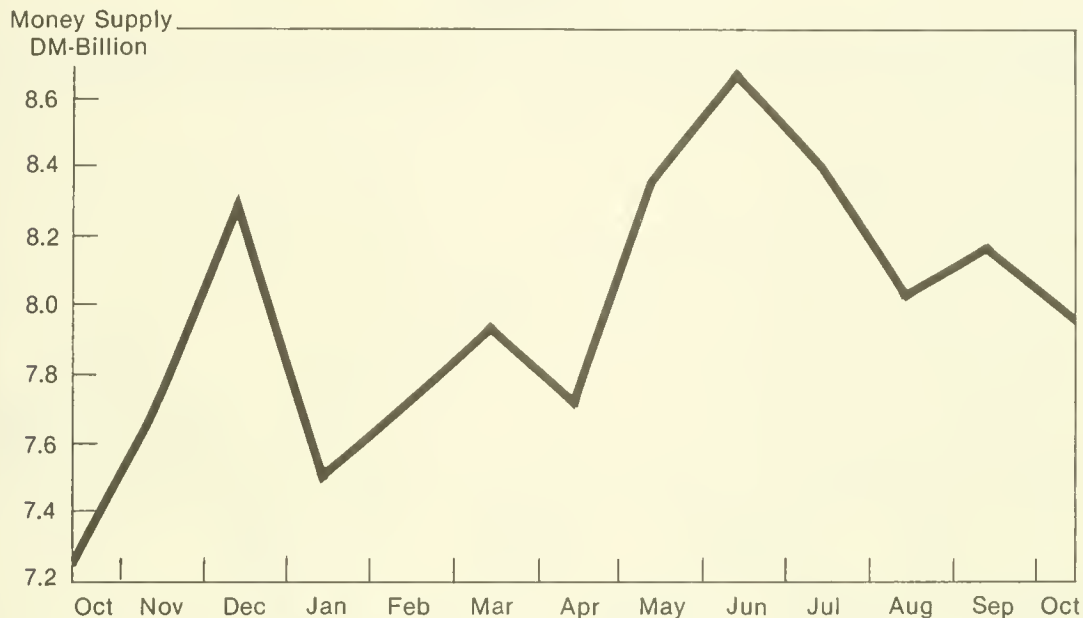
July 6, 1987 to November 12, 1987



Yield to Maturity 10Yr France Govt

## GERMAN MONEY SUPPLY GROWTH RATE

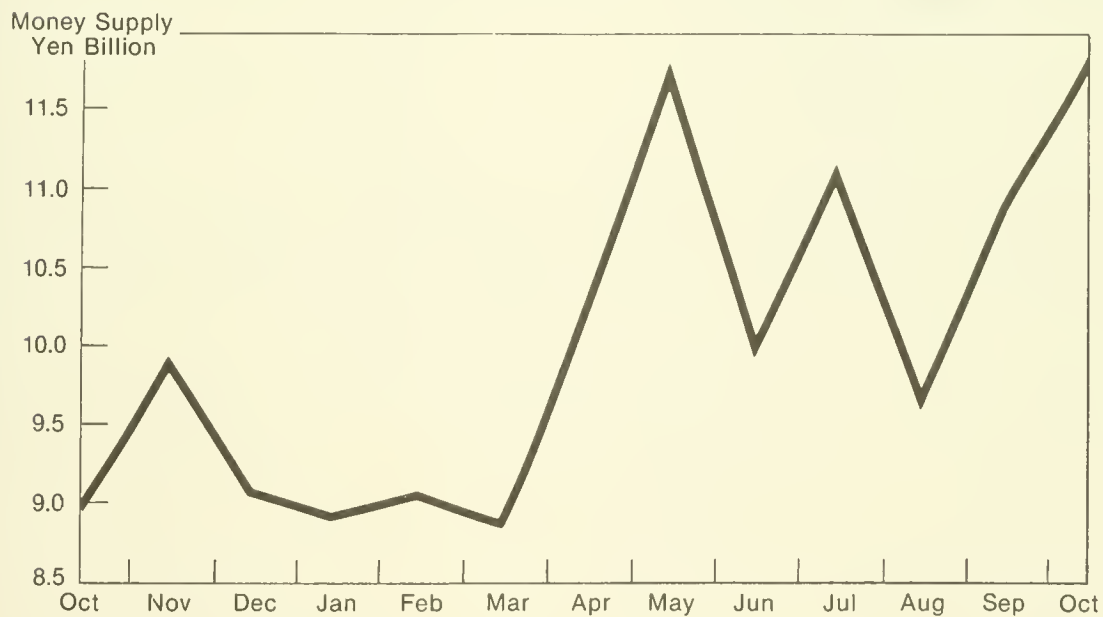
Deutschemark Billion



SOURCE: DEUTSCHE BUNDESBANK

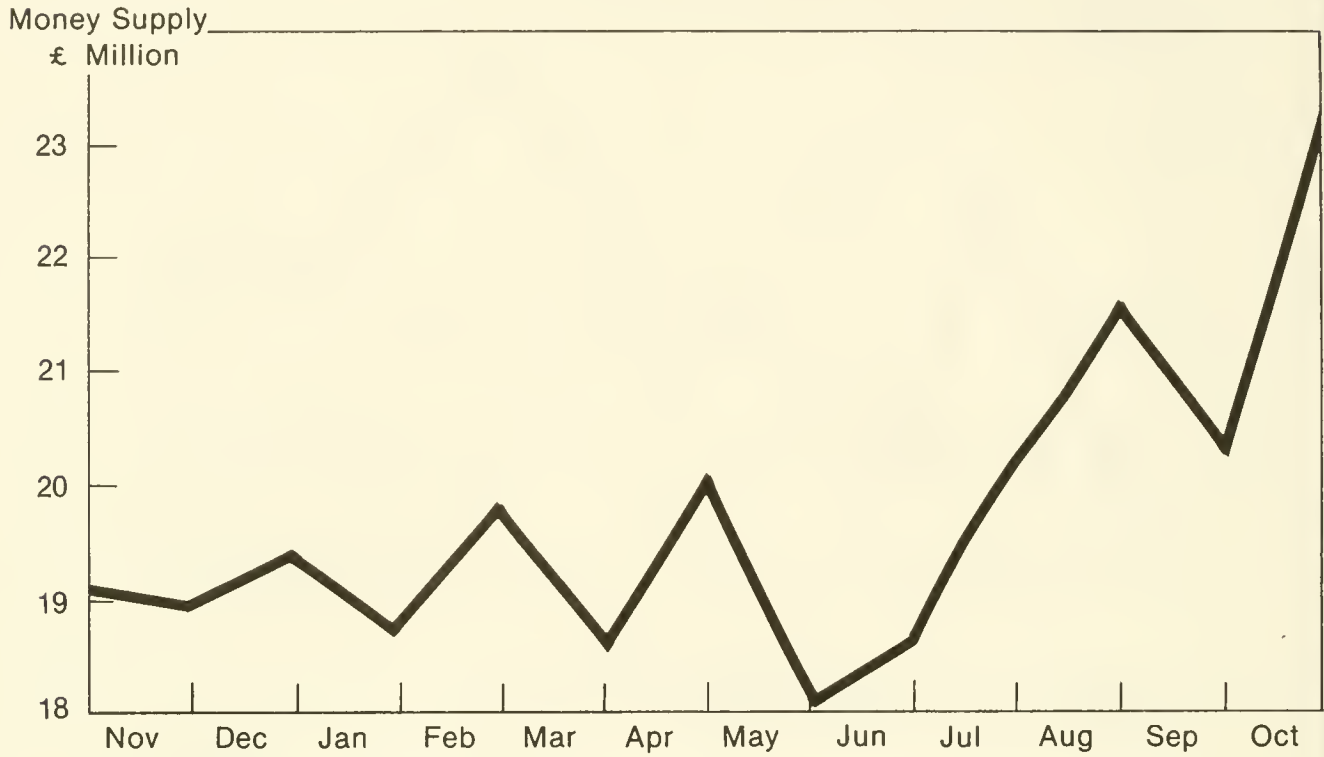
## JAPANESE MONEY SUPPLY GROWTH RATE

Yen Billion



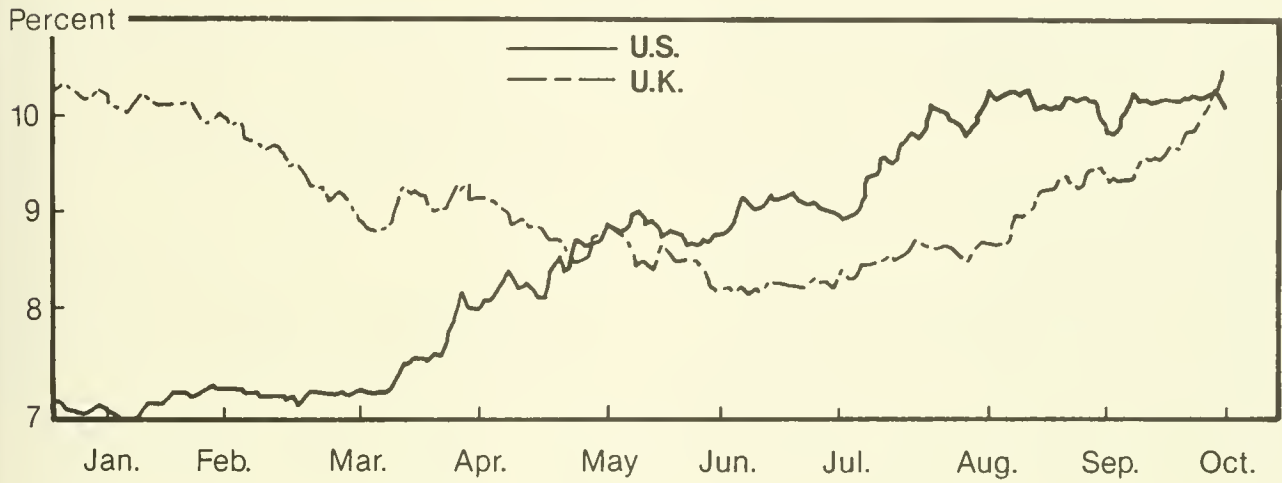
SOURCE: BANK OF JAPAN

# U. K. MONEY SUPPLY GROWTH RATE £ Million

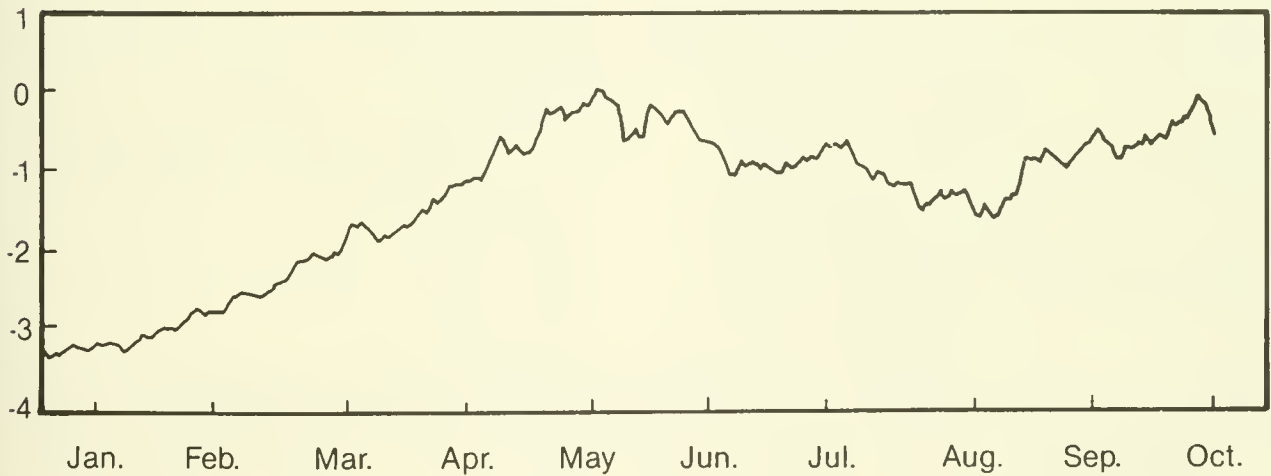


SOURCE: BANK OF ENGLAND

# U.S. VERSUS U.K. 10-YEAR BOND YIELDS

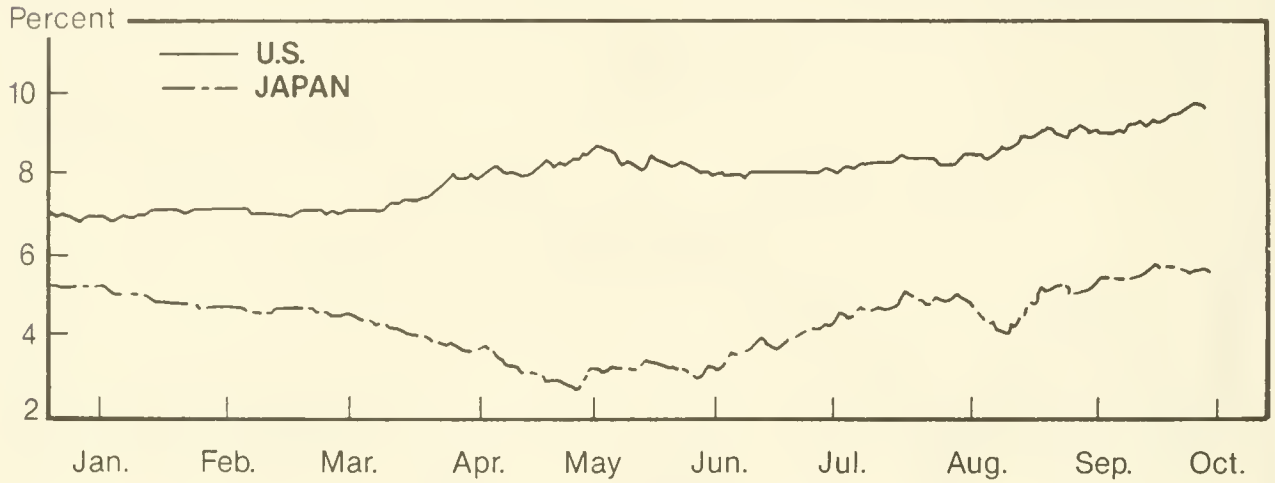


## Spread History

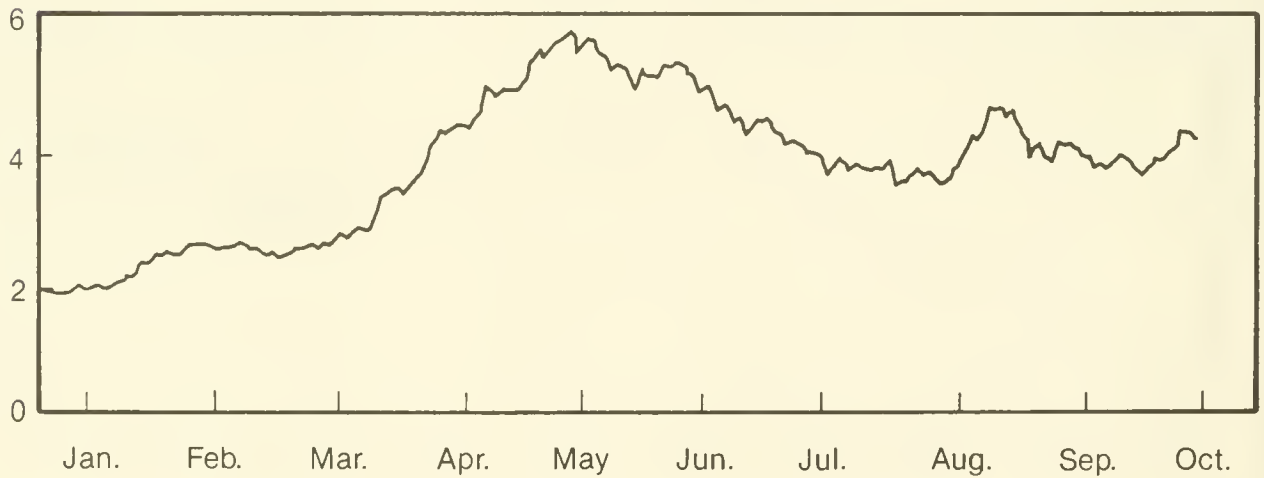




# U.S. VERSUS JAPAN 10-YEAR BOND YIELDS



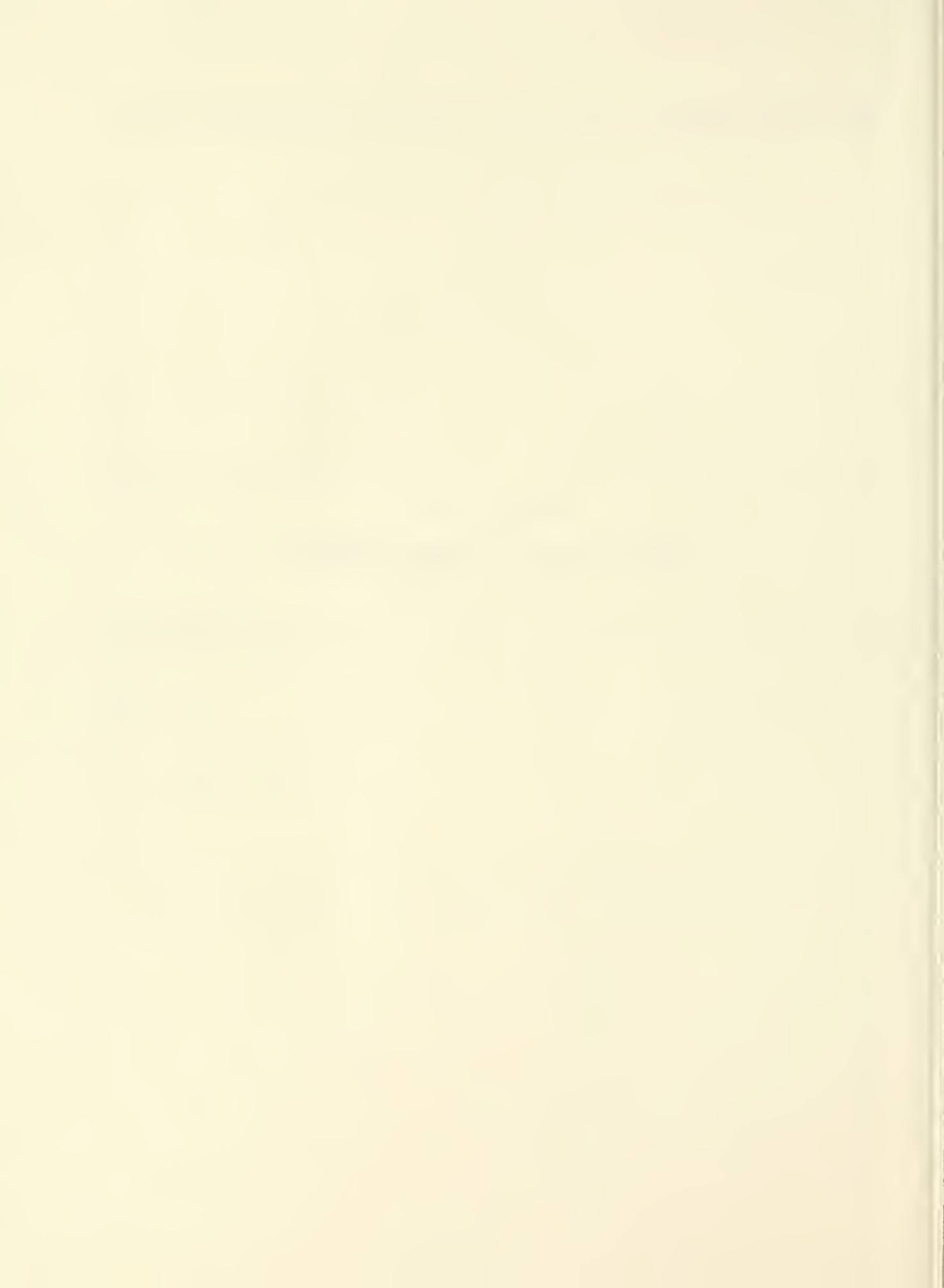
## Spread History



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Study II  
**Historical Perspectives**

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# Study II

## Historical Perspectives

### Introduction

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The purpose of this report is to examine a wide variety of historical evidence, and to use this evidence to provide a perspective on the stock market break of October 1987. The report is divided into three sections.

In Section I, it is argued that the market break is most significant in terms of the rapidity of the decline as opposed to the amount of that decline; thus, the Task Force ought to focus its inquiry primarily on the abrupt nature of the stock market move, and on market practices that may have contributed to that abruptness. These practices include portfolio insurance and other trading strategies, market making systems and the use of index futures and options. Less emphasis should be placed on "fundamental" explanations that could potentially rationalize the large change in prices, but which do not address its suddenness. Among these fundamental issues are the budget and trade deficits, increases in corporate and private debt and the general overvaluation of stocks.

Given this focus on short term movements, Section II explores whether the 508 point drop on October 19 should have come as a complete surprise or whether it might have been anticipated as an inevitable consequence of steadily increasing volatility. A variety of measures of daily price dispersion are examined. The conclusion is that prior to October 19 there was no systematic evidence to suggest that volatility was at a historical peak.

Section III presents information on a broad group of institutional trends which may be correlated to the potential for sudden stock market moves. The topics covered include: ownership of stock by different types of investors, historical trends in trading volume, foreign equity markets, derivative products, changes in corporate finance policies and leverage by stockholders and New York Stock Exchange member firms.

### Section I: The Focus on "Market Mechanisms"

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The commonly identified causes of the October break can be grouped into two categories. First are those causes that might be termed *broad fundamentals*—factors that could be responsible for a substantial decline in the level of stock prices but which do not explain why the drop was so precipitous. Included in this category are the budget and trade deficits, increases in corporate and private debt and the general overvaluation of stocks in the face of rising interest rates.

The second category, which might be called *market mechanisms*, offers more hope for explaining the unprecedented suddenness of the market's move and the consequent dislocation of financial markets. Among these market mechanisms are portfolio insurance and other trading strategies, market making systems and index futures and options. These mechanisms are the proper focus of the Task Force's investigation.

The first and most important reason for not evaluating and identifying fundamental causes of the October events is that the record on the long-run magnitude of the current decline is far from complete. As Table 1.1 illustrates, the movement in the stock market on October 19 was entirely without precedent (post-1928), and the movement between October 9 and October 23 was almost twice that of the next greatest two week decline in the post-war period. However, the movement in the market over any eight-week period which includes these two critical weeks is by no means unprecedented.

The fall of 30.5 percent from the market peak on August 25 to Thursday, November 19 is smaller than many post-war declines and is dwarfed by the decline of 89 percent from the 1929 peak to the 1932 low, which coincided with the start of the Great Depression. If the market stabilizes at its current level, the long-run magnitude of the recent break will, from the perspective of history, have scarcely justified special attention. If, on the other hand, the market continues along a path similar to that experienced from 1930 to 1932, it will, regardless of the sharp nature of the October drop, justifi-

ably be the subject of intense study (see Table 1.2). It is not yet clear which of these possibilities will occur.

The second reason for not focusing on fundamental causes is that large fluctuations in stock prices with no clear fundamental explanation (either prospectively or retrospectively) have historically occurred with some regularity both in the United States and abroad. Table 1.3 documents the fact that substantial market declines are often not followed by noteworthy downturns in the economy. Figures 1.1 and 1.2 illustrate long term movements of stock prices relative to corporate earnings and dividends, movements which were often not closely related to changes in long-term interest rates.

The difficulties associated with identifying fundamental causes are underscored by the international nature of the October decline in the market. Economies as diverse as those of the United States, the United Kingdom, Germany, France, Italy and Australia all experienced stock market declines of roughly comparable magnitudes (see Table 1.4). At the same time, indicators of potential and current economic problems differ widely among these countries.

Even if it were known with certainty that the market decline had been driven by fundamental factors, it is unrealistic to expect the Task Force to make reasonable policy recommendations in these areas within its two month reporting period. For example, despite extended study of the effect of government budget deficits, there is not yet agreement on how they should be measured or on the channels through which their effects are transmitted. Correspondingly, in longstanding discussions of the impact of "liquidity" on financial markets, there

is equally little agreement on how liquidity should be quantified or exactly how it influences stock prices. It is difficult, therefore, to see how the Task Force could expect sensibly to apportion responsibility for the October events to potential causes such as the budget deficit and liquidity. It is even more difficult to see how reliable policy prescriptions could be provided based on how these factors operate.

Finally, the Task Force on Market Mechanisms, as both its name and its limited reporting time suggest, was created in response to the extraordinary events that occurred between October 12 and October 23. What made these events extraordinary was the rapidity with which prices fell, the unprecedented volume of trading and the consequent dislocation in financial markets. Thus, whatever the causes of the original downward pressure on the market, the clearly implied mandate of the Task Force is to focus on those factors which transformed this downward pressure into the alarming events of these two critical weeks and to recommend measures to ensure, as far as possible, that future market fluctuations do not take on the extreme and potentially destructive character witnessed in October 1987.

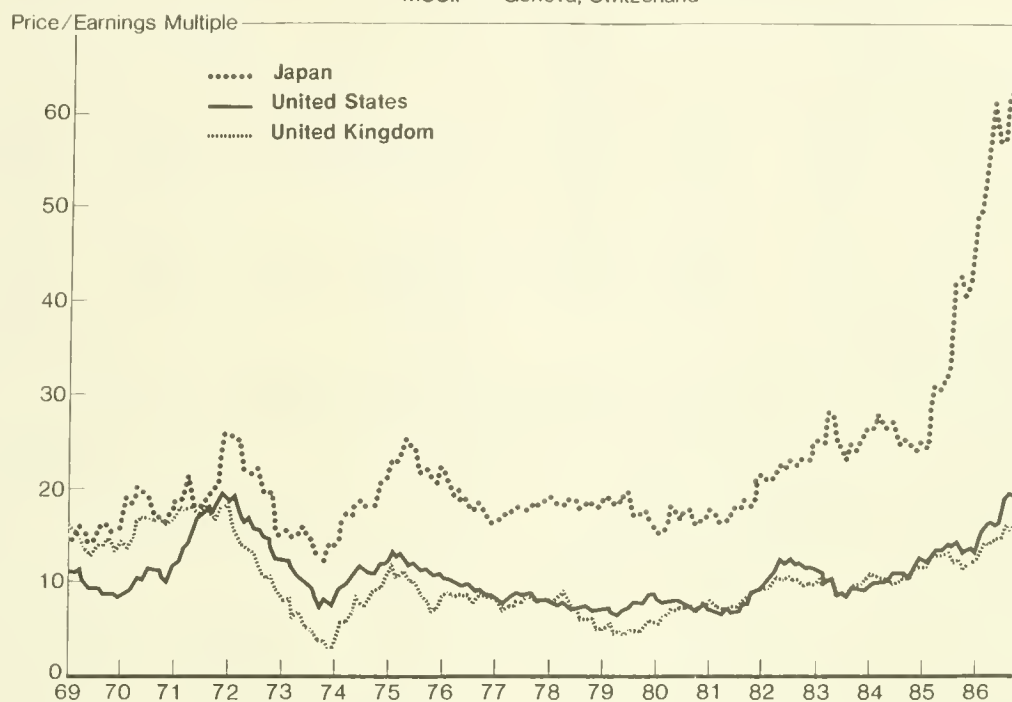
The fundamental causes of the recent market decline should not, of course, be ignored. To the extent that existing imbalances in the budget, foreign transactions, savings, corporate asset positions and other fundamental factors are perceived to be problems, they merit study. A heightened focus on these subjects represents perhaps one of the few benefits of the October market decline. This Task Force, however, is not equipped to deal with these questions in a useful way.



Figure 1.1

### P/E VALUATIONS

MSCIP — Geneva, Switzerland



Source: Morgan Stanley/Guardian International Statistics.

TABLE 1.1.—OCTOBER 1987—NYSE HISTORICAL PERSPECTIVE

| Period              | Daily               |          | 2-week period <sup>1</sup> |                   | 8-week period <sup>1</sup> |                  |
|---------------------|---------------------|----------|----------------------------|-------------------|----------------------------|------------------|
|                     | DJIA percent change | Date     | DJIA percent change        | Date              | DJIA percent change        | Date             |
| <b>A. Declines:</b> |                     |          |                            |                   |                            |                  |
| October 1987 .....  | (22.63)             | 10/19/87 | (21.41)                    | 10/ 9/87-10/23/87 | (26.10)                    | 8/28/87-10/23/87 |
| Post-war .....      | (6.54)              | 9/26/55  | (12.85)                    | 9/20/74-10/ 4/74  | (24.80)                    | 8/ 9/74-10/ 4/74 |
| Post-1928.....      | (12.82)             | 10/28/29 | (15.91)                    | 7/ 8/33- 7/22/33  | (36.59)                    | 3/ 5/32- 4/30/82 |
| <b>B. Advances:</b> |                     |          |                            |                   |                            |                  |
| October 1987 .....  | 10.15               | 10/21/87 | ( <sup>2</sup> )           | —                 | ( <sup>2</sup> )           | —                |
| Post-war .....      | 5.00                | 5/27/70  | 13.05                      | 8/13/82- 8/27/82  | 22.58                      | 8/13/82-10/ 7/82 |
| Post-1928.....      | 15.34               | 3/15/33  | 39.13                      | 7/23/32- 8/ 6/32  | 88.16                      | 7/ 9/32- 9/ 3/32 |

<sup>1</sup> Friday to Friday. <sup>2</sup> No advance greater than 5 percent.

Source: Salomon Brothers Research.

TABLE 1.2.—STOCK MARKET AND ECONOMIC DEVELOPMENTS 1929 TO 1933

|            | Changes in DJIA                     |                       | Real GNP              |                       | Price level           |                       |
|------------|-------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|            | Percent of 1929 level (end of year) | Annual percent change | Percent of 1929 level | Annual percent change | Percent of 1929 level | Annual percent change |
| 1929 ..... | 65.2                                | (34.8)                | 100.0                 | —                     | 100.0                 | —                     |
| 1930 ..... | 43.2                                | (33.8)                | 90.1                  | (9.9)                 | 95.7                  | (2.5)                 |
| 1931 ..... | 20.4                                | (52.7)                | 83.2                  | (7.7)                 | 88.9                  | (8.8)                 |
| 1932 ..... | 15.7                                | (23.1)                | 70.8                  | (14.9)                | 79.7                  | (10.3)                |
| 1933 ..... | 26.2                                | 66.7                  | 69.5                  | (1.8)                 | 75.6                  | (5.1)                 |

Source: "Historical Statistics of the United States."

TABLE 1.3.—SUBSTANTIAL MARKET DECLINES AND SUBSEQUENT ECONOMIC IMPACTS

| Dates                               | Percent change in DJIA              | Initial DJIA              | Percent GNP change (following 12 months) <sup>1</sup> | Recession |
|-------------------------------------|-------------------------------------|---------------------------|---|-----------|
| <b>a. United States (Post-War):</b> |                                     |                           |   |           |
| 5/29/46 to 10/9/46.....             | (23.2)                              | 212.5                     | <sup>2</sup> 6.4                                      | No        |
| 12/13/61 to 6/26/62.....            | (27.1)                              | 734.9                     | 4.9   | No        |
| 2/9/66 to 10/7/66.....              | (25.2)                              | 995.1                     | 2.4   | No        |
| 12/3/68 to 5/26/70.....             | (35.9)                              | 985.2                     | <sup>3</sup> (1.3)                                    | Yes       |
| 8/22/73 to 11/5/74.....             | (44.4)                              | 1,051.7                   | (3.6)   | Yes       |
| 9/21/76 to 2/28/78.....             | (26.9)                              | 1,014.8                   | 3.5   | No        |
| 4/27/76 to 8/12/82.....             | (24.1)                              | 1,024.0                   | 1.2   | Yes       |
| 8/25/87 to 11/19/87.....            | (30.5)                              | 2,722.4                   | N/A   | N/A       |
| Dates                               | Percent change in FT30 <sup>4</sup> | Initial FT30 <sup>4</sup> | Percent GNP change (following 12 months) <sup>1</sup> | Recession |
| <b>b. United Kingdom:</b>           |                                     |                           |   |           |
| 6/30/55 to 2/28/58.....             | (29.8)                              | 39.97                     | <sup>2</sup> 2.4                                      | No        |
| 4/30/61 to 7/31/62.....             | (21.2)                              | 64.05                     | <sup>2</sup> 1.1                                      | No        |
| 1/31/69 to 6/30/70.....             | (31.5)                              | 107.62                    | 2.7   | No        |
| 12/31/72 to 12/31/74.....           | (69.5)                              | 124.83                    | 0.2   | Yes       |
| Dates                               | Percent change in TSEI <sup>5</sup> | Initial TSEI <sup>5</sup> | Percent GNP change (following 12 months) <sup>1</sup> | Recession |
| <b>c. Japan:</b>                    |                                     |                           |   |           |
| 9/30/49 to 6/30/50.....             | (46.0)                              | 8.46                      | <sup>2</sup> 58.6                                     | No        |
| 2/28/53 to 4/30/53.....             | (24.4)                              | 21.97                     | <sup>2</sup> 21.1                                     | No        |
| 7/31/61 to 10/31/61.....            | (37.7)                              | 68.40                     | <sup>2</sup> 5.8                                      | Slowdown  |
| 1/31/73 to 10/31/74.....            | (35.6)                              | 145.87                    | (2.7)   | Yes       |

<sup>1</sup> From midpoint of decline. <sup>2</sup> Industrial production (real GNP figures not available quarterly). <sup>3</sup> Changes for one quarter backshift in window.<sup>4</sup> Financial Times 30 stock index. <sup>5</sup> Tokyo Stock Exchange Index.

Sources: Salomon Brothers Research; "OECD Economic Statistics; International Financial Statistics; U.S. Economic Report of the President."

TABLE 1.4.—STOCK MARKET PERFORMANCE IN OCTOBER 1987 VERSUS UNDERLYING ECONOMIC CONDITIONS—INTERNATIONAL COMPARISONS

[In percent]

| Country              | October price decline | P/E October 1987 | Long term Government rate | Rate of inflation | Unemployment rate | Growth rate <sup>1</sup> | Trade deficit <sup>2</sup> | Government deficit <sup>2</sup> |
|----------------------|-----------------------|------------------|---------------------------|-------------------|-------------------|--------------------------|----------------------------|---------------------------------|
| United States .....  | 21.5                  | 18.9             | 9.42                      | 4.1               | 6.9               | 5.2                      | (3.3)                      | (5.3)                           |
| Australia .....      | 44.7                  | 19.2             | 13.25                     | 8.1               | N/A               | N/A                      | (1.1)                      | (1.0)                           |
| Canada .....         | 22.2                  | 26.1             | 10.44                     | 4.2               | 9.4               | 4.4                      | 1.4                        | (4.2)                           |
| United Kingdom ..... | 21.7                  | 16.0             | 9.92                      | 4.0               | 11.6              | 3.8                      | 0.1                        | (2.2)                           |
| France .....         | 18.6                  | 14.9             | 9.85                      | 3.3               | 10.7              | 1.1                      | 1.0                        | (2.6)                           |
| Germany .....        | 17.7                  | 15.4             | 6.20                      | 0.6               | 7.5               | 2.2                      | 5.8                        | (1.5)                           |
| Italy .....          | 12.3                  | 17.0             | 10.58                     | 4.3               | 6.1               | 3.3                      | 0.5                        | (12.2)                          |
| Japan .....          | 7.5                   | 61.7             | 4.44                      | 0.2               | 2.9               | 5.0                      | 4.4                        | <sup>3</sup> (4.9)              |

<sup>1</sup> Industrial production change (October 1986 to October 1987).<sup>2</sup> Percent of GNP.<sup>3</sup> Calculated from the increase in net government debt outstanding (typically understates deficit which is not reported to the International Monetary Fund).

Sources: Morgan Stanley/Guardian International Statistics; "International Financial Statistics, U.S. Economic Report of the President."

## Section II: Historical Volatility Study

Should the huge drop in stock prices on October 19 have come as a surprise, or could it have been anticipated as an inevitable consequence of steadily increasing daily volatility? This section examines a variety of measures of daily price dispersion and concludes that, prior to October 19, there was no evidence to suggest that volatility was at a historically high point. Most measures do show volatility rising somewhat since 1983 or 1984, when the use of stock index futures and options contracts began gaining in popularity (see Section III for data on the growth of those products.) However, the levels of volatility reached were no higher than those seen at times in the early 1970's and 1940's, and are substantially lower than the levels attained at various points in the 1930's. Consequently, it is difficult to argue that the recent increases in volatility represent anything more significant than normal cyclical fluctuations.

For the most part, this study focuses on U.S. stock price data. Figures 2.1 to 2.7 are based on daily prices from the Standard and Poor's 500 index from 1928 through the present. Figures 2.8 and 2.9 come from daily data on S&P 100 index options, which go back only to 1983. The study also touches briefly on international evidence, in order to see how trends in volatility in Japan and Germany compare to those in the U.S. and whether the U.S. stock market has become more tightly linked with foreign markets in recent years.

Figure 2.1 displays one common measure of volatility: the annualized standard deviation of daily percentage returns, calculated using the preceding trading days. As the figure shows, this measure sug-

gests that recent volatility is not particularly high when viewed in a broad historical context. There have been higher levels at a number of points in the past several decades.

Standard deviation has been criticized as a measure of volatility, because it tends to be better at giving a picture of the nature of "average sized" moves than at revealing much about the propensity of the market to make infrequent, extremely large moves. However, a statistical quantity known as "kurtosis," which puts more emphasis on rare, big moves can also be calculated. Figure 2.2 shows the kurtosis of daily percentage returns. While the kurtosis did indeed get quite high at times in the year preceding October 19, it did not exceed historical peaks.

On a more intuitive level, the market's propensity for large moves can also be quantified by counting the number of days during a given period in which the market moved more than some threshold amount in either direction. For example, Figure 2.3 shows that in 1987 there were market moves in excess of a five percent threshold on slightly more than two percent of all trading days. While this is exceptional when compared with recent history, it does not approach the extreme volatility of 1933, when ten percent of all trading days featured moves of over five percent.

Figures 2.4 to 2.7 repeat the same methodology, using less extreme thresholds of four, three, two and one percent respectively. In each instance, the conclusion is essentially the same: the incidence of "big moves" in 1986 and 1987 was higher than in the few preceding years but not near historical peaks. By any measure, the early 1930's were the most volatile period in stock market history, and most measures (see Figure 2.5) suggest that there

were times in the early 1970's and in the 1940's that were at least as volatile as the period immediately before October 19, 1987.

Figures 2.8 and 2.9 present a final alternative measure of volatility—that implicit in the prices of S&P index options. Since options are more valuable when there is more uncertainty about future price levels, the market's expectation of future volatility can be inferred by using an options pricing model and by looking at options premiums. Unfortunately, the options data goes back only to 1983 and does not allow the historical perspective possible for previous measures. However, the data does reinforce our earlier conclusions for the past few years. As figures 2.8 and 2.9 show, implied volatility was generally higher in 1986 and 1987 than in 1984 and 1985.

Table 2.1 compares volatility trends in Germany and Japan to those in the U.S. A similar story emerges for these countries. Japan saw slightly higher volatility in 1986 and 1987 than in 1984 and

1985, but this volatility was not new by historical standards. Indeed, Japan's 17.4 percent volatility in 1987 exactly equals its average for the period from 1973 to 1987 and is well below the 26.4 percent mark of 1974. Germany's volatility in 1987 did reach a historical peak of 24.4 percent, but nonetheless was not completely out of line with its volatility levels of 19.1 percent and 18.9 percent for 1973 and 1974 respectively.

Table 2.2 examines trends in international stock price correlations to see if there is any statistical foundation to the notion that markets have become more closely linked in recent years. As can be seen, there is little foundation at all. The correlations between the market in the U.S. and the markets in Germany and Japan appear to form totally random series; moving from relatively high values to negative values and back again to high values. The one market which does exhibit a consistently close association with the U.S. market is that of Canada. However, there is no evidence to suggest that the association is any closer today than it was a decade ago.

TABLE 2.1.—VOLATILITY TRENDS AND INTERNATIONAL COMPARISONS

(Averages of 60 day annualized volatilities, in percent)

|                          | Germany | Japan | United States |
|--------------------------|---------|-------|---------------|
| 1987 (pre-October).....  | 24.4    | 17.4  | 17.8          |
| 1986.....                | 19.3    | 17.0  | 15.5          |
| 1985.....                | 12.6    | 12.2  | 14.3          |
| 1984.....                | 14.7    | 14.5  | 16.6          |
| 1983.....                | 11.8    | 17.4  | 17.0          |
| 1982.....                | 15.1    | 20.6  | 19.1          |
| 1981.....                | 18.3    | 16.8  | 21.4          |
| 1980.....                | 7.8     | 18.7  | 18.1          |
| 1979.....                | 7.6     | 14.1  | 19.1          |
| 1978.....                | 7.8     | 12.8  | 16.2          |
| 1977.....                | 13.0    | 11.5  | 24.6          |
| 1976.....                | 9.9     | 13.8  | 20.1          |
| 1975.....                | 14.5    | 19.1  | 43.0          |
| 1974.....                | 18.9    | 26.4  | 33.6          |
| 1973.....                | 19.1    | 15.7  | 14.3          |
| Average (1973-1987)..... | 14.5    | 17.4  | 21.2          |
| October 1987.....        | 58.1    | 73.0  | 56.9          |

Source: Morgan Stanley/Guardian International Statistics.

TABLE 2.2.—TRENDS IN CROSS-NATIONAL MARKET PRICE MOVEMENT CORRELATIONS

|            | Correlations <sup>1</sup> of U.S. stock price movements with— |        |                |        |
|------------|---|--------|----------------|--------|
|            | Germany   | Japan  | United Kingdom | Canada |
| 1987 ..... | 0.62  | 0.67   | 0.86           | 0.95   |
| 1986 ..... | 0.45  | 0.14   | 0.78           | 0.67   |
| 1985 ..... | 0.17  | 0.11   | 0.36           | 0.82   |
| 1984 ..... | 0.64  | 0.65   | 0.78           | 0.83   |
| 1983 ..... | 0.28  | (0.08) | 0.88           | 0.61   |
| 1982 ..... | (0.14)  | 0.60   | 0.24           | 0.76   |
| 1981 ..... | 0.51  | 0.23   | 0.44           | 0.57   |
| 1980 ..... | 0.75  | 0.26   | 0.62           | 0.76   |
| 1979 ..... | 0.60  | 0.47   | 0.32           | 0.70   |
| 1978 ..... | (0.03)  | (0.19) | 0.68           | 0.74   |
| 1977 ..... | (0.19)  | 0.20   | (0.21)         | 0.74   |
| 1976 ..... | 0.43  | 0.64   | 0.59           | 0.59   |
| 1975 ..... | 0.32  | 0.74   | 0.55           | 0.65   |
| 1974 ..... | 0.24  | (0.14) | 0.48           | 0.76   |
| 1973 ..... | 0.35  | 0.54   | 0.60           | 0.84   |

<sup>1</sup> Annual Correlations of Monthly Movements.

Source: Morgan Stanley/Guardian International Price Indices.

Figure 2.1

**60 DAY HISTORICAL VOLATILITY**

S&P 500 Index

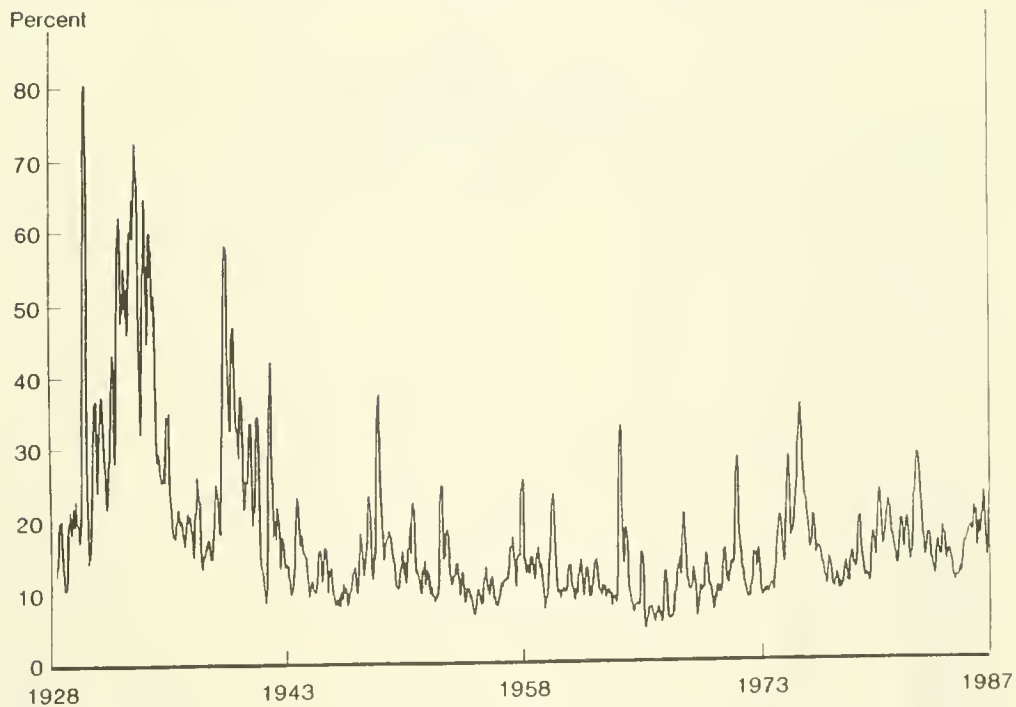




Figure 2.2

### 60 DAY HISTORICAL KURTOSIS

S&P 500 Index

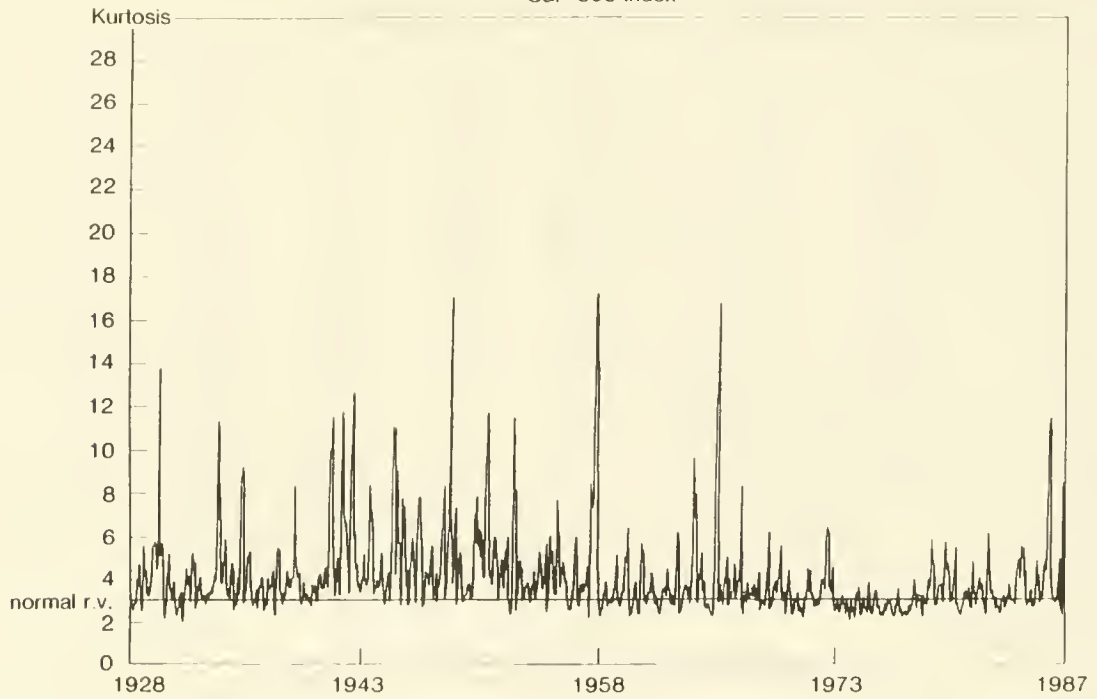


Figure 2.3

### DAILY CHANGE > 5%

S&P 500 INDEX

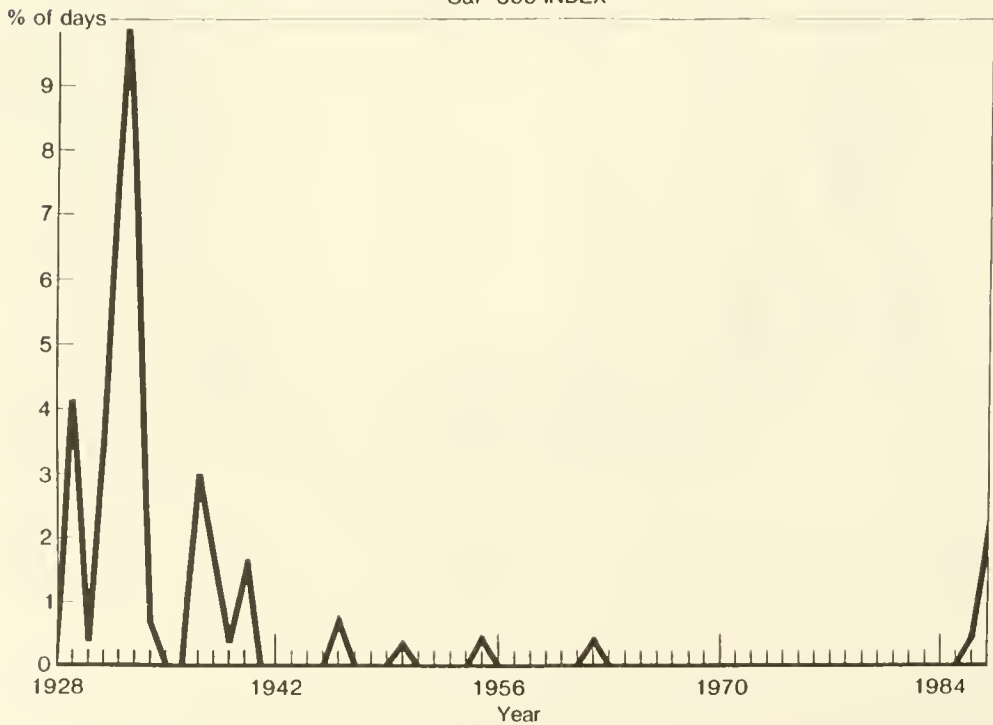


Figure 2.4

**DAILY CHANGE > 4%**  
S&P 500 Index

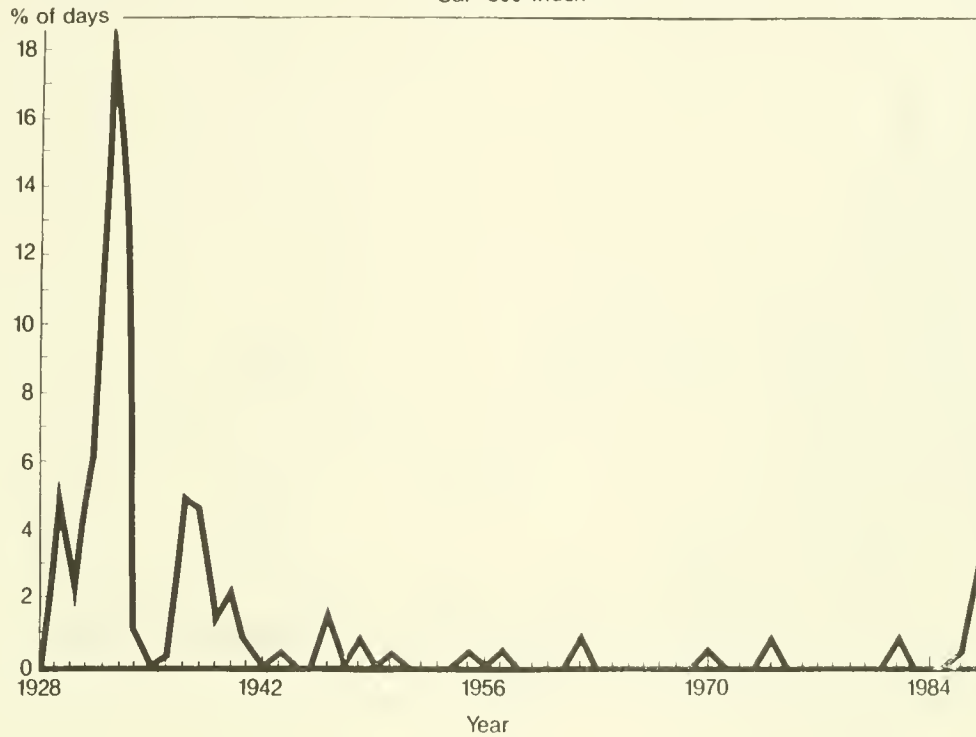


Figure 2.5

**DAILY CHANGE > 3%**  
S&P 500 Index

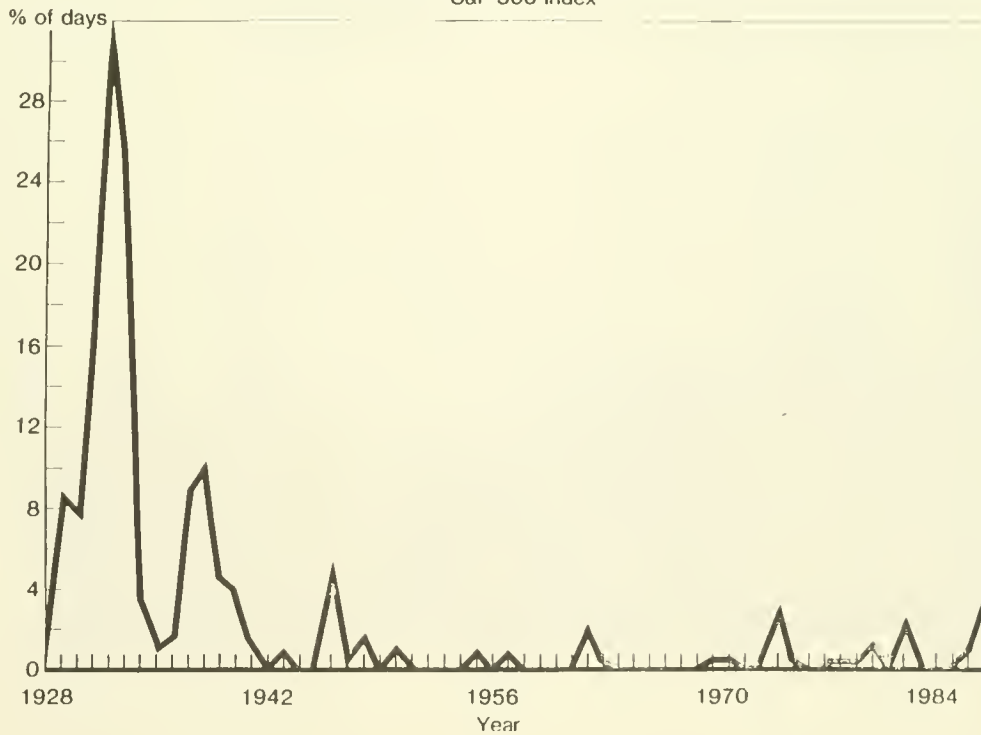


Figure 2.6

**DAILY CHANGE > 2%**  
S&P 500 INDEX

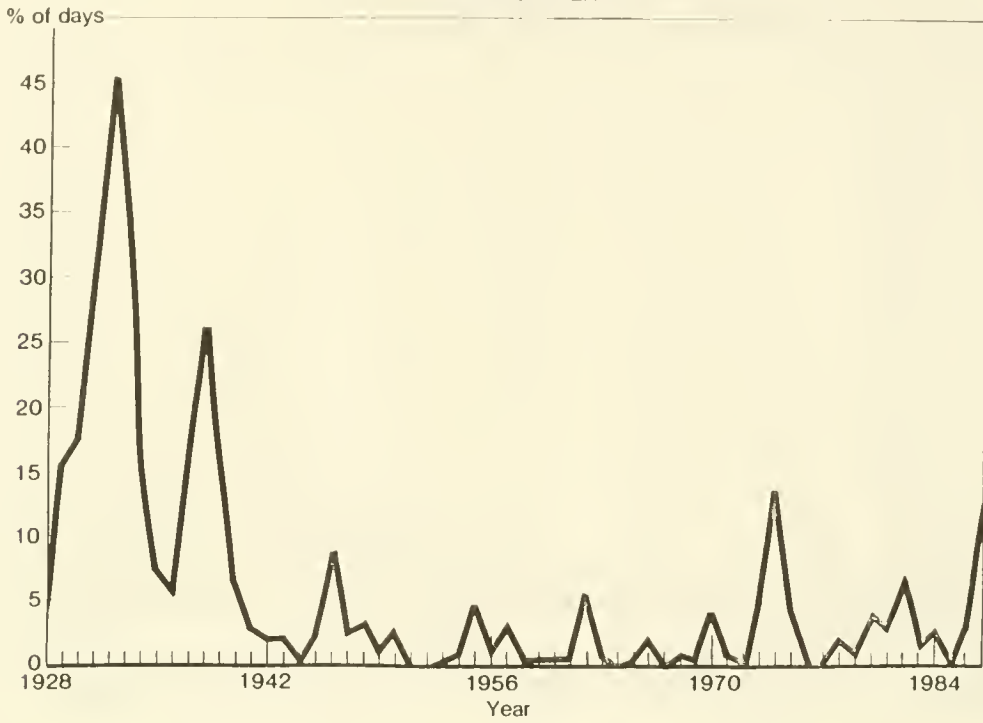


Figure 2.7

**DAILY CHANGE > 1%**  
S&P 500 INDEX



Figure 2.8

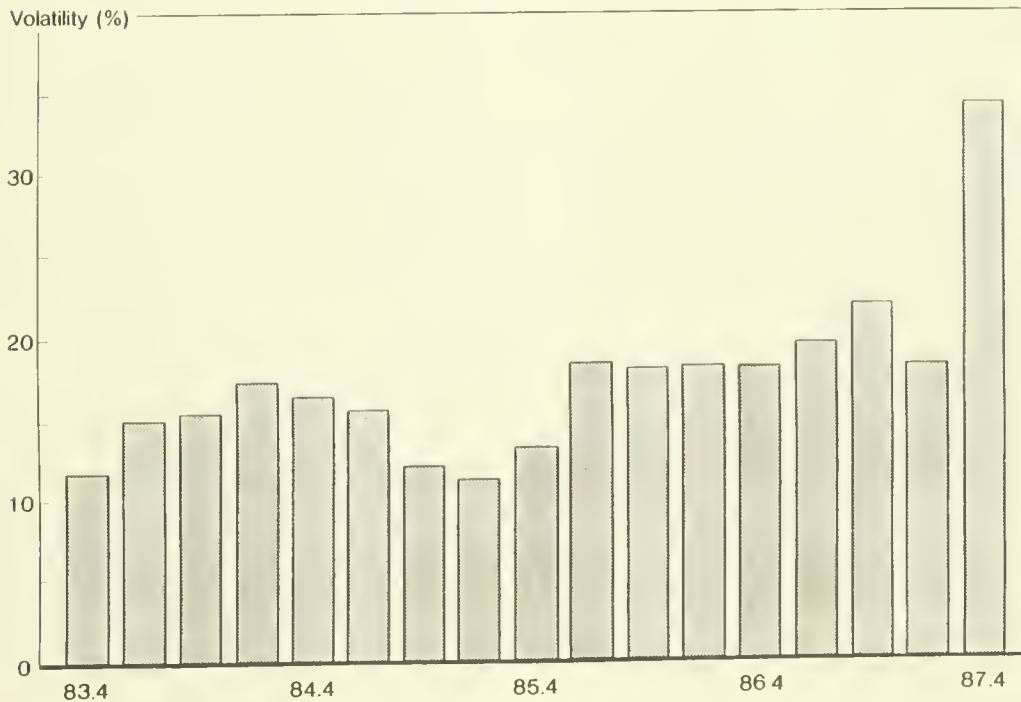
### IMPLIED VOLATILITY S&P 100 Index



Source: Goldman Sachs.

Figure 2.9

### IMPLIED VOLATILITY — S & P 100 Quarterly Means 1983.4 - 1987.4



Source: Goldman Sachs.

## Section III: Institutional Trends

This section examines data on a variety of institutional trends. There are 16 tables in all, covering such topics as: ownership of stock by different types of investors, historical trends in trading volume, foreign equity markets, derivative products, trends in corporate finance and leverage by stockholders and NYSE member firms.

### Who Owns U.S. Stock?

Table 3.1 gives a breakdown of the control of U.S. equity. The majority of stock (62.1 percent as of second quarter 1987) is still held by households, personal trusts and non-profit institutions, but this percentage has been declining in recent years. It was 69.7 percent in 1981. Over the same period, there has been growth in the proportion of equity controlled by pension funds, (from 17.7 percent to 20.4 percent), mutual funds (from 2.5 percent to 5.8 percent), and the foreign sector (from 4.3 percent to 6.2 percent).

Tables 3.2 to 3.5 provide more detail on the four investor categories mentioned above, calculating the percentage of their total assets that is invested in equity. Notably, pension funds show a steady increase in their equity allocations. As Table 3.3 shows, private pension funds had 53.8 percent of assets in equity as of the second quarter of 1987, up from 45.7 percent in 1981. This increase is less impressive when viewed in a broader historical context. For example, in the early 1970's the equity ratio of private funds was, for a time, in the neighborhood of 70 percent. Over the same time period, the percentage of equity in state and local retirement fund assets rose from 21.3 percent to 34.7 percent.

In contrast to pension funds, the percentage of equity in mutual fund assets decreased from 62.5 percent in 1981 to 42.1 percent in second quarter 1987 (see Table 3.5). However, because of the rapid growth of total mutual fund assets (from \$59.8 billion to \$498.5 billion), they still more than doubled their presence in the equity market, as was seen in Table 3.1.

Table 3.6 provides another illustration of the rising importance of delegated money management. In 1981, only 15.8 percent of individual investors owned mutual fund shares. By 1985, this percentage had almost doubled—to 30.3 percent. In the meantime, the number of people owning stock directly declined. For example, the percentage of investors owning shares on the NYSE fell from 80.9 percent to 69.7 percent from 1981 to 1985.

One reason for the growth of institutional management is the deregulation of commissions that occurred in 1975. As Table 3.7 shows, institutions have been able to negotiate reductions in fees since

that time, while individual investors have been much less successful in doing so.

### Trends in Trading Volume

Table 3.8 documents the growth of NYSE volume, turnover and average trade size. Turnover has approximately tripled in the last decade, rising from 21 percent in 1977 to 64 percent in 1986. Average trade size has also come close to tripling, increasing from 641 shares to 1,881 shares in the same time period. The 1986 turnover figure is not a historical peak. It is not close to the 172 percent mark of 1900, and it is below the figures recorded during the first three decades of the century. Of course, there were far fewer shares outstanding then.

The growth in trading volume and average trade size has been fueled by the concurrent growth of block trading, which was virtually non-existent 20 years ago, but now accounts for 50 percent of all volume today (see Table 3.9).

Over-the-counter trading has also gained in relative importance in recent years, as Table 3.10 points out. In 1975, only a third as many shares traded each day on the OTC market as on the NYSE. Today, the two markets are much closer in trading volume, with OTC daily share volume about four-fifths that on the NYSE.

Finally, the volume of trading on international markets has grown relative to that in the United States, as can be seen in Figure 3.11. As recently as 1985, 58 percent of total worldwide trading volume, measured in U.S. dollars, took place on U.S. markets, with the Japanese and U.K. markets handling only 18 percent and 4 percent respectively. By July 1987, the U.S. markets share of worldwide trading had fallen to 41 percent while Japan and the U.K. had increased to 31 percent and 14 percent, respectively. Most of the increase in the U.K. is "legitimate" and is attributable to the recent "Big Bang" deregulation of markets there. A good portion of the Japanese growth, however, is simply a consequence of the falling value of the dollar relative to the yen, since all the figures in the table refer to dollar volumes. Also, the U.S. loss of "market share" was more than offset by a huge growth in total volume, which rose overall from \$0.6 trillion in 1982 to \$2.5 trillion on an annualized basis in 1987.

### The Emergence of Derivative Products

The last few years have seen the development of large markets for stock index futures, index options and options on index futures. Table 3.12 details the growth of both the index futures market as a whole and the most popular contract, which is based on the S&P 500 index. In 1987, the trading volume on the S&P 500 contract alone reached 20.55 million



contracts on an annualized basis. Since each contract is worth 500 times the value of the underlying index, the dollar volume of this trading (using an S&P index price of 250) is \$2.5 trillion. This is roughly equivalent to the dollar volume of trading on the U.S. stock market, which as noted, represents 41 percent of the world's total trading volume.

Table 3.13 illustrates the growth of options on stock indexes and index futures, highlighting the growth of the most popular group of options, those on the S&P 100 index. In 1987, these S&P 100 options contracts alone have been trading at an annualized rate of over 100 million contracts.

## Corporate Finance

The recent wave of takeovers, leveraged buyouts and financial restructurings has significantly altered the balance sheets of U.S. corporations. Table 3.14 gives the data on net corporate purchases of equity from 1975 through the first half of 1987. From 1975 to 1983, companies were net issuers of an average of \$6.3 billion in new equity each year.

From 1984 to June 1987, companies were net buyers of an average of \$78.4 billion each year. Those repurchases reduced the net supply of equity by \$275 billion in three-and-a-half years.

## Stockholder and NYSE Member Firm Leverage

Table 3.15 looks at the capital of NYSE member firms and calculates the ratios of their capital to market value and to annual dollar trading volume. The former ratio has approximately tripled in the past several years, rising from 0.5 percent in 1980 to 1.4 percent in 1987. However, the latter ratio, which is probably a better measure of member firm capital adequacy, has remained fairly stable. The reason for this apparent anomaly is the rapid increase in stock turnover, which has also tripled in recent years (see Table 3.8).

Finally, Table 3.16 shows securities industry margin debt as a percentage of the collateral securing it. This ratio has remained quite stable over time, and was most recently at 32.6 percent.

TABLE 3.1.—BREAKDOWN OF CONTROL OF U.S. EQUITY

[Billions of dollars, except ratios]

|  | 1981      | 1982      | 1983      | 1984      | 1985      | 1986:I    | II        | III       | IV        | 1987:I    | II        |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Total market value <sup>1</sup> .....  | \$1,504.9 | \$1,720.9 | \$2,021.9 | \$2,021.5 | \$2,584.3 | \$2,876.7 | \$3,068.4 | \$2,836.3 | \$2,948.0 | \$3,521.1 | \$3,623.7 |
| Amount controlled by pensions <sup>1</sup> .....                                   | \$266.3   | \$322.2   | \$403.2   | \$405.2   | \$513.4   | \$593.4   | \$627.0   | \$580.6   | \$606.6   | \$711.0   | \$739.1   |
| Percent of total.....  | 17.7      | 18.7      | 19.9      | 20.0      | 19.9      | 20.6      | 20.4      | 20.5      | 20.6      | 20.2      | 20.4      |
| Amount controlled by households, personal trusts and nonprofits <sup>1</sup> ..... | \$1,049.4 | \$1,175.0 | \$1,324.5 | \$1,320.6 | \$1,687.0 | \$1,833.0 | \$1,955.1 | \$1,792.9 | \$1,844.8 | \$2,215.9 | \$2,251.7 |
| Percent of total.....  | 69.7      | 68.3      | 65.5      | 65.3      | 65.3      | 63.7      | 63.7      | 63.2      | 62.6      | 62.9      | 62.1      |
| Amount controlled by foreign sector .....  | \$64.4    | \$76.3    | \$96.4    | \$94.6    | \$124.1   | \$143.0   | \$160.4   | \$155.7   | \$167.4   | \$209.4   | \$223.8   |
| Percent of total.....  | 4.3       | 4.4       | 4.8       | 4.7       | 4.8       | 5.0       | 5.2       | 5.5       | 5.7       | 5.9       | 6.2       |
| Amount controlled by mutual funds .....  | \$37.4    | \$49.4    | \$74.4    | \$80.6    | \$113.7   | \$140.9   | \$150.8   | \$148.1   | \$161.2   | \$195.6   | \$210.1   |
| Percent of total.....  | 2.5       | 2.9       | 3.7       | 4.0       | 4.4       | 4.9       | 4.9       | 5.2       | 5.5       | 5.6       | 5.8       |

<sup>1</sup> Does not include mutual fund shares.

Source: Federal Reserve Board

TABLE 3.2.—ASSETS OF HOUSEHOLDS, PERSONAL TRUSTS AND NONPROFITS

[Billions of dollars, except ratios]

|   | 1981      | 1982      | 1983      | 1984      | 1985       | 1986:I     | II         | III        | IV         | 1987:I     | II         |
|---|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|
| Total assets .....                                    | \$7,118.3 | \$7,679.8 | \$8,461.8 | \$9,040.7 | \$10,143.7 | \$10,546.9 | \$10,862.2 | \$10,824.8 | \$11,086.4 | \$11,689.6 | \$11,926.5 |
| Mutual fund shares .....                              | \$52.6    | \$66.7    | \$98.0    | \$117.7   | \$203.0    | \$259.3    | \$297.2    | \$322.5    | \$365.5    | \$431.6    | \$441.2    |
| Other equity .....                                    | \$1,049.4 | \$1,175.0 | \$1,324.5 | \$1,320.6 | \$1,687.0  | \$1,833.0  | \$1,955.1  | \$1,792.9  | \$1,844.8  | \$2,215.9  | \$2,251.7  |
| Equity ratio (including mutual funds) (percent) ..... | 15.5      | 16.2      | 16.8      | 15.9      | 18.6       | 19.8       | 20.7       | 19.5       | 19.9       | 22.6       | 22.6       |

Source: Federal Reserve Board.

TABLE 3.3.—PENSION FUND ASSETS

[Billions of dollars, except ratios]

|  | 1981    | 1982    | 1983    | 1984    | 1985    | 1986:I  | II      | III     | IV      | 1987:I    | II        |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|-----------|
| A. Private pension funds:                                    |         |         |         |         |         |         |         |         |         |           |           |
| Total assets.....  | \$486.7 | \$567.2 | \$668.5 | \$694.5 | \$837.9 | \$909.6 | \$937.1 | \$924.2 | \$939.3 | \$1,070.3 | \$1,109.6 |
| Mutual fund shares.....                                      | \$4.1   | \$4.2   | \$7.0   | \$8.8   | \$19.1  | \$20.9  | \$22.4  | \$23.7  | \$25.0  | \$26.5    | \$28.5    |
| Other equity.....  | \$218.5 | \$262.0 | \$313.6 | \$308.7 | \$393.3 | \$457.6 | \$477.9 | \$438.7 | \$456.4 | \$547.4   | \$564.5   |
| Equity ratios (including mutual funds shares) (percent)..... | 45.7    | 47.0    | 48.0    | 45.7    | 49.2    | 52.6    | 53.4    | 50.0    | 51.3    | 53.6      | 53.8      |
| B. State and local government employee retirement funds:     |         |         |         |         |         |         |         |         |         |           |           |
| Total assets.....  | \$224.2 | \$262.5 | \$311.2 | \$356.6 | \$404.7 | \$428.8 | \$451.0 | \$450.1 | \$469.5 | \$486.9   | \$503.0   |
| Corporate equities.....                                      | \$47.8  | \$60.2  | \$89.6  | \$96.5  | \$120.1 | \$135.8 | \$149.1 | \$141.9 | \$150.2 | \$163.6   | \$174.6   |
| Equity ratio (percent).....                                  | 21.3    | 22.9    | 28.8    | 27.1    | 29.7    | 31.7    | 33.1    | 31.5    | 32.0    | 33.6      | 34.7      |

Source: Federal Reserve Board

TABLE 3.4.—FOREIGN SECTOR ASSETS

[Billions of dollars, except ratios]

|                             | 1981    | 1982    | 1983    | 1984    | 1985    | 1986:I  | II      | III     | IV      | 1987:I    | II        |
|-----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|-----------|
| Total U.S. assets.....      | \$394.5 | \$388.3 | \$466.3 | \$625.2 | \$772.9 | \$828.3 | \$885.8 | \$932.9 | \$974.1 | \$1,067.0 | \$1,106.5 |
| U.S. equities.....          | \$64.4  | \$76.3  | \$96.4  | \$94.6  | \$124.1 | \$143.0 | \$160.4 | \$155.7 | \$167.4 | \$209.4   | \$223.8   |
| Equity ratio (percent)..... | 16.3    | 19.6    | 20.7    | 15.1    | 16.1    | 17.3    | 18.1    | 16.7    | 17.2    | 19.6      | 20.2      |

Source: Federal Reserve Board

TABLE 3.5.—MUTUAL FUNDS ASSETS

[Billions of dollars, except ratios]

|                             | 1981   | 1982   | 1983    | 1984    | 1985    | 1986:I  | II      | III     | IV      | 1987:I  | II      |
|-----------------------------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Total assets.....           | \$59.8 | \$76.9 | \$112.1 | \$136.7 | \$240.2 | \$299.7 | \$340.2 | \$367.7 | \$413.5 | \$485.0 | \$498.5 |
| U.S. equities.....          | \$37.4 | \$49.4 | \$74.4  | \$80.6  | \$113.7 | \$140.9 | \$150.8 | \$148.1 | \$161.2 | \$195.6 | \$210.1 |
| Equity ratio (percent)..... | 62.5   | 64.2   | 66.4    | 59.0    | 47.3    | 47.0    | 44.3    | 40.3    | 39.0    | 40.3    | 42.1    |

Source: Federal Reserve Board

TABLE 3.6.—PERCENTAGE OF INDIVIDUAL INVESTORS OWNING EQUITIES

|           | Percent owning shares in— |                |               |                 |
|-----------|---------------------------|----------------|---------------|-----------------|
|           | Mutual funds              | NYSE companies | OTC companies | Other companies |
| 1981..... | 15.6                      | 80.9           | 30.9          | 10.0            |
| 1983..... | 23.9                      | 75.5           | 29.6          | 5.6             |
| 1985..... | 30.3                      | 69.7           | 23.0          | 8.9             |

Source: NYSE individual investor surveys.

TABLE 3.7.—COMMISSIONS PAID BY INSTITUTIONS AND INDIVIDUALS ON STOCK TRANSACTIONS

[Cents per share]

|                               | Institutions | Individuals                              |
|-------------------------------|--------------|--|
| April 1975 <sup>1</sup> ..... | 26.0         | 30.0                                     |
| 1976 .....                    | 18.0         | 28.9                                     |
| 1977 .....                    | 14.3         | 26.7                                     |
| 1978 .....                    | 12.6         | 27.0                                     |
| 1979 .....                    | 11.9         | 27.1                                     |
| 1980 .....                    | 12.2         | 26.9                                     |
| 1981 <sup>2</sup> .....       | 11.6         | 26.6                                     |
| 1986 <sup>3</sup> .....       | 7.5          | <sup>4</sup> 60.0<br><sup>5</sup> [10.0] |

<sup>1</sup> April 1975 represents pre-deregulation commissions.<sup>2</sup> SEC data only available through 1981.<sup>3</sup> Estimated by McKinsey and Company.<sup>4</sup> Full service brokers.<sup>5</sup> Discount brokers.

Source: SEC, McKinsey &amp; Co.

TABLE 3.8.—ANNUAL VOLUME, TURNOVER AND AVERAGE TRADE SIZE ON NYSE

|                         | Reported volume (millions of shares) | Percent turnover | Average trade size (shares) |
|-------------------------|--------------------------------------|------------------|-----------------------------|
| 1900 <sup>1</sup> ..... | 102.4                                | 172              | —                           |
| 1910 <sup>1</sup> ..... | 161.1                                | 127              | —                           |
| 1920 .....              | 227.6                                | 91               | —                           |
| 1930 .....              | 810.6                                | 67               | —                           |
| 1940 .....              | 207.6                                | 14               | —                           |
| 1950 .....              | 524.8                                | 23               | —                           |
| 1960 .....              | 766.7                                | 12               | —                           |
| 1970 .....              | 2,937.4                              | 19               | 388                         |
| 1975 .....              | 4,693.4                              | 21               | 495                         |
| 1976 .....              | 5,360.1                              | 23               | 559                         |
| 1977 .....              | 5,273.8                              | 21               | 641                         |
| 1978 .....              | 7,205.1                              | 27               | 717                         |
| 1979 .....              | 8,155.9                              | 28               | 787                         |
| 1980 .....              | 11,352.3                             | 36               | 872                         |
| 1981 .....              | 11,853.7                             | 33               | 1,013                       |
| 1982 .....              | 16,458.0                             | 42               | 1,305                       |
| 1983 .....              | 21,589.6                             | 51               | 1,434                       |
| 1984 .....              | 23,071.0                             | 49               | 1,781                       |
| 1985 .....              | 27,510.7                             | 54               | 1,878                       |
| 1986 .....              | 35,680.0                             | 64               | 1,881                       |

<sup>1</sup> Excludes unlisted trading, which was discontinued in 1910.

Source: NYSE Factbook.

TABLE 3.9.—GROWTH OF BLOCK TRADING, NYSE

|           | Total block trades | Percent of total share volume |
|-----------|--------------------|-------------------------------|
| 1965..... | 2,171              | 3.1                           |
| 1970..... | 17,217             | 15.4                          |
| 1975..... | 34,420             | 16.6                          |
| 1976..... | 47,632             | 18.7                          |
| 1977..... | 54,275             | 22.4                          |
| 1978..... | 75,036             | 22.9                          |
| 1979..... | 97,509             | 26.5                          |
| 1980..... | 133,597            | 29.2                          |
| 1981..... | 145,564            | 31.8                          |
| 1982..... | 254,707            | 41.0                          |
| 1983..... | 363,415            | 45.6                          |
| 1984..... | 433,427            | 49.8                          |
| 1985..... | 539,039            | 51.7                          |
| 1986..... | 665,587            | 49.9                          |

Source: NYSE Factbook.

TABLE 3.10.—GROWTH OF OVER-THE-COUNTER TRADING RELATIVE TO NYSE

|                | Average daily volume, NYSE (millions) | Average daily volume, NASDAQ (millions) | Ratio, NASDAQ to NYSE |
|----------------|---------------------------------------|---|-----------------------|
| 1975.....      | 19                                    | 6                                       | 0.32                  |
| 1976.....      | 21                                    | 7                                       | 0.33                  |
| 1977.....      | 21                                    | 8                                       | 0.38                  |
| 1978.....      | 29                                    | 11                                      | 0.38                  |
| 1979.....      | 32                                    | 14                                      | 0.44                  |
| 1980.....      | 45                                    | 27                                      | 0.60                  |
| 1981.....      | 47                                    | 31                                      | 0.66                  |
| 1982.....      | 65                                    | 33                                      | 0.51                  |
| 1983.....      | 85                                    | 63                                      | 0.74                  |
| 1984.....      | 91                                    | 60                                      | 0.66                  |
| 1985.....      | 109                                   | 82                                      | 0.75                  |
| 1986.....      | 141                                   | 113                                     | 0.80                  |
| Jan. 1987..... | 188                                   | 152                                     | 0.81                  |

Source: NYSE, NASD Factbooks.

TABLE 3.11.—PROPORTION OF WORLDWIDE EQUITY TRADING VOLUMES BY MARKET <sup>1</sup>

|                         | Total volume (trillions) | Percent—            |             |                      |                   |             |
|-------------------------|--------------------------|---------------------|-------------|----------------------|-------------------|-------------|
|                         |                          | United States share | Japan share | United Kingdom share | West German share | Other share |
| 1982.....               | \$0.8                    | 70                  | 17          | 4                    | 2                 | 7           |
| 1983.....               | 1.5                      | 66                  | 15          | 3                    | 2                 | 14          |
| 1984.....               | 1.5                      | 62                  | 19          | 3                    | 2                 | 14          |
| 1985.....               | 2.1                      | 58                  | 18          | 4                    | 4                 | 16          |
| 1986.....               | 3.8                      | 51                  | 25          | 4                    | 4                 | 16          |
| 1987 <sup>2</sup> ..... | 6.2                      | 41                  | 31          | 14                   | 2                 | 12          |

<sup>1</sup> Translated into U.S. dollars at average annual exchange rates.<sup>2</sup> 1987 data through July 31, annualized.

Source: NYSE, NASD, London Stock Exchange, Tokyo Stock Exchange, Goldman Sachs.

TABLE 3.12.—GROWTH OF STOCK INDEX FUTURES CONTRACTS

|           | Total contracts traded on 11 largest exchanges <sup>1</sup> (millions) | S&P 500 futures contracts traded (millions) |
|-----------|--|---|
| 1982..... | 4.9  | 2.94  |
| 1983..... | 12.8   | 8.10  |
| 1984..... | 18.4   | 12.36                                       |
| 1985..... | 22.2   | 15.06                                       |
| 1986..... | 26.5   | 19.51                                       |
| 1987..... | N/A  | <sup>2</sup> 20.55                          |

<sup>1</sup> Includes NYSE Composite, S&P 500, Value Line and MMI.

<sup>2</sup> Annualized, based on data through October 31.

Source: Futures Industry Association, Chicago Mercantile Exchange.

TABLE 3.13.—GROWTH OF INDEX OPTIONS CONTRACTS

|           | Growth of index options and index futures options trading (millions) <sup>1</sup> | S&P 100 index options contracts traded (millions) |
|-----------|---|---|
| 1983..... | 15.0  | <sup>2</sup> 10.60                                |
| 1984..... | 78.4  | 64.29   |
| 1985..... | 115.7   | 90.80   |
| 1986..... | 140.7   | 113.15  |
| 1987..... | —   | <sup>3</sup> 106.17                               |

<sup>1</sup> Includes NYSE Composite, Value Line, MMI, Industrial, S&P 500 and S&P 100 indexes.

<sup>2</sup> Represents 205 trading days—not annualized.

<sup>3</sup> Annualized, based on data through November 31.

Source: Futures Industry Association, CBOE.

TABLE 3.14.—NET CORPORATE STOCK PURCHASES (ISSUES)

[In billions of dollars]

|                      |         |
|----------------------|---------|
| 1975.....            | (9.91)  |
| 1976.....            | (10.53) |
| 1977.....            | (2.73)  |
| 1978.....            | 0.10    |
| 1979.....            | 7.84    |
| 1980.....            | (12.88) |
| 1981.....            | 11.45   |
| 1982.....            | (11.39) |
| 1983.....            | (28.31) |
| 1984.....            | 76.98   |
| 1985.....            | 81.60   |
| 1986.....            | 80.75   |
| 1987 (1st half)..... | 35.00   |

Source: Ned Davis Research, Inc.



TABLE 3.15.—MEMBER FIRM CAPITAL, NYSE

|              | Capital of<br>NYSE<br>member firms<br>(millions) | Percent—   |  |
|--------------|--|--|--|
|              |  | Capital to<br>market value<br>ratio <sup>1</sup> | Capital to<br>trading<br>volume <sup>2</sup> |
| End of year: |  |  |  |
| 1971 .....   | \$4,015  | 0.5  | 2.7  |
| 1975 .....   | 3,660  | 0.5  | 2.7  |
| 1976 .....   | 3,913  | 0.5  | 2.4  |
| 1977 .....   | 3,933  | 0.5  | 2.5  |
| 1978 .....   | 4,390  | 0.5  | 2.1  |
| 1979 .....   | 4,999  | 0.5  | 2.0  |
| 1980 .....   | 6,835  | 0.5  | 1.7  |
| 1981 .....   | 8,168  | 0.7  | 2.0  |
| 1982 .....   | 10,779   | 0.8  | 2.1  |
| 1983 .....   | 14,207   | 0.9  | 1.7  |
| 1984 .....   | 16,848   | 1.1  | 2.1  |
| 1985 .....   | 22,039   | 1.1  | 2.2  |
| 1986 .....   | 30,110   | 1.4  | —  |

<sup>1</sup> Defined as capital divided by market value of shares on NYSE.

<sup>2</sup> Defined as capital divided by dollar value of trading.

Source: NYSE Factbook.

TABLE 3.16.—SECURITIES INDUSTRY MARGIN DEBT

|                              | Margin debt |   |
|------------------------------|-------------|---|
|                              | Millions    | As a percentage<br>of collateral<br>securing debt |
| End of year:                 |             |   |
| 1965 .....                   | \$4,990     | 26.0  |
| 1970 .....                   | 4,010       | 30.0  |
| 1975 .....                   | 5,390       | 36.2  |
| 1976 .....                   | 7,960       | 32.7  |
| 1977 .....                   | 9,740       | 36.5  |
| 1978 .....                   | 10,830      | 38.9  |
| 1979 .....                   | 11,450      | 33.2  |
| 1980 .....                   | 14,500      | 32.5  |
| 1981 .....                   | 14,150      | 39.4  |
| 1982 .....                   | 12,980      | 33.4  |
| 1983 .....                   | 22,720      | 36.0  |
| 1984 .....                   | 22,470      | 35.7  |
| 1985 .....                   | 28,390      | 34.3  |
| June 1986 <sup>1</sup> ..... | 32,480      | 32.6  |
| December 1986 .....          | 36,840      | —   |

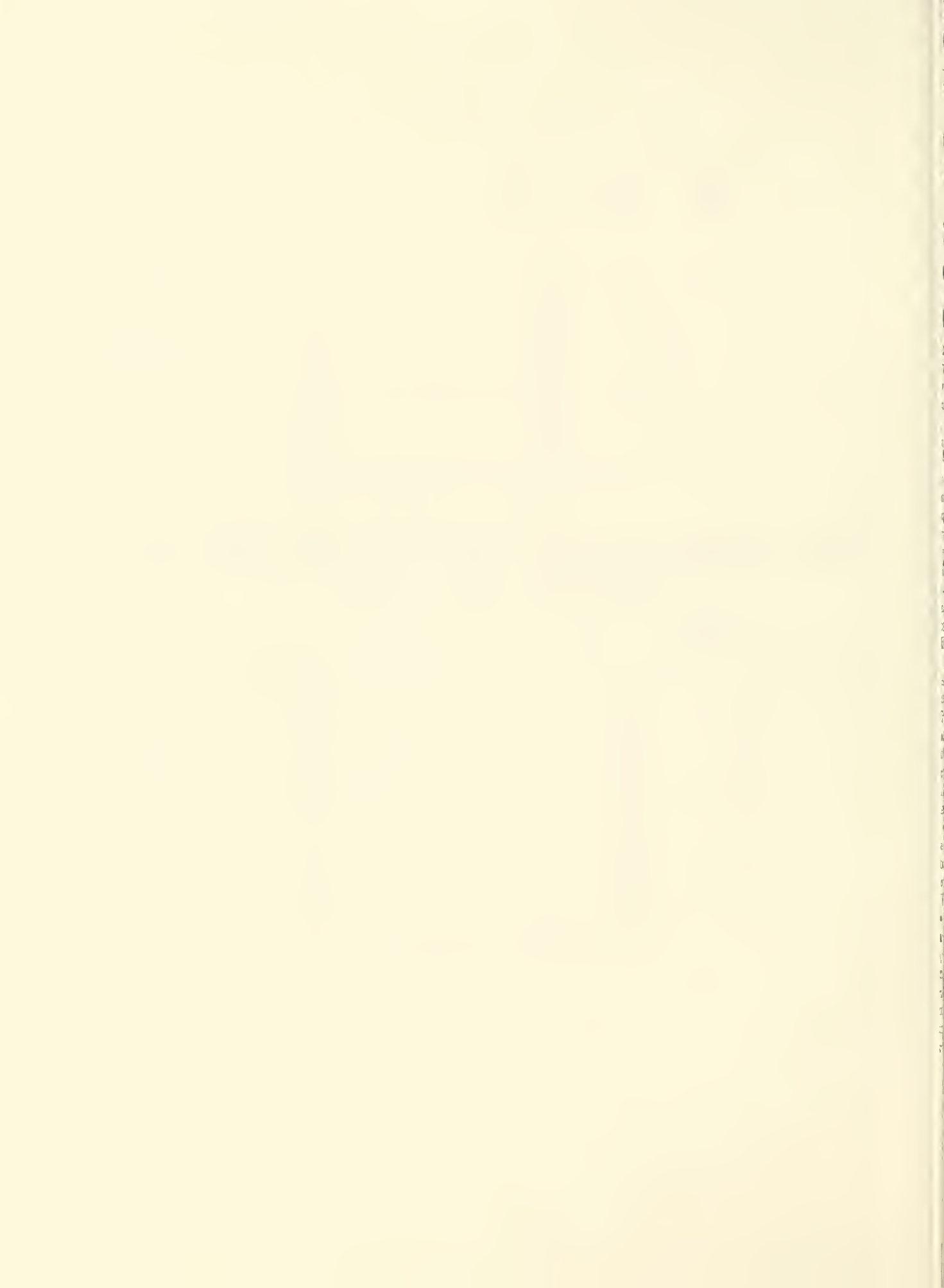
<sup>1</sup> Data on collateral no longer compiled after June 1986.

Source: NYSE Factbook.

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**Study III**  
**The Market Break: October 14, 1987 to**  
**October 20, 1987**

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# Study III

## The Market Break: October 14, 1987 to October 20, 1987

### Introduction

On August 25, 1987, the Dow Jones Industrial Average ("DJIA") reached a record high close of 2,722. The Dow had risen by more than 40 percent during the year, and expectations were favorable toward stocks for the remainder of 1987. In slightly more than two months those expectations were shattered. The unprecedented five year bull market that had more than tripled stock prices was over, ending in the worst week in history for U.S. equities.

The purpose of this study is to examine in detail events in the stock, futures, and options markets during the week of October 14 to October 20, and to focus in particular on the actions and motivations of market participants.

The five trading sessions beginning October 14 were among the most tumultuous and volatile in history. From the closing level of 2,505 recorded on Tuesday, October 13, the DJIA declined by 30.6 percent to 1,738 by the close on the following Monday. On Tuesday, October 20, the DJIA, after a series of wild swings, rallied by over 100 points to 1,841. This pattern was followed by major equity markets around the world.

The prominence during this period of new derivative instruments, such as futures and options on stock market indices, increased investor uncertainty because of their interaction with the stock market. Trading strategies which relied on these new products, coupled with a deteriorating environment for stocks, helped compress trading activity into a few hyperactive days, as equities were revalued on an unprecedented scale. Trading volume on the New York Stock Exchange ("NYSE") and in the Standard and Poor's 500 ("S&P 500") futures pit on the Chicago Mercantile Exchange ("CME") remained at record levels during these five days as a relatively

small group of major institutions intensified their selling activity.

The catalyst for this abrupt shift in market direction was a series of economic and political events which served to reinforce concerns that had developed in the late summer about the market's overvaluation. Fueled by weak currency and bond markets in late August and early September, the DJIA had slid to 2,480. Although the total return on stocks continued to outstrip that of bonds, by August the relative yield on stocks was at an historic low to the yield on bonds, which sent a warning to investors (see Figure 1). In addition, investors were being asked to absorb, domestically and internationally, a record amount of new equity issues.

A rally in late September—including a one-day advance of more than 75 points in the DJIA—erased these concerns for many investors. They became convinced that the recent decline was simply a correction in the bull market and that new highs in the DJIA were likely in the near future.

Events in early October proved how wrong these convictions were. Bond yields were steadily approaching the psychologically important 10 percent level, while the dollar remained near its record lows. Word circulated in the markets of possible tax law changes that would make take-overs less attractive, sending a chill into a market that had fed on take-over speculation. At the close on Tuesday, October 13, the DJIA had dropped back near its September low, and market participants waited nervously overnight for Wednesday's release of the September U.S. merchandise trade figures—an important economic barometer.

What follows is a day-by-day account of the major events and the actions of investors that moved the markets from Wednesday, October 14 through Tuesday, October 20.

## Wednesday, October 14

Several events which occurred from Wednesday, October 14 through Friday, October 16 appear to have been the catalysts for the October 19 market crash. On Wednesday morning at 8:30 a.m. (all time references are to Eastern Time), the Commerce Department announced that the U.S. merchandise trade deficit for August amounted to \$15.7 billion, compared to a market expectation of \$14 billion to \$14.5 billion. Immediately, the dollar fell sharply in the foreign exchange markets from 144 yen to 142.50 yen and from 1.8231 marks to 1.8050 marks. The bond market reaction was also negative, as the bellwether 30-year Treasury bond fell in price by  $\frac{2}{32}$  of a point, pushing the yield up close to 10 percent (see Appendix, Figure 2). These two markets, which are closely watched by equity investors, were the only domestic ones then open.

The foreign currency market is important due to the growing influence in the U.S. markets of foreign investors whose investment return is dependent not just on the movement in stock prices, but also on the movement in currency rates. A falling dollar heightens fears among U.S. investors that foreign investors will sell their dollar-denominated securities, forcing prices down (see Appendix, Figures 3 and 4).

Movements in bond yields are important to equity investors for three reasons. First, many market participants use valuation models which compare the expected returns on bonds and stocks. By Wednesday, October 14, most of these models were indicating that stocks were overvalued relative to bonds. A further decline that morning in bond prices exacerbated this valuation discrepancy. Second, a rise in interest rates can slow the growth of the economy and thereby slow corporate earnings. Finally, higher interest rates would make the financing of leveraged buyouts more costly. That, in turn, could reduce corporate takeover activity, which had helped fuel the bull market in stocks.

Compounding the financial market uncertainty was the news late Tuesday of pending legislation in the House Ways and Means Committee that would effectively eliminate the current tax benefits associated with leveraged buyouts and impose a tax on "greenmail" profits. Rumors of this news had already led to a five percent decline in selected takeover stocks since October 9 (see Appendix, Figures 5 and 6). These highly visible and volatile stocks had often led the market up as widespread takeover activity led market participants to invest in stocks on the expectation that they might be acquired at handsome premiums to their market value. Such investment began to take place across the board, pushing up the market in general.

As fears spread on Wednesday and Thursday that the adoption of the proposed legislation was possible, the suddenly less attractive takeover stocks continued to fall more rapidly than the market. In fact, on Tuesday, October 20, the takeover stocks fell an additional five percent to their lows for this period, while the DJIA registered a one-day record advance of more than 100 points. In part, this underperformance by the takeover stocks may also have been tied to rumors beginning on Friday, October 16, that a number of firms, known as risk arbitrageurs, that invest in the securities of potential takeover candidates had to meet large margin calls. When prices started to fall these firms were left with two choices: putting up additional capital or selling their shares. The firms' inability or reluctance to meet these margin calls contributed to the selling of takeover stocks.

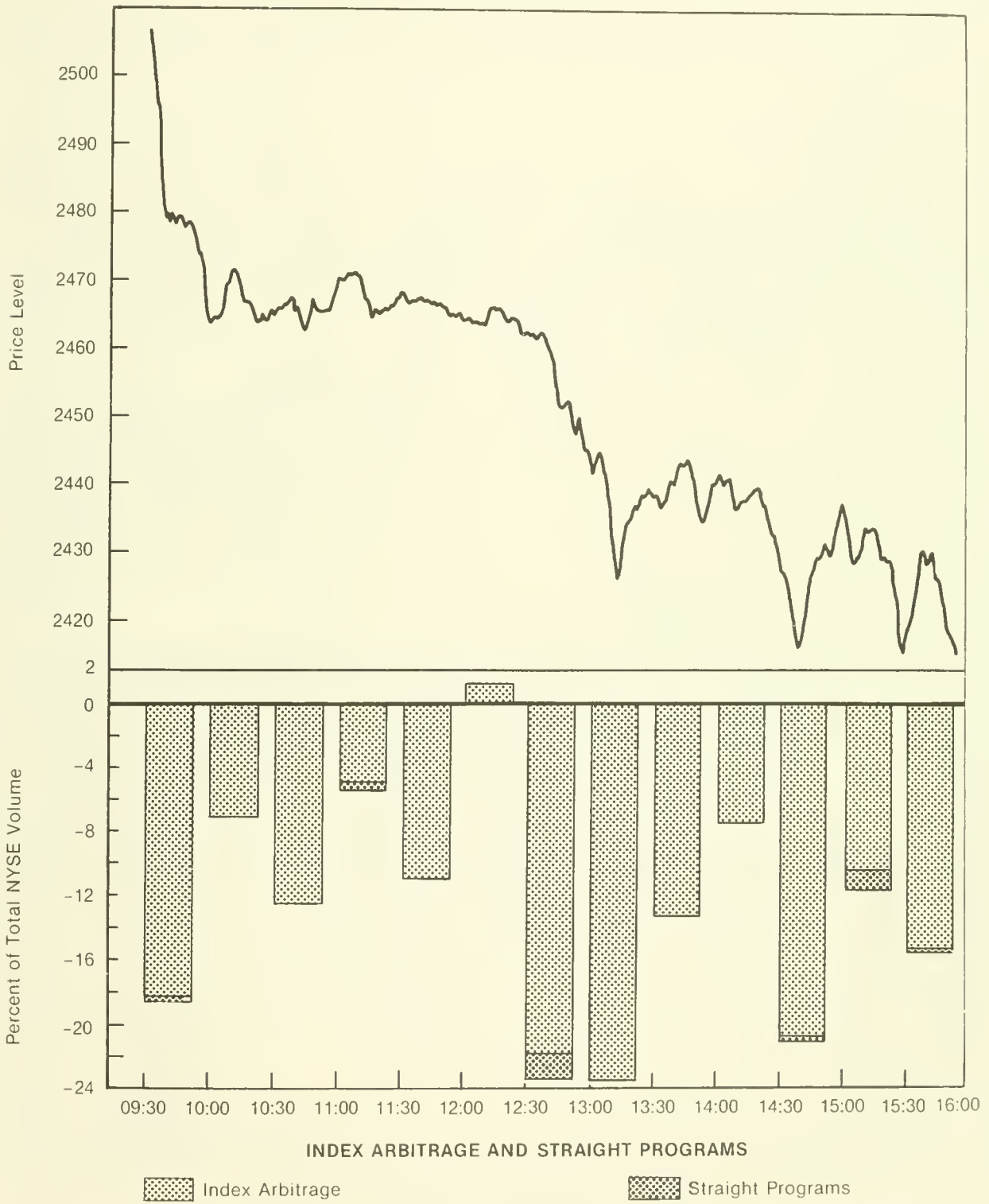
An additional alternative for the risk arbitrageurs was to hedge their positions by selling in-the-money call options on their takeover stocks. The premium received for the calls would protect the risk arbitrageurs from a moderate decline in the market. However, as the market tumbled and the stocks declined through the strike price of these calls, the existence of short call positions did not provide downside price protection. This served to concentrate the selling pressure in these stocks and, at times, the takeover stocks led the market down. By 9:00 a.m. Wednesday morning, trading-oriented investors were faced with the news of both the trade deficit figure and proposed House Ways & Means Committee tax bill and braced themselves for a tough market opening (see Charts 1 to 3).

Although the stock market opens at 9:30 each morning, one futures contract, the Major Market Index ("MMI"), opens on the Chicago Board of Trade ("CBT") at 9:15 a.m. The MMI is comprised of 20 major stocks and is used by market participants as a leading indicator of the stock market's opening level, even though the MMI market is relatively small, with a low open interest level and minor trading volume. As the MMI opened on Wednesday, 30-year Treasury bond yields had just traded above 10 percent for the first time since November 1985. The reaction in the futures pit was to open the MMI contract at 492.50, a substantial drop of 5.15 points below the Tuesday afternoon closing price.<sup>1</sup> Other futures and equity markets opened down sharply at 9:30 a.m. The most widely-

<sup>1</sup> Although various indices do not necessarily track each other perfectly, there is a reasonably high correlation among them. Thus, generally speaking, a one point move on the MMI futures index translates into a move of about 4.8 points on the DJIA; a move of one point on the S&P futures contract is equal to a move of about eight points on the DJIA.

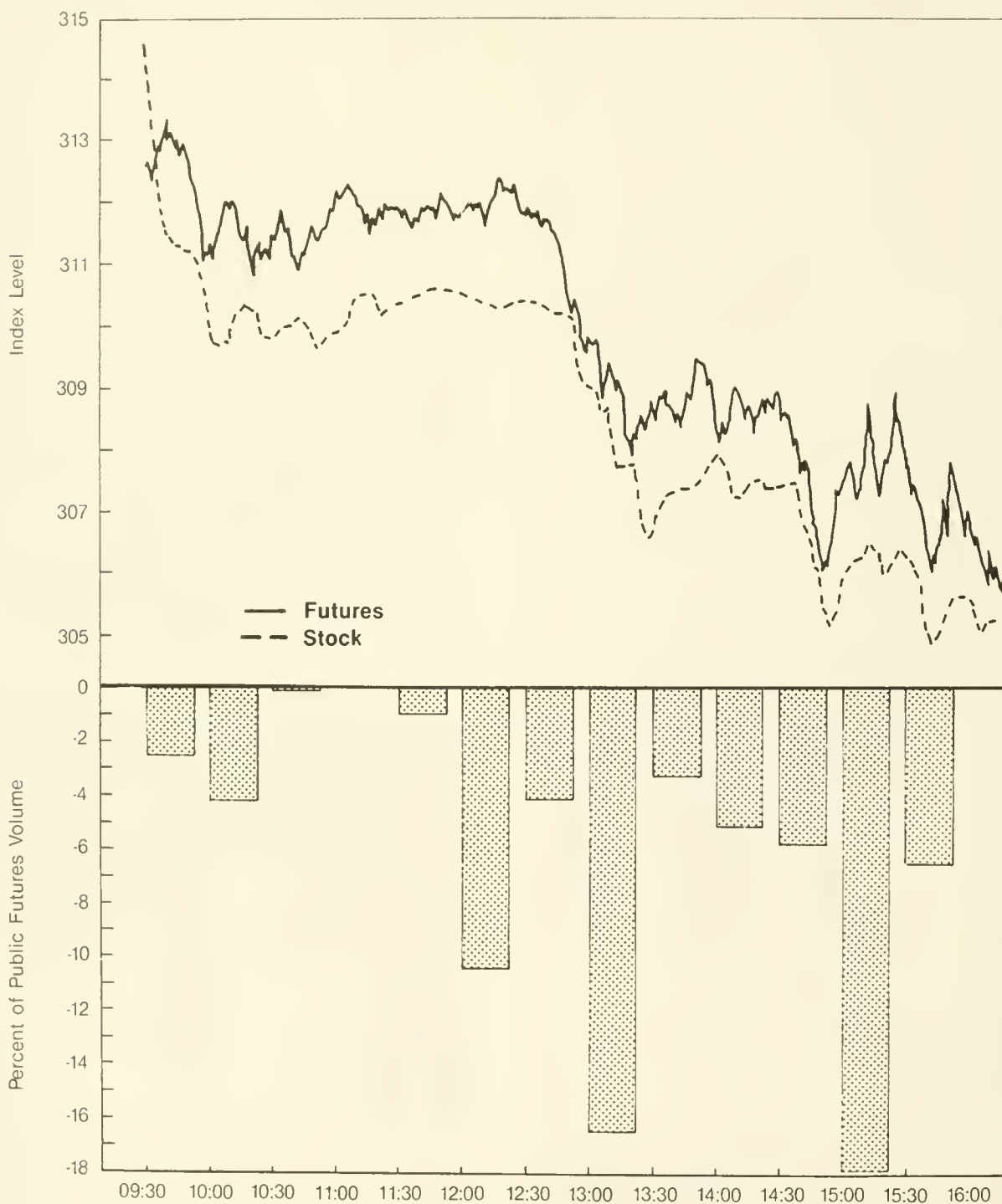


Chart 1  
**DOW JONES INDUSTRIAL ONE MINUTE CHART**  
 Wednesday, October 14, 1987



## Chart 2 S & P INDEX AND FUTURES CONTRACT

Wednesday, October 14, 1987

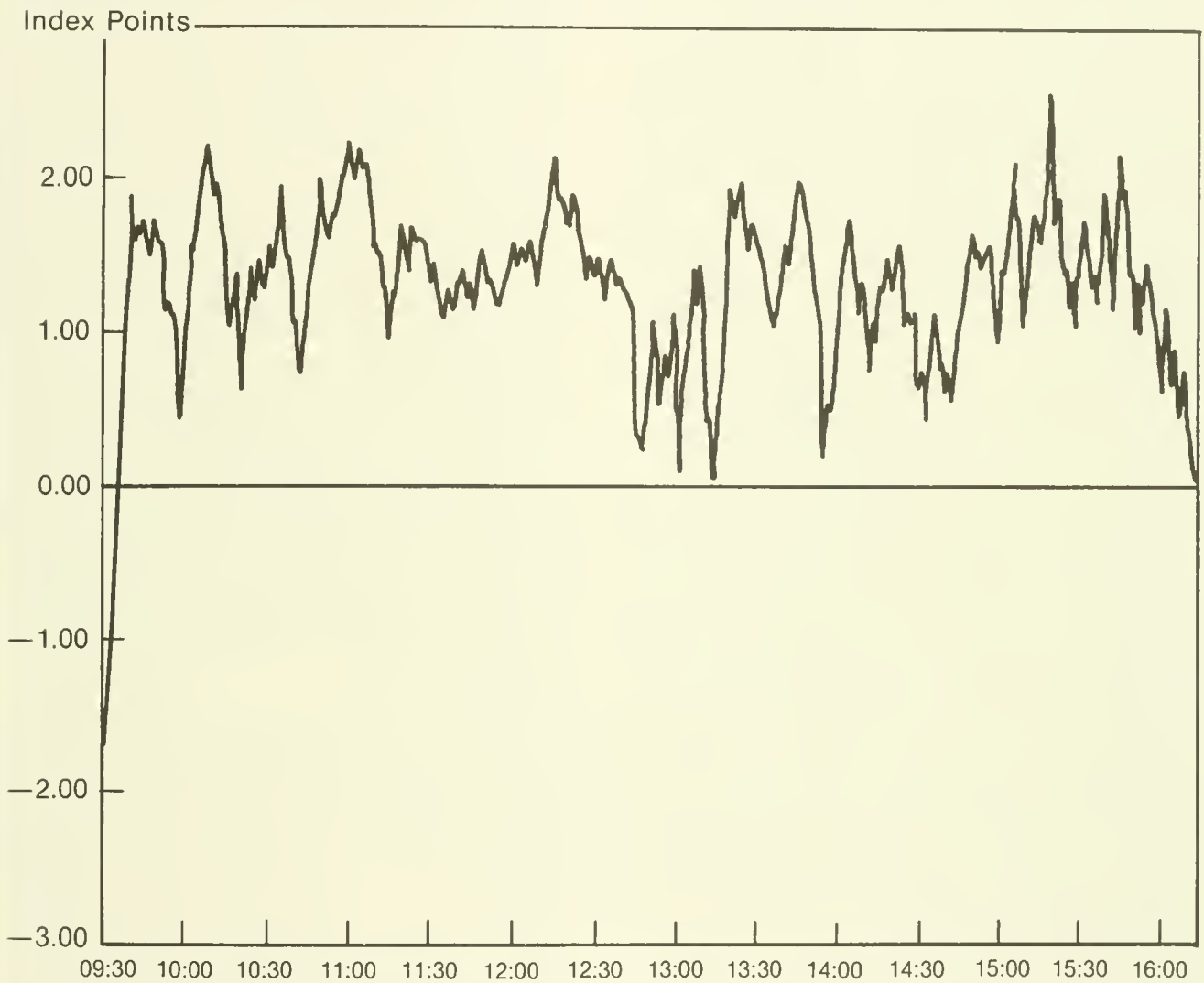


PORTFOLIO INSURANCE SALES AND PURCHASES

Chart 3

# S & P INDEX AND FUTURES CONTRACT SPREAD

Wednesday, October 14, 1987



followed stock index futures contract at the time was the S&P 500 December futures contract ("Contract"), which trades primarily on the Chicago Mercantile Exchange. The Contract declined 3.3 points to 312.35 at the opening (it would trade as low as 181.00 by Tuesday, October 20). The DJIA dropped 35 points at the opening of trading to the 2,473 point level, falling below the lows of September. Many trading-oriented investors believe that once a market has declined and then risen again as the stock market had in September, the lowest point of the move provides a support level in the future. If this support level is subsequently violated, it represents a sign of weakness. Therefore, when the DJIA broke through its September low point of 2,480, many technical trading-oriented investors, who use a variety of stock price movement theories to guide their investments, reacted by selling stock and stock index futures.

On the Chicago Mercantile Exchange, the negative market expectations resulted in selling by trading-oriented investors, who were betting on the direction of the market. During the first hour of trading, these investors accounted for 18 percent of trading activity. The price of the Contract fell below the technically important 311 level. Due to the sharp downward opening of the Contract, the difference in price, or the spread, between the Contract and the S&P 500 stock index ("Index"), on which the Contract is based, caused a group of trading-oriented investors known as index arbitrageurs to begin buying the Contract and selling stocks that make up the Index.<sup>2</sup>

This index arbitrage can be done by utilizing many different stocks and derivative securities. In addition to using the Contract and the Index, arbitrageurs commonly use the MMI and the 20 stocks it represents as well as Chicago Board Options Exchange's option on the S&P 100 ("OEX") and the 100 stocks which it represents.

The buying of S&P 500 futures by the index arbitrageurs caused the Contract to rally to the 313.40 level, its high for the day. The arbitrage activity resulted in the sale of at least \$200 million in baskets of stock, 16 percent of the first half hour's volume (see Appendix, Figures 7 to 11). By 10 a.m.,

<sup>2</sup> Index arbitrage is a trading strategy by which investors purchase or sell stocks comprising an index and establish offsetting positions in derivative stock index futures or options, when the difference or spread between the price of the index and the price of the derivative is greater or less than fair value. At fair value, the spread equals the difference between a risk-free rate of return (i.e., Treasury bills) and the dividend yield of the stocks comprising the index. In other words, at fair market value an investor would be indifferent to owning risk-free securities or engaging in index arbitrage. In essence, the arbitrageurs take advantage of the spreads that periodically open up between equities, futures and options markets by buying in the lowest-priced market and selling in the highest-priced market. While an attempt is made to execute simultaneously both sides of the arbitrage, the trader runs some risk in both marketplaces in attempting to carry out his strategy.

the futures discount had disappeared, largely because of arbitrage activity.

After the first hour of trading, the DJIA had fallen to 2,464, down 44 points on the day. Between 10:30 a.m. and noon, the stock market drifted sideways with the DJIA unchanged. There was little index arbitrage activity during this period.

The price of the Contract dropped sharply from 312.25 to 308.00 between 12:15 p.m. and 1:15 p.m., largely as a result of selling by portfolio insurers. This selling pressure pushed the Contract back to a discount to the Index and, as in the morning, index arbitrageurs entered the market to bring the prices back into line. Index arbitrageurs bought futures and sold stock worth approximately \$300 million, or a striking 30 percent of the total stock volume this hour. By 1:15 p.m. the DJIA had dropped 75 points to a level approximately 10 percent below the August peak. This important technical level helped to support the market psychologically for much of the afternoon, and the DJIA changed little from 1:15 p.m. to 3:30 p.m. But the market's inability to rally from this support level began to create selling pressure late in the afternoon. The volume of block trades of 100,000 shares or more increased during the afternoon, suggesting that institutional investors were beginning to reevaluate their equity positions. Between 3:30 p.m. and 4:00 p.m. index arbitrageurs were again active, selling \$120 million in stocks or 14 percent of the volume. During this time period, the DJIA fell 17 points.

The DJIA closed at 2,412, down 95 points—then its largest-ever one-day point decline—on volume of 207 million shares. Index arbitrage stock selling activity accounted for \$1.4 billion, 17 percent of total activity. Of the 207 million shares traded on the New York Stock Exchange, block trades of 10,000 shares or more accounted for 47.6 percent, which is slightly larger than normal. The 20 largest NYSE member firms sold as principal approximately \$689 million net of stocks, or eight percent of total volume, a signal that the members were lightening their inventory positions because of an unfavorable market outlook (see Appendix, Figure 12). Down volume was nine times greater than up volume during the day, which was indicative of a broad base of selling (see Appendix, Figures 13 and 14).

While the stock market closes every day at 4 p.m., the futures market remains open until 4:15 p.m. On Wednesday afternoon, the Contract continued to sell off after 4:00 p.m., suggesting the possibility of heavy arbitrage activity at the opening on Thursday. Overall, trading-oriented accounts in the futures markets sold \$2 billion on Wednesday, which on a gross basis represents 12 percent of the total selling volume. This was nearly four times the activity of any other category except for the market makers in the futures pit at the CME, who are known as locals (see Appendix, Figures 15 to 20).



## Thursday, October 15

After achieving a record-high close in Tokyo on Wednesday, the Nikkei stock average, Japan's equivalent of the DJIA, fell 218 points to the 26,428 level, in reaction to the weakening U.S. bond, currency, and stock markets. In London, the Financial Times ("FTSE") index of 100 stocks, another broad measure of market performance, fell 22 points to the 1,812 level for the same reasons. The performance of these international markets prior to the daily opening of the U.S. markets sends important signals to investors for several reasons. For one, many securities are traded in several international markets, achieving different price levels in each time zone. Moreover, investors, both domestic and foreign, have become major participants in a variety of international markets. Price changes in one market may cause investors to alter their investment decisions in another market (see Appendix, Figure 21). In addition, global investors must decide to which market they will allocate new investment funds. During the month of October, for example, public offerings for British Petroleum and Nippon Telephone & Telegraph absorbed approximately \$50 billion of investors' capital. Several trading-oriented investors have stated that they saw foreign capital withdrawn from the U.S. market because of these two offerings. In addition to these two large foreign offerings, the new issue calendar in the U.S. was extraordinarily heavy, with 285 public stock offerings in registration.

On the foreign exchange markets Thursday morning, the dollar threatened to break through the 1.80 level against the Deutschemark. This approached the bottom of the presumed trading range established under the Louvre accord, reached in February 1987 in Paris by the finance ministers of seven major industrial nations. Consequently, the dollar firmed as trading-oriented investors expected central bank intervention.

Trading in the U.S. bond markets was exceptionally weak in the morning, given the market's expectation of an imminent increase in the discount rate by the Federal Reserve Board. The 30-year Treasury bond opened at a 10.25 percent yield and by 10:30 a.m. was trading at 10.37 percent, when the Federal Reserve Bank of New York surprised the market by announcing overnight system repurchase agreements. This represented an injection of liquidity into the banking system and led bond investors to question their assumptions of a discount rate increase. Because of the early time of the announcement (repurchase activity is normally announced between 11:30 a.m. and 11:45 a.m.), as well as the general perception that the Federal Reserve had been tightening credit to support the dollar, the view spread that the Federal Reserve was caught

between two conflicting objectives: to provide liquidity to a falling stock market at the same time it restricted credit to protect the dollar's value and to extinguish inflationary expectations. Through the rest of Thursday and Friday, 90-day Treasury bill rates fell, reflecting the easier money stance, while longer term rates continued to rise in expectation of tighter credit in the future.

Given the market weakness at Wednesday afternoon's close and during Thursday's Far Eastern and European trading, the S&P 500 futures contract opened down 1.85 points to 303.15 at 9:30 a.m. At 9:45 a.m. the DJIA was at 2,392, 19 points below Wednesday's closing level. During the first half hour, volume on the NYSE was an extremely heavy 48 million shares, with approximately 60 percent of the trading in the form of blocks of 10,000 shares or more. This unusually heavy institutional activity came from foreign investors who were large buyers of stock (see Charts 4 to 6).

Portfolio insurers were heavy sellers early in the day on Thursday in response to Wednesday's market decline. The portfolio insurance vendors use different trading strategies in reacting to volatility in the market. While some investors employing portfolio insurance constantly reevaluate their correct hedge ratios during trading hours, others believe it is less costly to run their models only at the end of the trading day. By lagging the market, these insurers hope to avoid the hedging costs created by intraday volatility. This lagging strategy works well in choppy, trendless markets but can be very expensive when the market moves in the same direction for several trading sessions in a row.

On Thursday morning, this reactive selling of futures contracts by portfolio insurers led to an initial spread between the Contract and the Index of negative 1.50 points compared to fair value of positive 1.75 points. (The spread is the difference between the price of the contract and the underlying index.) In the first half hour of trading, two large foreign speculative accounts and three portfolio insurers sold approximately 2,900 contracts or 15 percent of the total for that period. Much of the futures buying was related to short covering and activity by index arbitrageurs. Index arbitrage selling of stock during this period amounted to \$231 million or 12 percent of total volume. That level of activity is normal for index arbitrage which indicates, given the market weakness, that there were other significant sellers of stock.

The stock and bond markets both rallied between 10:30 a.m. and noon, in part because the activity of the Federal Reserve indicated that there would not be an immediate rise in the discount rate. Many of the large buyers of stock were such non-trading-oriented institutions as pension funds and bank trust departments. These institutions are sometimes

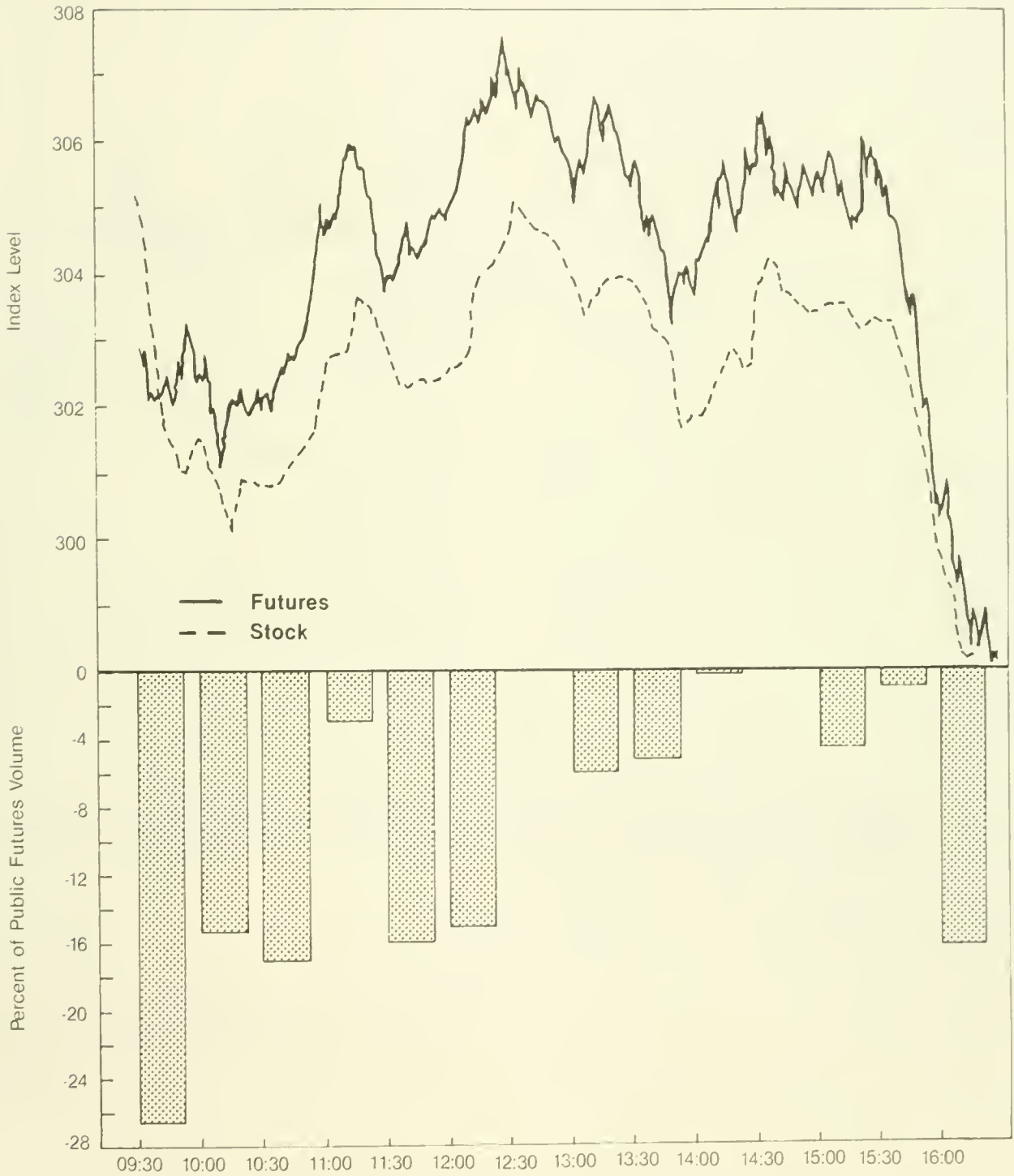


Chart 4  
**DOW JONES INDUSTRIAL ONE MINUTE CHART**  
 Thursday, October 15, 1987



# Chart 5 S & P INDEX AND FUTURES CONTRACT

Thursday, October 15, 1987



PORTFOLIO INSURANCE SALES AND PURCHASES

# Chart 6 S & P INDEX AND FUTURES CONTRACT SPREAD

Thursday, October 15, 1987



referred to as "fundamental buyers." Short coverings in the futures market also helped to fuel the rally. However, at 12:30 p.m., market expectations were disrupted by disappointing news regarding the budget deficit when the Administration stated "that simple prudence should make it possible to meet the 1988 Gramm-Rudman-Hollings deficit reduction target." This statement indicated the Administration was not planning any special deficit cutting effort, and activity in the equity markets slowed immediately as investors analyzed the impact of potentially larger-than-expected domestic deficits. The bond market rally fizzled as well.

Still, by 3:30 p.m., the DJIA was only down four points. Over the last 30 minutes of trading, it would fall another 53 points, as an announcement by the Administration that the dollar could fall further, coupled with increased uncertainty in the bond market about the dollar's already weak condition, led to some equity selling. Broad-based selling in the futures market quickly drove the spread between the stocks and futures to a discount, and index arbitrageurs stepped in and started to buy futures and sell stocks. Their activity led to the sale of \$192 million of stock in the last half hour, which accounted for 19 percent of trading activity during this period.

Also active was the selling of baskets of stocks representing the S&P 500 through the NYSE's Designated Order Turnaround ("DOT") automated execution system (see Appendix, Figures 22 to 26). This practice, often unrelated to index arbitrage activity, is known as straight program selling.<sup>3</sup> This selling accounted for \$100 million of shares sold or 10 percent of total volume. Therefore, total index arbitrage and straight program activity accounted for 29 percent of the last half hour's total volume. By 4:00 p.m. the Dow was down 57 points and the Contract closed even with the underlying Index. This broad, rapid sell-off late in the trading session in the absence of substantive fundamental news confused trading-oriented investors, and many turned negative on the market.

<sup>3</sup> Straight program trading occurs when a large portfolio of stocks is bought or sold as a basket either through the DOT system or manually on the floor of the NYSE. There are no offsetting trades in the futures market, which differentiates this trading from index arbitrage. A typical program trade involves the sale or purchase of one portfolio of stocks weighted in certain industry groups. Program trading is used for its speed and efficiency of execution, lower commission costs and reduced market impact.

Thursday's volume was heavy at 263 million shares with block volume accounting for 51 percent. Overall, arbitrage-related stock sales were a low seven percent of total volume, while total program sales accounted for nine percent of the volume. Both activities were concentrated at the beginning and the end of the trading session. Seven trading-oriented institutions sold a total of \$834 million of stocks, representing approximately nine percent of total volume for the day. Two Japanese investment advisors bought \$284 million of stock, or three percent of total volume. The 10 largest sellers together accounted for \$1.049 billion, or 11.3 percent of the day's volume of transactions. The ten largest buyers accounted for \$1.013 billion, or 10.9 percent (see Appendix, Figure 27).

Illustrating the concentration in the market, the fourth largest seller and the second largest buyer of stock was the same institutional investor. This investor was also the third largest buyer and fourth largest seller in the futures market, and was also active in the options market. This shows that a relatively small number of institutional investors tend to account for a significant amount of trading volume in all three markets. In fact, they often turn up on both sides of the market.

In the futures market, total volume for the day was 125,000 contracts worth \$19 billion. A high concentration of activity was evident, as just five portfolio insurers sold \$968 million contracts, which accounted for nine percent of non-local volume.

Another factor in turning some fundamental investors bearish was a signal flashed at Thursday's close by the Dow Theory, one of the oldest and most widely-watched technical indicators. The Dow Theory holds that a bear market will begin when the stocks of the companies that make goods—those comprising the Dow Jones Industrial Average—and the stocks of the companies that move goods—those comprising the Dow Jones Transportation Index—both begin to break through certain critical levels. On Thursday, the Transportation Index suffered its second largest one-day decline in history, falling 31 points to 980—breaking through its September 21 low of 1,005. At the same time, the DJIA was already trading well below its October 9 low of 2,482. (It finished the day at 2,355.) Complicating the decline of the Transportation Index, many of the stocks of the companies that comprise that index were themselves takeover candidates, and takeover stocks had been adversely affected by Wednesday's Ways and Means announcement. These stocks were especially hard hit on Thursday.



## Friday, October 16

Despite the quick selloff at Thursday's close in New York, trading in Tokyo was relatively quiet with the Nikkei down just 62 points to 26,366 on Friday morning. Because of a hurricane, the London markets were essentially closed, as most market participants were unable to get to their offices.

At 8:00 a.m., reports of an Iranian attack on a U.S.-flagged oil tanker crossed the Dow Jones news wire. The U.S. government announced it was weighing its response to this incident. The growing tension in the Persian Gulf added to the general feeling of uncertainty and at times there were rumors of a war between the U.S. and Iran.

At 9:15 a.m., the MMI opened at 467 to 468, up from 465 the day before. The DJIA opened up 12 points to 2,367. The slightly firmer tone in the first few minutes of trading quickly gave way to selling pressure on the CME. (See Charts 7 to 9.)

One key factor behind this selling pressure was the expiration at the close of trading on Friday of options on the MMI, S&P, and OEX indices as well as futures on the MMI. Due to the expiration, investors must either roll their holdings into a new contract month, or unwind their positions by selling or buying the appropriate security prior to the expiration or at the closing bell. Because of difficulties in the options market, several firms noted for trading heavily in options markets became major participants on both sides of the futures markets. Options trading-oriented investors accounted for seven percent of the gross selling and six percent of gross buying in the futures market during the day; they were net sellers of \$150 million in the futures market.

Normally, options trading-oriented investors are far less active in the futures market. This spillover of trading activity was especially large because the week's fall in stock prices had essentially eliminated all at-the-money options, which meant that investors could not roll their positions into a new contract month. Most listed option strike prices were above the prevailing market levels. Since it became difficult to establish, or to maintain, efficiently hedged positions using options, many options trading-oriented investors shifted their hedging activity to the futures market.

By 11 a.m., the DJIA was down 7 points. Then, new selling entered the futures market as three portfolio insurers sold the equivalent of \$265 million of futures. Futures led the stock market down because, despite the apparent lack of a significant discount between the Contract and the Index, some index arbitrageurs took the other side of the portfolio insurance sellers, buying futures and selling

\$183 million of stock, 18 percent of total New York Stock Exchange volume from 11:00 a.m. to 11:30 a.m. The DJIA fell 30 points during that half hour, then subsequently bounced partially back, aided by index arbitrageurs who reversed their positions, selling futures and buying baskets of stock. The DJIA stood at 2,340 at noon, down 15 points for the day.

The market then plummeted. Between 12:00 p.m. and 2:00 p.m., the DJIA declined by another 70 points to 2,271, or a total drop of 85 points thus far during the day. Index arbitrage activity accounted for sales of \$334 million in stock, or 13 percent of NYSE volume over this period, which indicates significant selling pressure from sources other than index arbitrageurs.

Total index arbitrage and straight program selling over this period accounted for 15 percent of NYSE volume. In addition, the number of large block transactions in the DJIA stocks accounted for approximately half the volume in those stocks. This suggests that large institutions had begun to sell their blocks of stock. A rally caused by investors covering short positions, as well as index arbitrage and straight program buying by technicians responding to what was believed to be a key support level, brought the DJIA back to 2,311.

This technical rally died swiftly, however, and by 2:30 p.m. the spread between the Contract and the Index had widened to its largest discount of the day. Between 2:30 p.m. and 3:30 p.m., \$271 million of stock was sold by index arbitrageurs, representing 18 percent of the volume during that hour. An additional \$31 million of program selling unrelated to arbitrage accounted for another two percent of the volume. At 3:30 p.m., the DJIA level had fallen back to 2,274, 81 points below the previous day's close.

Given the extreme weakness in the stock market thus far that week, trading-oriented investors felt more comfortable establishing short positions before the weekend. Additionally, institutional investors that had been fully invested in equities began to lighten their exposure to the stock market. Specifically, just four investors believed to be fully invested sold \$482 million of stocks during the day.

Between 3:30 p.m. and 3:50 p.m., the DJIA fell another 50 points. Then, in the last ten minutes of trading, it regained 22 points, demonstrating extreme volatility. During this half hour, index arbitrageurs sold \$580 million of stock and portfolio insurers sold \$151 million of stock for a total of \$731 million, accounting for a striking 43 percent of the total NYSE volume. The buy side was made up primarily of trading-oriented investors who were unwinding option hedges.



Chart 7  
**DOW JONES INDUSTRIAL ONE MINUTE CHART**  
 Friday, October 16, 1987

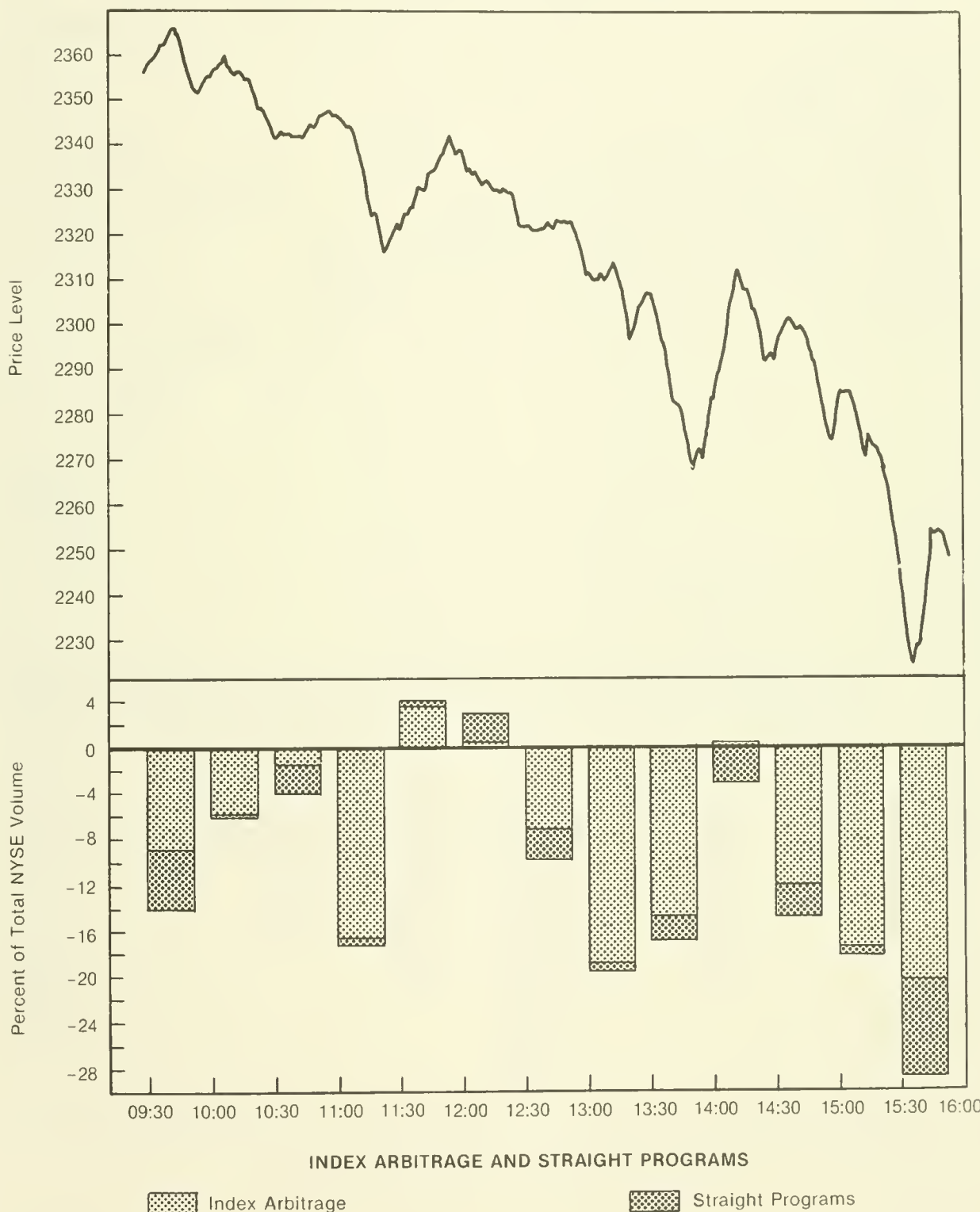


Chart 8  
S & P INDEX AND FUTURES CONTRACT  
Friday, October 16, 1987

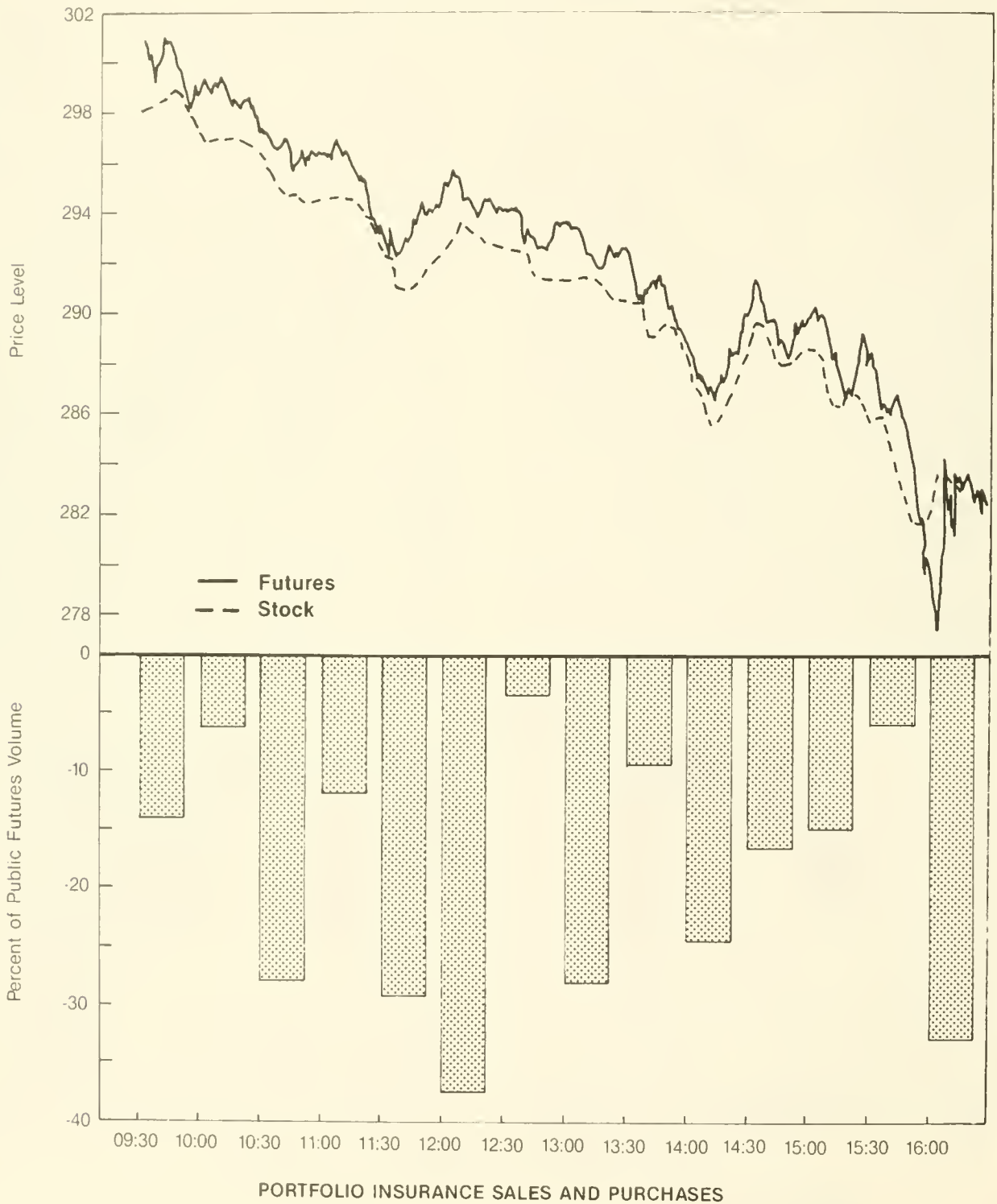


Chart 9

# S & P INDEX AND FUTURES CONTRACT SPREAD

Friday, October 16, 1987



The extreme volatility experienced in the last half hour of trading capped the largest one-week decline in the DJIA to date. The DJIA was now 475 points below its August 25 high, and this 17.5 percent decline represented the Dow's largest correction since the low of 777, registered in August 1982 at the start of the bull market.

Stock-selling activity, while generally broad, was often quite large and concentrated. The top 10 stock sellers accounted for \$1.545 billion worth of stock sales—12.3 percent of total NYSE volume for the day. The top 10 buyers bought \$1.216 billion of stock or 9.7 percent of total volume, but much of this buying represented short covering and was concentrated during large market movements.

The selling in the futures market was partially due to the use of portfolio insurance and other strategies designed to reduce stock market exposure. Five of the top seven net sellers in the futures market were portfolio insurance vendors. Portfolio protection strategies accounted for 11 percent of total selling in the futures market Friday—or about \$2.1 billion—but as a group, portfolio insurers reduced their selling in the early afternoon.

### Monday, October 19

Heading into Monday's trading a number of unsettling signs hung over the market. Over the weekend, numerous news stories had dissected the fragile condition of the U.S. and international capital markets. In its October 17 edition, the influential *Barron's* noted that the Dow had suffered its worst week since May 18, 1940, when a 15 percent fall was brought on by the French armies' crumbling resistance to the German advance. Another important article appeared in the Sunday edition of *The New York Times* quoting Treasury Secretary James Baker as exhorting the West German central bank to ease credit conditions and stimulate that country's economy. He appeared to warn the Bundesbank that if monetary easing in Germany was not forthcoming, the U.S. would feel less inclined to support the dollar in the foreign currency markets. Reacting to press accounts, Japanese and European investors would sell the dollar in early Monday trading.

Moreover, the clear market perception over the weekend was that the portfolio insurers had sold fewer futures contracts than their models had dictated. Therefore, there was the potential for great selling pressure on Monday morning.

In Tokyo overnight, the Nikkei Index dropped 620 points to 25,746. There were sharp declines in Hong Kong and Sydney. Near midday in London, stocks had declined 10 percent, with the FTSE Index down 224 points to 2,077. Trading hours on the London Stock Exchange and the New York Stock Exchange normally overlap for approximately

two hours each day. One explanation for the particularly heavy decline in London was that because that market had been closed on Friday, investors were only now able to fully react to New York's plummeting markets of Thursday and Friday.

Thus, prices of U.S. stocks and bonds trading in London were falling sharply lower on heavy volume early Monday morning New York time. Some U.S. portfolio managers tried to beat the expected selling on the New York Stock Exchange by dumping U.S. shares in the London market. In particular, one mutual fund complex sold \$95 million of its equity portfolio in London prior to New York's opening.

At 8:05 a.m. New York time, sources reported that U.S. forces had responded to Friday's attack by the Iranians on a U.S.-flagged Kuwaiti tanker by bombing Iranian oil platforms in the Persian Gulf. Though a flight by investors to dollar securities in the wake of Gulf tensions might have been expected, fears of the demise of the Louvre currency accord proved stronger, causing the dollar to weaken substantially as foreign currency trading began in New York. The Treasury bond market opened with yields higher, the 30-year bond rising to 10.50 percent, and orders to sell shares of stock flooded the floor of the New York Stock Exchange.

By 9:00 a.m., large sell order imbalances were reported on the NYSE. Prior to 9:30 a.m., there was approximately \$500 million, or 14 million shares, waiting to be sold through the DOT system. Between 9:30 a.m. and 10 a.m., another \$475 million to sell was loaded into DOT. This represented approximately 25 percent of the first half hour's record volume of 51 million shares. Over the next hour, new orders to sell another \$1.1 billion of shares were entered into DOT. This massive selling pressure was accumulating while many major stocks remained closed for trading due to the order imbalances. (See Charts 10 to 12.)

In Chicago, the MMI opened at a price of 430.00, dropping 11 points, or 2.5 percent, from Friday afternoon's already weak close. On the CME, the portfolio insurers, that had fallen behind in their selling programs on Friday, reacted quickly, selling in excess of 3,000 Contracts in the first half hour. This activity was 18 percent of the total volume traded in the time period and 24 percent of the non-local volume.

At 9:45 a.m. the DJIA was off 21 points. Because most of the DJIA stocks did not open on time, the average was based in part on Friday's closing prices. Selling pressure was intense from mutual funds and index arbitrage trading-oriented investors. One mutual fund complex sold \$500 million in the first half hour, representing 25 percent of the volume. At least 6.2 million shares, or 12 percent of total volume, were sold by index arbitrageurs in the first half hour. At this point on Monday, the apparent

Chart 10  
**DOW JONES INDUSTRIAL ONE MINUTE CHART**  
 Monday, October 19, 1987

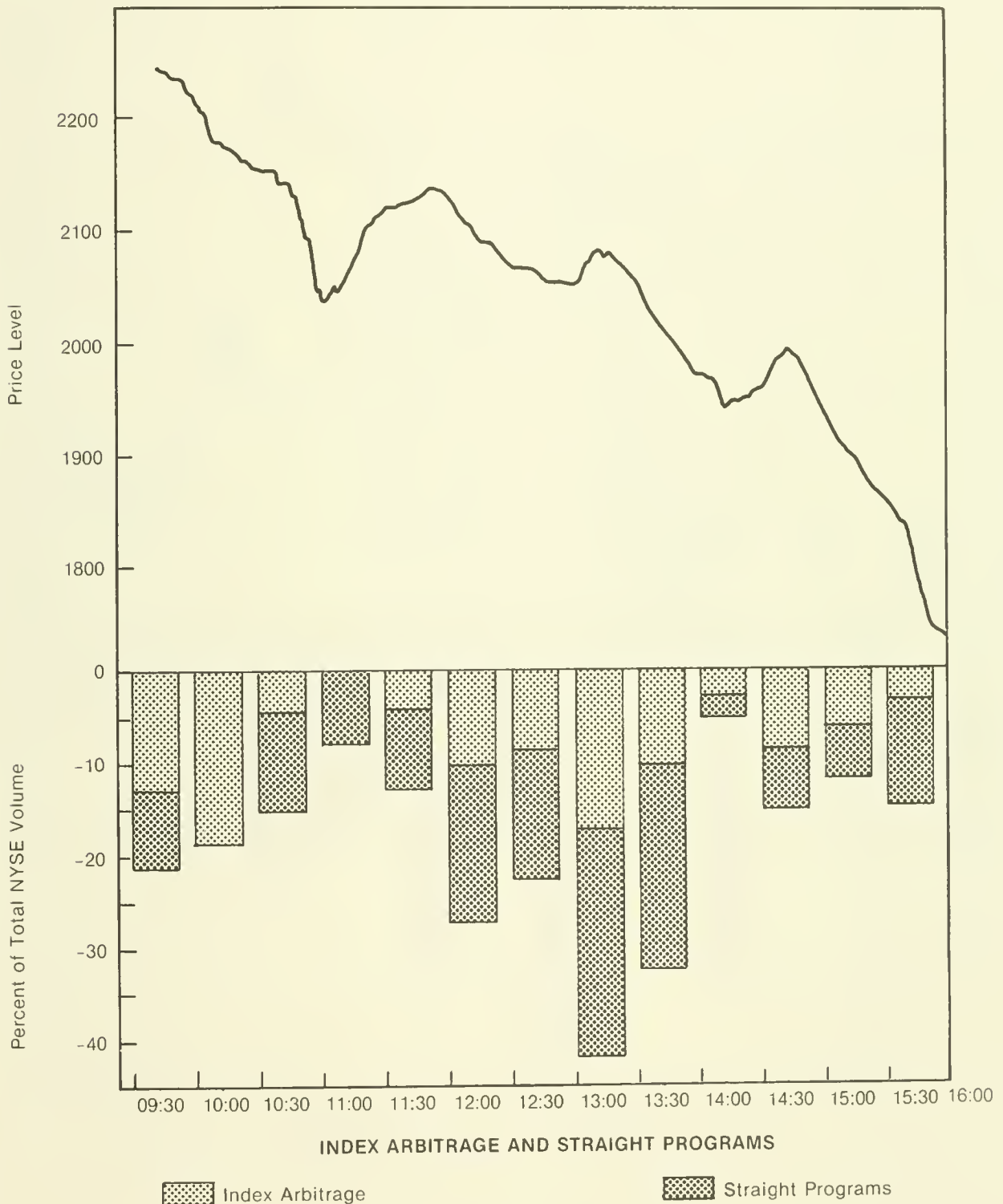




Chart 11  
S & P INDEX AND FUTURES CONTRACT  
Monday, October 19, 1987

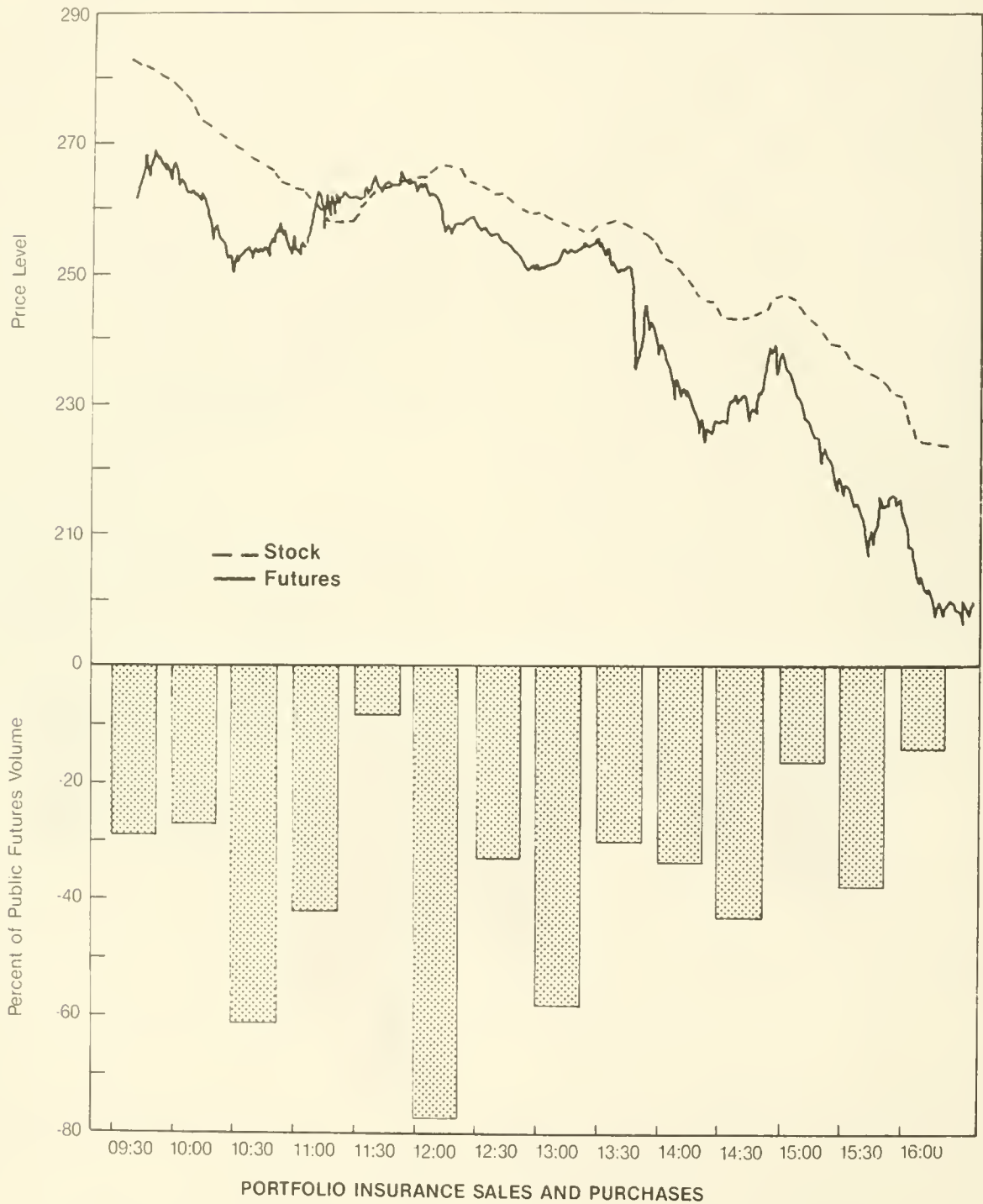


Chart 12

# S & P INDEX AND FUTURES CONTRACT SPREAD

Monday, October 19, 1987



discount between the Contract and the Index varied between 10 and 17 points. For the day, a premium of 1 point would have represented fair value. The size of the discount or premium had become one of the most widely followed indicators of the direction of the stock market even by investors who do not use the futures exchanges as a trading vehicle. The potential arbitrage profits which could be earned by selling the Index and simultaneously buying the Contract amounted to an annualized return of 47 percent at these price levels.

Ironically, the large discount on Monday morning was illusory. Since many of the stocks in the Index had not yet opened, the Index was calculated from their Friday closing prices. Although the index arbitrageurs clearly knew that many stocks had not yet opened, they nevertheless believed that a large discount existed. This belief led the index arbitrageurs to conclude that the market was headed much lower and instead of simultaneously selling the Index and buying the Contract, many merely sold the Index and waited to buy what they believed would be a cheaper Contract. Aside from encouraging the index arbitrageurs to hold back on buying the futures half of the arbitrages, the apparent discount also discouraged buyers of stock from entering what appeared to be a relatively overpriced stock market.

By 10:30 a.m., the DJIA was down 104 points. In the next half hour, it dropped another 104 points to the 2,080 level. Volume at 11 a.m. had already reached 154 million shares, a record pace. At 10:33 a.m., a portfolio insurer with the ability to sell either stock or futures for its clients sold the first of thirteen \$100 million dollar baskets of stock it would unload during the day. This institution sold stock rather than futures because the size of the discount in the futures market made selling stocks seem relatively more attractive. This alternative of selling stock was not available to most of the other large portfolio insurers because they do not have the authority to sell clients' stocks. Therefore, they continued to sell futures throughout the morning and early afternoon at tremendous discounts to the prices in the stock market.

By approximately 11 a.m., most stocks had finally opened sharply lower on the New York Stock Exchange and the index arbitrageurs who had not yet completed their arbitrage by buying futures suddenly realized that the spread between the Contract and the Index was virtually nonexistent. Caught in a short squeeze, they rushed into the market to buy the Contract and it rallied from 254 at 10:50 a.m. to 265.5 at 11:40 a.m. During this period portfolio insurance selling temporarily abated, and short covering by one large foreign investor—which bought \$218 million of futures—caused the Contract to trade at a premium to the Index for the only time of the day. Between 11:00 a.m. and 11:40 a.m., index arbitrageurs bought approximately \$110 million of

stocks while selling futures. Non-trading-oriented investors, believing that the market might have reached a support level, also began to purchase stocks.

The market, however, began a dramatic reversal at 11:40 a.m., with the Contract plunging from 265.5 to 251.5 by 12:40 p.m., while the DJIA fell from 2,140 at 11:46 a.m. to 2,053 at 12:55 p.m., as 36 million shares, or \$1.3 billion, were routed through the DOT system. The price declines were caused by the lack of significant buyers and the resumption of large selling by the portfolio insurance providers. Between 11:30 a.m. and 1:30 p.m., the portfolio insurers sold over 10,000 futures contracts, the equivalent of \$1.3 billion. These contracts amounted to 28 percent of total futures volume traded and 41 percent of public volume. Index arbitrageurs during this period sold approximately \$350 million in stock. More significantly, straight program selling of stocks totaled \$560 million, of which one portfolio insurer alone sold \$400 million of stock.

At 1:09 p.m., the Dow Jones news wire reported that the Chairman of the Securities and Exchange Commission ("SEC") said that he had not discussed halting trading on the NYSE with the Exchange or President Reagan, although "anything is possible." He continued, ". . . there is some point, and I don't know what that point is, that I would be interested in talking to the NYSE about a temporary, very temporary halt in trading." Between 1:15 p.m. and 2:05 p.m., the Contract plunged from 255 to 227; the Index fell from 258 to 246, and the DJIA dropped from 2,081 to 1,969, breaking through the 2,000 level for the first time since January 7, 1987.

By 1:25 p.m., the Dow Jones news wire quoted the SEC as stating that it was not discussing closing the stock markets. However, the uncertainty created by the possible inability to sell may have exacerbated the dramatic selling pressure. In fact, between 1:30 p.m. and 2:00 p.m., one portfolio insurer sold 1,762 Contracts, worth \$200 million, which represented 20 percent of the total volume during that half hour. In addition, during this same time period, this portfolio insurer sold \$500 million of stocks. Between 1:00 p.m. and 1:30 p.m., index arbitrageurs sold \$216 million of stocks, and straight program selling totalled \$305 million of stocks. Together these two selling interests accounted for 39 percent of total share volume during this period.

A short-lived rally, the last one of the day, began at 2:05 p.m. and was led by the futures market. The Contract rallied from 227 to 239 at 2:35 p.m. The buying interest was concentrated in the futures market and the Index only rallied 4.00 points. The DJIA rose approximately 50 points to the 2,000 level.



By about 2 p.m., many index arbitrageurs had discontinued their activity because they could not be assured timely execution of their orders. This removed a significant buyer in the futures market and, combined with the continued selling by portfolio insurers, caused the spread between the Contract and the Index to widen to a huge discount. Trading-oriented accounts that were not fully invested and were active in both the futures and stock markets, chose to buy futures because of their belief that this discount represented a good trading opportunity. Most of the buying in the stock market by trading-oriented investors was short covering. Most non-trading-oriented investors that were fully invested, sold stocks throughout the day to lighten their exposure to the equity market. The only non-trading-oriented accounts that were significant buyers were pension funds and financial institutions, such as bank departments, that perceived bargain prices to exist on many blue chip stocks.

By 4:00 p.m. the Contract had declined to 200 and the DJIA had fallen from 2,000 to 1,738, a closing level last reached on April 7, 1986.

While the stock and stock index futures markets were collapsing, a flight to safety began in the fixed income markets. Over the next twenty-four hours, 90-day Treasury bill yields would fall from 6.75 percent to just above 5 percent and the 30-year Treasury bond would rally from a price of 85 to 96½ as the focus of market participants abruptly changed from fears of inflation and tight money to worries about deflation, recession and potential stock market failure.

The falling stock market was stopped only by the 4 p.m. close. The DJIA had fallen 508 points, or 23 percent, on volume of 604 million shares. On the day, the Contract had dropped from 282.25 on Friday to 201.50 at the close, a decline of 29 percent on volume of 162,000 contracts.

The record volume on the New York Stock Exchange had overwhelmed the data processing and communications systems of the exchange. Execution of stock trades were at times reported more than an hour late which created confusion for traders and investors. One major problem on the floor of the NYSE was the breakdown of the computerized DOT system because of inadequate capacity. A total of 396 million shares were routed through DOT, but 112 million shares were not executed, of which 92 million were limit orders. Because timely information was scarce, investors did not know if their limit orders had been executed and therefore did not know to set new limits. Of the 284 million shares which were executed on DOT, 33 million were market orders to buy and 148 million were market orders to sell. Limit orders which were executed included 69 million shares to buy and 24 million to sell. Of the 396 million shares routed through DOT, 89 million shares were related to program and arbi-

trage activity, representing 15 percent of total NYSE volume for the day. By the close of trading, specialist firms on the NYSE were carrying approximately \$1.3 billion of inventory, up from \$900 million on Friday, October 16. This heavy inventory was a major factor in their inability to make orderly markets the following day.

The options markets were unable to keep pace with the rapid price changes occurring in the equity markets on October 19. While both futures and stock volume increased dramatically from Friday, the volume of trading in the OEX market was only 35 percent of Friday's level. Options did not trade freely for most of the day due to lengthy and unwieldy rotations. As a result, options trading-oriented investors turned to the futures and equity markets to reduce their equity exposure and to hedge positions. In options, many short put strategies require the sale of the underlying security when the market declines. Because of the inability to close option positions, there may have been more selling in the futures and equity markets than there otherwise would have been had the options markets been operating normally.

In many options markets, retail investors are the major component. When a broker places emergency margin calls, the retail investor with exposed option positions is the first to be called. In the absence of additional margin, these positions are liquidated. Discussions with many brokers revealed forced liquidations contributed to the enormous downward pressure in the market throughout the day.

At the same time, the cost of using the options market increased dramatically as normal levels of volatility increased at least fourfold—beyond all precedent. Some options investors thus turned to the futures or equity markets to hedge positions, because the cost of using those markets was significantly lower. This created additional selling pressure in those markets.

Two commonly used options strategies that went awry Monday were so-called "dividend capture" and "buy-write" strategies. Both involve buying stock and selling a call on that stock. The premium received for writing the call option provides a measure of protection in a falling market, but when the market falls more than the amount of the premium received, the investor is long stock which is declining in value. On October 19 and again on October 20, investors employing these option-based strategies found themselves in just this long position and many sold stock.

The dominant sellers in the futures market on October 19 were portfolio insurance providers. Total portfolio insurance-related selling amounted to approximately 33,000 contracts, 21 percent of total volume and 43 percent of public volume. Significantly, even though these insurers were the larg-

est group of sellers, they remained far behind the hedge ratios dictated by their computer programs. In addition, those portfolio insurance vendors who react to market changes with a one day lag, sold only enough on Monday to hedge Friday's market move. The 23 percent decline in the market on Monday implied, then, that the portfolio insurers would inevitably need to sell more on Tuesday if they continued to follow their models. In addition to the \$4 billion of futures Contracts sold by the portfolio insurers, most of the \$2.2 billion of straight sell programs in the stock market appears to be related to portfolio insurance. One portfolio insurer alone sold \$1.3 billion in stock. The buying in the futures market was largely related to index arbitrage and short covering.

The 10 largest sellers in the stock market sold equities worth \$3.2 billion or 15.2 percent of total volume. The 10 largest buyers bought \$1.8 billion, 8.7 percent of the total market volume. The largest individual sellers of stocks were mutual funds and portfolio insurers, while the largest individual buyers were pension funds and financial institutions. One mutual fund complex sold over \$800 million of stock. Block trades of stock of 10,000 shares represented 51 percent of the NYSE share volume and 31 percent of the dollar volume.

## Tuesday, October 20

The Monday break of the U.S. equity markets affected all international markets. The Nikkei Index was down Tuesday by 3,336 points to 21,910, a fall of 13.2 percent. Because Tokyo has a limit on daily price movements of 15 percent, trading was light as all but three stocks hit their lower daily trading limits and ceased to trade. At mid day in London, the FTSE Index was down 296 points to 1,755, a drop of 14 percent. In Hong Kong, the stock exchange was closed for the remainder of the week, and there were considerable questions about the viability of the Hong Kong Futures Exchange.

Comments by the Bank of Japan early Tuesday morning indicated that Japan would continue to support the Louvre accord, and helped to calm currency markets in early morning trading.

At 8:41 a.m., Federal Reserve Chairman Alan Greenspan released a one line statement: "The Federal Reserve, consistent with its responsibilities as the nation's central bank, affirmed today its readiness to serve as a source of liquidity to support the economic and financial system." This statement rallied the bond market because it was interpreted as an indication of the credit strains being seen by the Federal Reserve. The bond market rally thus demonstrated a flight to quality by investors.

At 9:30 a.m., the New York Stock Exchange announced that it had asked its members to refrain from using the DOT system to execute "program

trades." Doing so would effectively eliminate index arbitrage, severing the trading link between the Contract and the Index. There was, however, a great deal of confusion among market participants as to whether or not arbitrage could be manually executed and whether straight program activity could be routed through DOT.

In New York, a startling reversal from Monday's activity was apparent from the start of trading as many stocks did not open due to buy side imbalances. Although some corporations had announced stock buyback programs on Monday and early on Tuesday, the order imbalances at the open could not have resulted from buyback activity as corporations are prohibited from opening the market in their own stocks (see Charts 13 to 15).

The vast majority of orders to buy at the market's open were "market orders," enabling the NYSE specialists to open stocks significantly higher than Monday's close. From 9:30 a.m. to 10:27 a.m., the DJIA rallied from 1,739 to 1,936 as specialists opened stocks higher, in many cases on large volume.

On the CME, the Contract opened at 223, up 21.5 points from Monday's close. The tremendous opening increase was due to trading-oriented investors who believed that the NYSE's higher opening levels could be sustained. Buying pressure also stemmed from nervous investors closing out short positions due to rumors circulating about the financial condition of the CME and its clearing members, as well as the exchange's ability to clear trades from the previous day. These rumors would keep certain investors out of the futures market for the entire day.

The Contract continued to recover until 9:50 a.m., at which time catch-up portfolio insurance selling and some renewed short selling drove it to lower levels. In the first hour of trading, portfolio insurance selling amounted to 4,500 contracts or 16 percent of total volume.

The Contract now began to trade at a significant discount to the Index. However, because of the restrictions placed on the use of DOT, index arbitrageurs were unable to perform their function of keeping the two markets in line. The futures markets plummeted from 10:00 a.m. to 12:15 p.m. During this time the Contract fell from a high of 246 to a low of 181, a decline of almost 27 percent. By comparison, that drop was equivalent to a move of more than 500 points in the DJIA. At 12:15 p.m., the CME decided to close the market temporarily.

While market volatility this extreme made investment decisions difficult, some trading-oriented investors were able to use it to their advantage. One example of the profit potential of short selling on Tuesday was that of a large investor which sold 500 Contracts at an average price of 229 and covered



Chart 13  
**DOW JONES INDUSTRIAL ONE MINUTE CHART**  
Tuesday, October 20, 1987

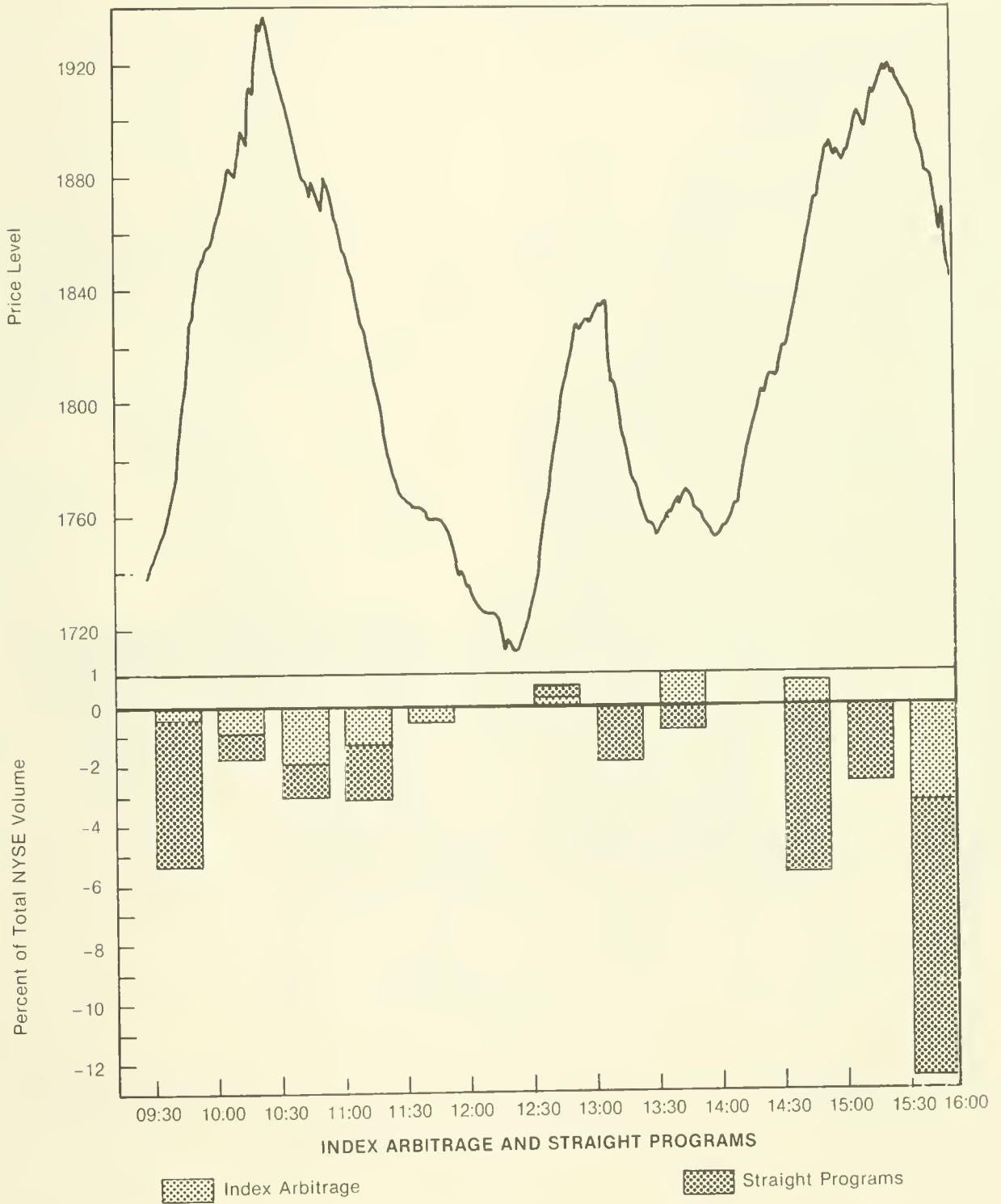


Chart 14  
**S & P INDEX AND FUTURES CONTRACT**  
Tuesday, October 20, 1987

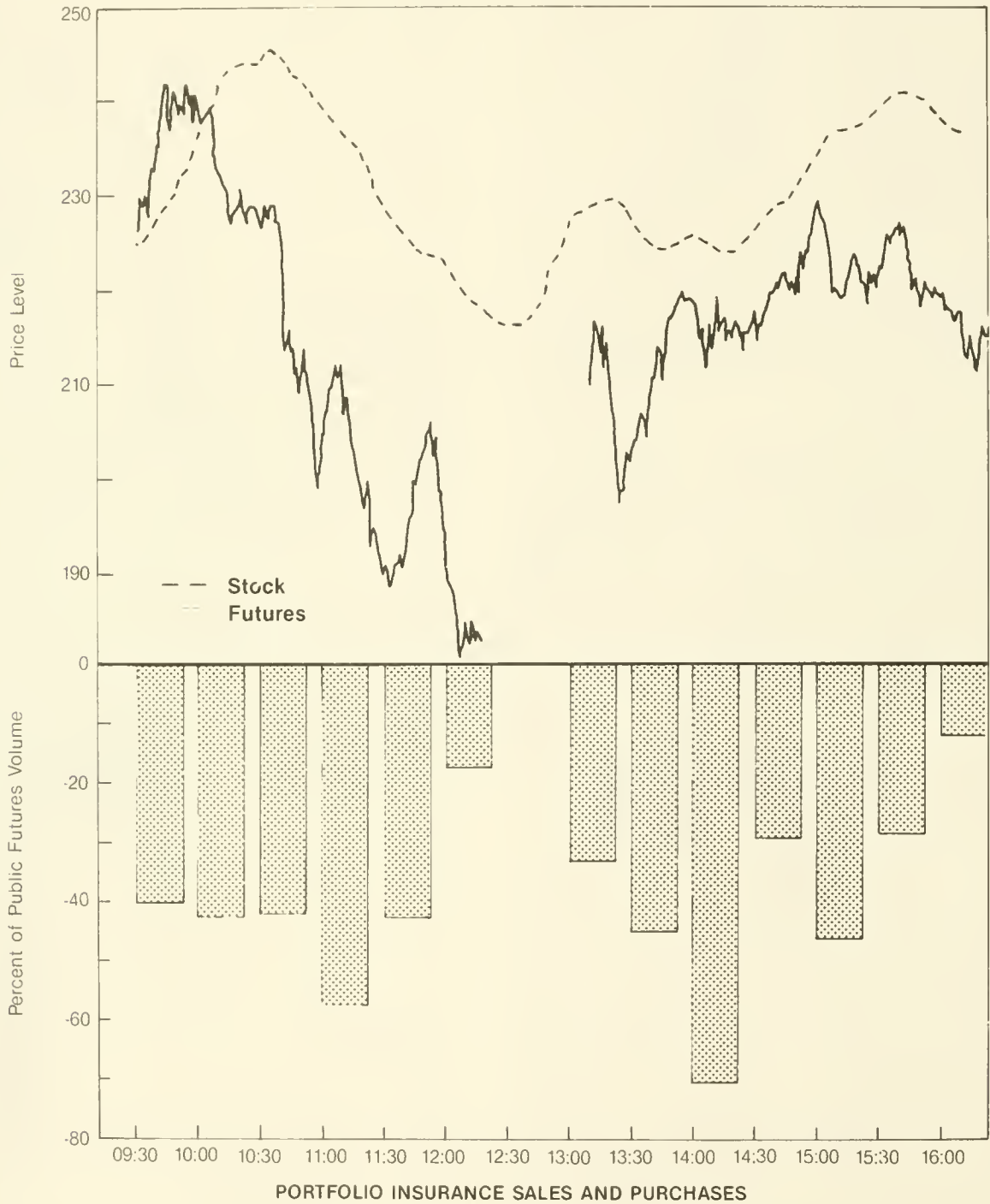


Chart 15

# S & P INDEX AND FUTURES CONTRACT SPREAD

Tuesday, October 20, 1987



the short within 40 minutes at an average price of 201. The profit on this trade amounted to \$7 million.

On the NYSE, many stocks of major corporations opened late and closed at various times during the day. For instance, between 1:00 p.m. and 1:30 p.m., 49 stocks stopped trading. Yet there was heavy volume for each half hour trading period. During the first two hours alone, total volume was 259 million shares.

Once the buying was absorbed and the futures market had begun to fall, the stock market started a sustained and dramatic reversal as the DJIA declined from 1,936 at 10:27 a.m. to 1,711 at 12:29 p.m. Selling pressure was broad-based due to fears of index arbitrage activity, mutual fund redemptions and portfolio insurance. Although no DOT orders were being executed for index arbitrage on the NYSE, the appearance of large and unprecedented discounts in the futures markets led many participants to believe that additional selling pressure in the equity markets was imminent as the size of the discount itself had become a market indicator. The process became self-reinforcing. Large discounts fed selling expectations, and these expectations, in turn, inspired selling in anticipation of further declines. Thus, while the inability to carry out arbitrage via the DOT system severed the trading link between the equity and futures markets, the flow of information emanating from the respective markets continued to exert a strong influence on trading decisions.

With many stocks having closed as order imbalances on the sell side built up, and with price information from the NYSE exceedingly difficult to obtain, the CBOE and the CME suspended trading of their derivative products at 11:45 a.m. and 12:15 p.m., respectively. At the time of the CME closing, the futures discount was more than 46 points, the largest ever experienced. With the CME closed, the last link in the circuitous relationship between the futures and stock markets—pricing information—was severed.

Some specialists took this opportunity to reopen stocks at higher levels. Non-trading-oriented investors who had been leery of the apparent discount between the Contract and the Index also began to buy. However, this buying was not sustainable and the rally was soon extinguished. During the 49 minute period that the futures market was closed, the DJIA rallied from 1,711 to 1,835.

The Contract reopened at 1:04 p.m. at 213, up from 183 at the temporary 12:15 p.m. closing. At this price, the Contract was at a 17 point discount to the stock market. Even though no arbitrage took place, the renewed perception of a discount was enough to discourage buyers. The initial trading in the futures market was characterized by buying by

speculative accounts and moderate selling by portfolio insurers. Volume in the first half hour after the reopening was a relatively heavy 7,500 Contracts, worth \$800 million.

In the following hour, major investment bank buying activity dominated the futures market and narrowed the discount to approximately eight points.

Another force affecting the stock market at this time was the growing list of U.S. corporations announcing that they were willing to buy their stock from investors. On Monday and Tuesday, corporations announced approximately \$6.2 billion in stock buybacks. This, combined with the narrowing of the discount between the Contract and the Index, may have led market participants to believe that the buybacks were going to maintain a solid floor price. Bargain hunters rushed in to buy and sellers finally could unload large blocks of stock directly to corporate buyers. As prices started to rally, short covering began and the DJIA rose toward the close when some profit taking, additional uncertainty concerning overnight activity, and portfolio insurance selling resulted in a rapid decline. The DJIA, which was trading at a level of 1,712 at 12:30 p.m., had rallied back to 1,919 at 3:33 p.m., before dropping back to 1,841 at the close.

Tuesday can at best be characterized as confusing and uncertain. The absence of any clear relationship between the stock, futures and options markets led many trading-oriented investors to exit the market altogether. Many trading-oriented investors that would have bought, postponed their buying until a better understanding of the linkages could be developed. One of the factors that was prevalent from Thursday through Tuesday was the concentration of buying and selling activity by a small number of large investors. This concentration peaked on Monday when the top 10 buyers and sellers accounted for 9 and 15 percent of stock market activity, respectively, despite the record volume. In the futures market the top 10 trading-oriented buyers and sellers comprised between 25 and 26 percent of the total volume. In both markets, these top 10 institutions were net sellers of securities on Friday and Monday and became net buyers on Tuesday (see Appendix, Figure 27).

During the course of the day on Tuesday, the 10 largest buyers bought \$2.1 billion of stocks and the 10 largest sellers sold \$1.6 billion of stocks. The largest buying institutions were portfolio insurers, pension funds, corporations and foreign investors. The largest selling institutions were portfolio insurers, foreign investors, and risk arbitrageurs. The largest buyer and seller on Tuesday was the same portfolio insurer.

Figure 1

### RATIO: BOND YIELD / S&P 500 YIELD

January 1947 — December 1987

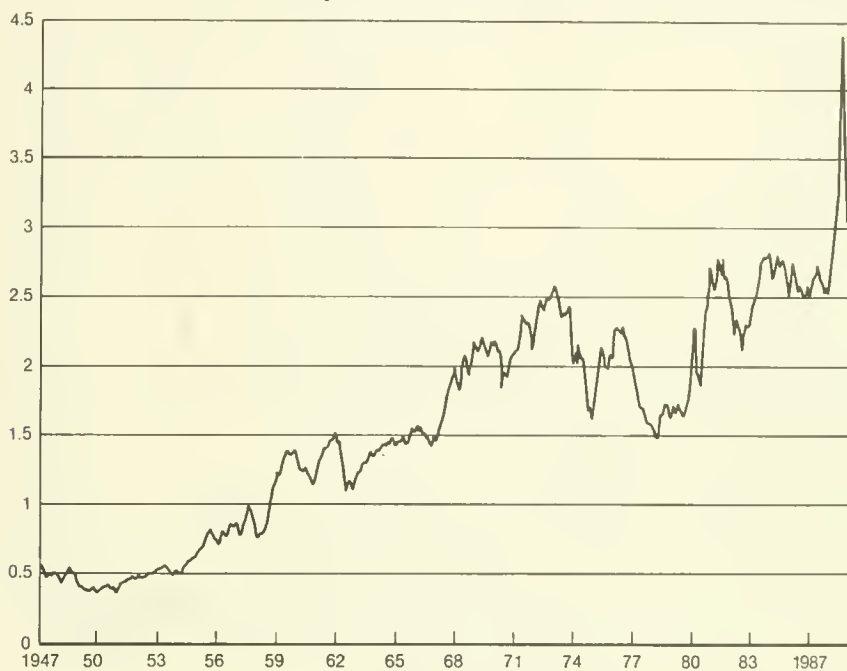


Figure 2

### U.S. TREASURY 8 7/8 DUE 8/15/17

October 14-20





Figure 3  
**JAPANESE YEN PER U.S. DOLLAR**

October 14, 1987 - October 20, 1987



Figure 4  
**GERMAN MARKS PER U.S. DOLLAR**

October 14, 1987 - October 20, 1987

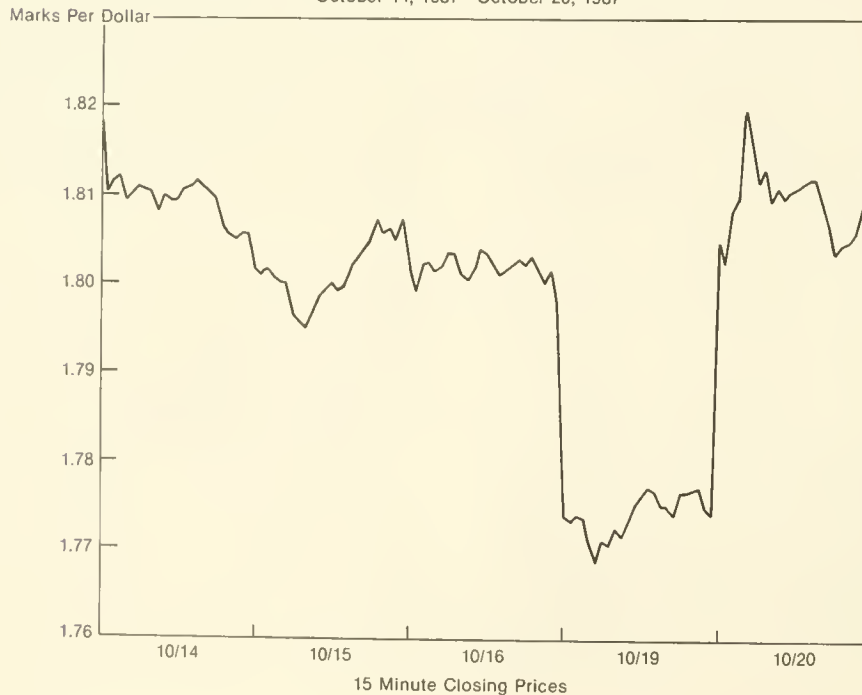
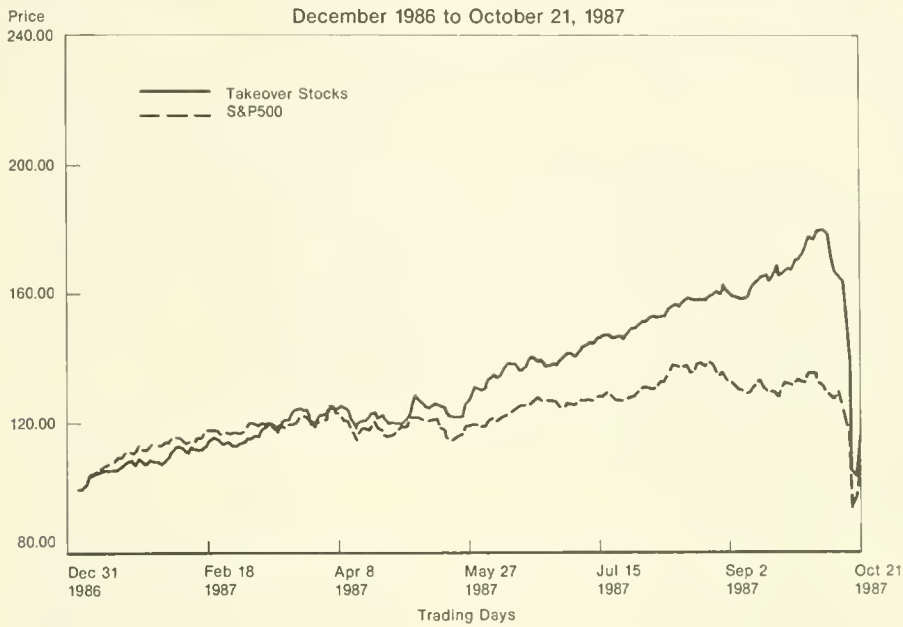


Figure 5

**TAKEOVER STOCK INDEX VS S&P 500 INDEX  
NORMALIZED PRICE SERIES**

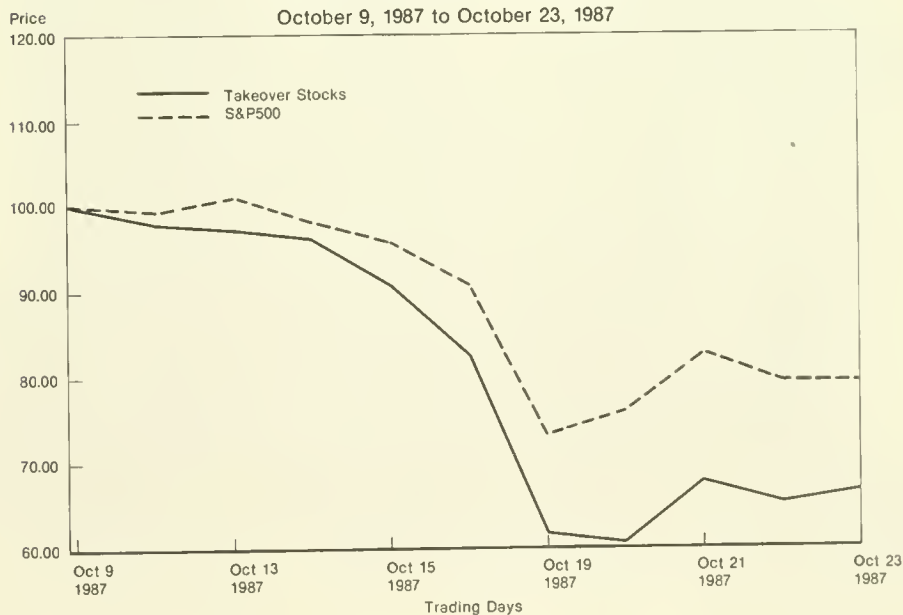


Takeover Stock Index:

Allegis, USG Corp., Tenneco, Gillette, Newmont Mining, GAF Corp., Irving Bank, Kansas City Southern Industries, Telex, Sante Fe Southern Pacific, Dayton Hudson

Figure 6

**TAKEOVER STOCK INDEX VS S&P 500 INDEX  
NORMALIZED PRICE SERIES**



Takeover Stock Index:

Allegis, USG Corp., Tenneco, Gillette, Newmont Mining, GAF Corp., Irving Bank, Kansas City Southern Industries, Telex, Sante Fe Southern Pacific, Dayton Hudson

Figure 7

# SHARE VOLUME FOR ALL NYSE STOCKS

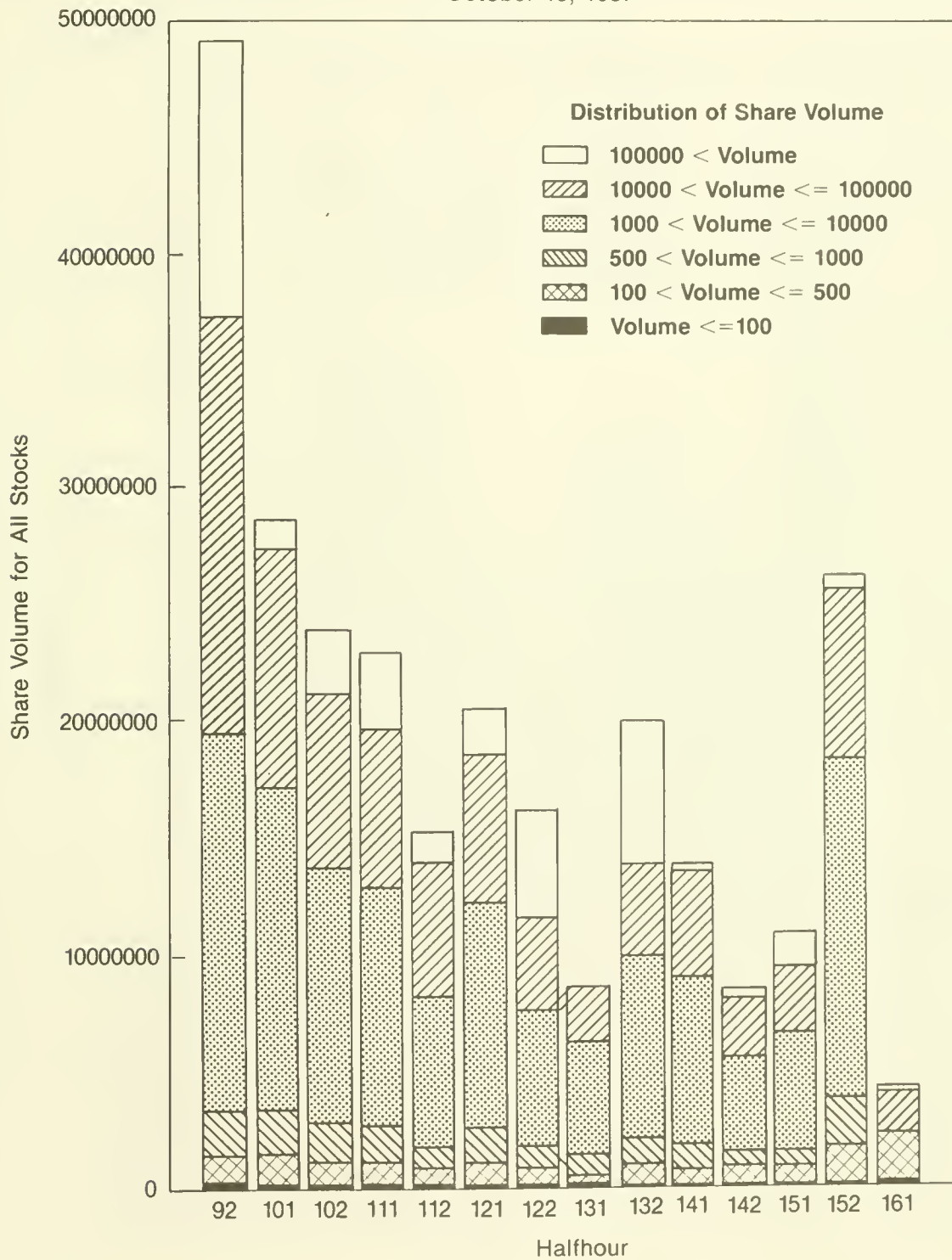
October 14, 1987



Source: SIAC

# Figure 8 SHARE VOLUME FOR ALL NYSE STOCKS

October 15, 1987



Source: SIAC

Figure 9

# SHARE VOLUME FOR ALL NYSE STOCKS

October 16, 1987



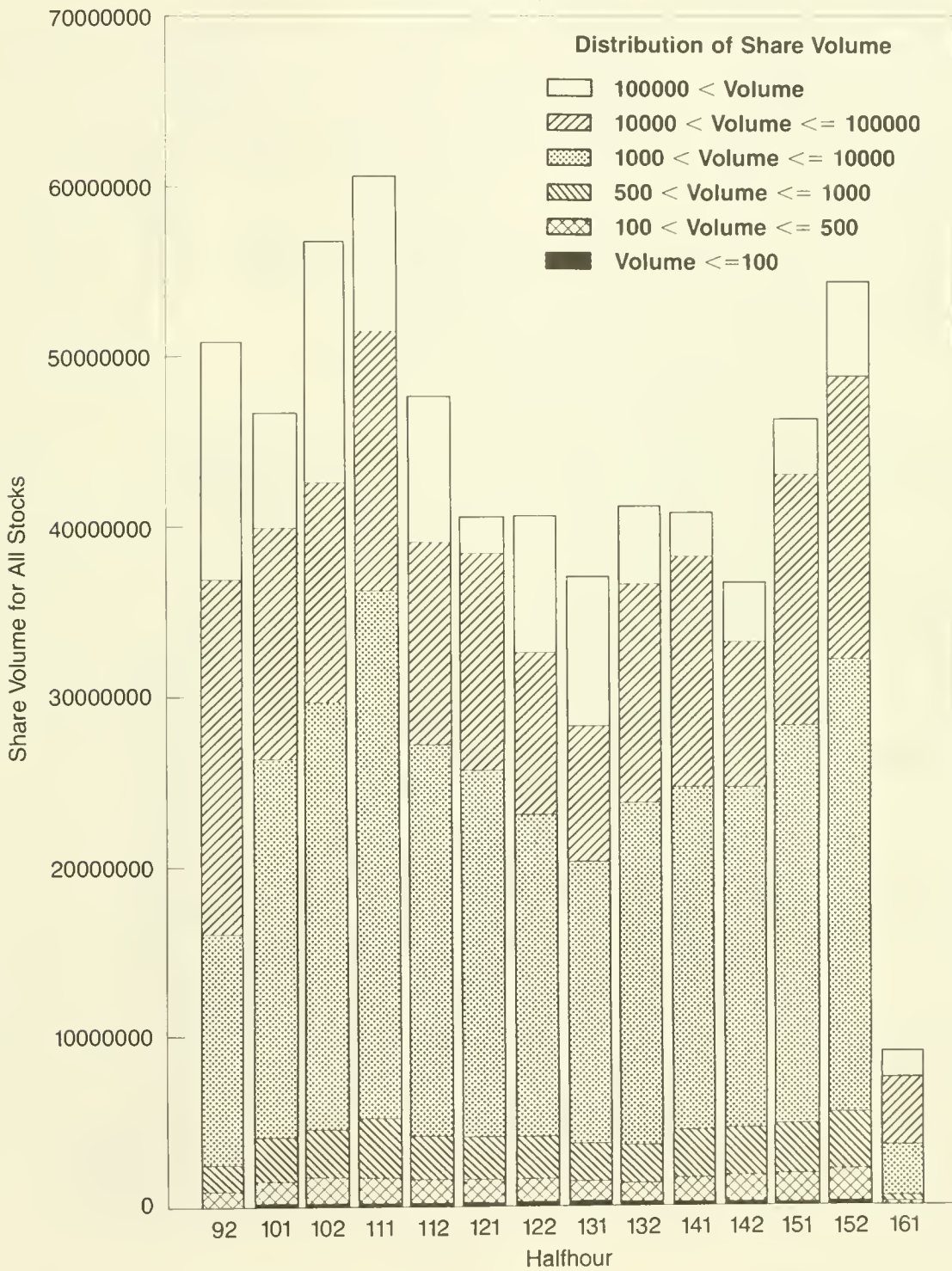
Source: SIAC



Figure 10

# SHARE VOLUME FOR ALL NYSE STOCKS

October 19, 1987

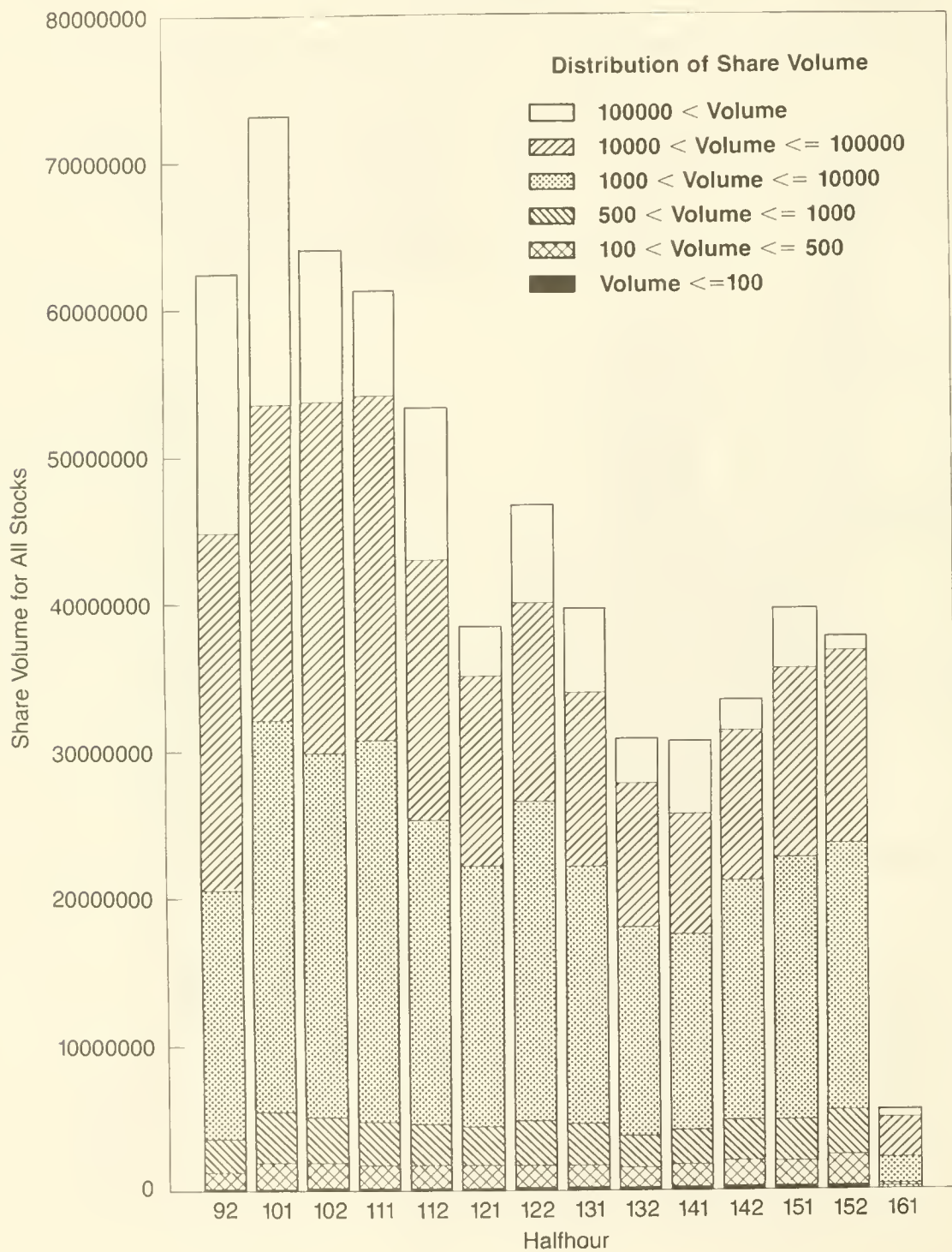


Source: SIAC

Figure 11

# SHARE VOLUME FOR ALL NYSE STOCKS

October 20, 1987



Source: SIAC

FIGURE 12.—NYSE MEMBER PRINCIPAL POSITIONS—  
TWENTY LARGEST MEMBERS

| Date            | Net principal positions | Net (selling)/buying activity |
|-----------------|-------------------------|-------------------------------|
| October 13..... | \$183,885,000           |                               |
| October 14..... | (505,116,000)           | (\$689,001,000)               |
| October 15..... | (26,405,000)            | 478,711,000                   |
| October 16..... | (185,267,000)           | (158,862,000)                 |
| October 19..... | (188,528,000)           | (3,261,000)                   |
| October 20..... | (233,584,000)           | (45,056,000)                  |

Source: NYSE.

FIGURE 13.—NYSE LARGE INSTITUTIONAL DOLLAR  
VOLUME—SALES <sup>1</sup>

[In millions of dollars]

|  | October 15 | October 16 | October 19 | October 20 |
|--|------------|------------|------------|------------|
| SELL                                     |            |            |            |            |
| Portfolio insurers.....                  | \$257      | \$566      | \$1,748    | \$698      |
| Other pension.....                       | 190        | 794        | 875        | 334        |
| Trading-oriented investors.....          | 1,156      | 1,446      | 1,751      | 1,740      |
| Mutual funds.....                        | 1,419      | 1,339      | 2,168      | 1,726      |
| Other financial.....                     | 516        | 959        | 1,416      | 1,579      |
| Total.....                               | 3,538      | 5,104      | 7,598      | 6,077      |
| Index arbitrage (included in above)..... | 717        | 1,592      | 1,774      | 128        |

<sup>1</sup> Sample does not include: (1) individual investors, (2) institutional accounts with purchases and sales less than \$10 million per day and (3) certain sizable broker/dealer trades.

FIGURE 14.—NYSE LARGE INSTITUTIONAL DOLLAR  
VOLUME—PURCHASES <sup>1</sup>

[In millions of dollars]

|  | October 15 | October 16 | October 19 | October 20 |
|--|------------|------------|------------|------------|
| BUY                                      |            |            |            |            |
| Portfolio insurers.....                  | \$201      | \$161      | \$449      | \$863      |
| Other pension.....                       | 368        | 773        | 1,481      | 920        |
| Trading-oriented investors.....          | 1,026      | 1,081      | 1,316      | 1,495      |
| Mutual funds.....                        | 998        | 1,485      | 1,947      | 1,858      |
| Other financial.....                     | 798        | 1,221      | 2,691      | 2,154      |
| Total.....                               | 3,391      | 4,721      | 7,884      | 7,290      |
| Index arbitrage (included in above)..... | 407        | 394        | 110        | 32         |

<sup>1</sup> Sample does not include: (1) individual investors, (2) institutional accounts with purchases and sales less than \$10 million per day and (3) certain sizable broker/dealer trades.

FIGURE 15.—CME LARGE TRADER SALES

[Dollar amounts in millions]

|  | October 14 | October 15 | October 16 | October 19 | October 20 |
|--|------------|------------|------------|------------|------------|
| SELL   |            |            |            |            |            |
| Portfolio insurers.....  | \$534      | \$968      | \$2,123    | \$4,037    | \$2,818    |
| Arbitrageurs.....  | \$108      | \$407      | \$392      | \$129      | \$31       |
| Options.....   | \$554      | \$998      | \$1,399    | \$898      | \$635      |
| Locals.....  | \$7,325    | \$7,509    | \$7,088    | \$5,479    | \$2,718    |
| Other pension.....   | \$37       | \$169      | \$234      | \$631      | \$514      |
| Trading-oriented investors.....                                    | \$1,993    | \$2,050    | \$3,373    | \$2,590    | \$2,765    |
| Foreign.....   | \$398      | \$442      | \$479      | \$494      | \$329      |
| Mutual funds.....  | \$46       | \$3        | \$11       | \$19       | \$40       |
| Other financial.....   | \$49       | \$109      | \$247      | \$525      | \$303      |
| Published total.....   | \$16,949   | \$18,830   | \$19,640   | \$18,987   | \$13,641   |
| Volume accounted for.....  | \$11,045   | \$12,655   | \$15,347   | \$14,801   | \$10,152   |
| Percent accounted for.....   | 65.2       | 67.2       | 78.1       | 78.0       | 74.4       |
| Portfolio insurance: Percent of publicly accounted for volume..... | 14.37      | 18.80      | 25.70      | 43.30      | 37.91      |

FIGURE 16.—CME LARGE TRADER PURCHASES

[Dollar amounts in millions]

|  | October 14 | October 15 | October 16 | October 19 | October 20 |
|--|------------|------------|------------|------------|------------|
| BUY  |            |            |            |            |            |
| Portfolio insurers.....  | \$71       | \$171      | \$109      | \$113      | \$505      |
| Arbitrageurs.....  | \$1,313    | \$717      | \$1,705    | \$1,582    | \$119      |
| Options.....   | \$594      | \$864      | \$1,254    | \$915      | \$544      |
| Locals.....  | \$7,301    | \$7,530    | \$7,125    | \$5,682    | \$2,689    |
| Other pension.....   | \$90       | \$76       | \$294      | \$447      | \$1,070    |
| Trading-oriented investors.....                                    | \$1,494    | \$2,236    | \$3,634    | \$4,510    | \$4,004    |
| Foreign.....   | \$240      | \$298      | \$443      | \$609      | \$418      |
| Mutual funds.....  | \$0        | \$27       | \$73       | \$143      | \$51       |
| Other financial.....   | \$155      | \$57       | \$126      | \$320      | \$517      |
| Published total.....   | \$16,949   | \$18,830   | \$19,640   | \$18,987   | \$13,641   |
| Volume accounted for.....  | \$11,259   | \$11,976   | \$14,763   | \$14,320   | \$9,915    |
| Percent accounted for.....   | 66.4       | 63.6       | 75.2       | 75.4       | 72.7       |
| Portfolio insurance: Percent of publicly accounted for volume..... | 1.80       | 3.86       | 1.43       | 1.31       | 6.98       |

FIGURE 17.—CME LARGE TRADER CONTRACT VOLUME (SALES)

[In number of contracts]

|                                 | October 14 | October 15 | October 16 | October 19 | October 20 |
|---------------------------------|------------|------------|------------|------------|------------|
| SELL                            |            |            |            |            |            |
| Portfolio insurers.....         | 3,460      | 6,413      | 14,627     | 34,446     | 26,146     |
| Arbitrageurs.....               | 700        | 2,700      | 2,700      | 1,100      | 285        |
| Options.....                    | 3,589      | 6,618      | 9,643      | 7,667      | 5,890      |
| Locals.....                     | 47,426     | 49,773     | 48,847     | 46,753     | 25,214     |
| Other pension.....              | 238        | 1,122      | 1,615      | 5,387      | 4,770      |
| Trading-oriented investors..... | 12,906     | 13,587     | 23,246     | 22,098     | 25,651     |
| Foreign.....                    | 2,575      | 2,927      | 3,301      | 4,212      | 3,050      |
| Mutual funds.....               | 300        | 19         | 77         | 160        | 375        |
| Other financial.....            | 317        | 720        | 1,705      | 4,478      | 2,808      |
| Published total.....            | 109,740    | 124,810    | 135,344    | 162,022    | 126,562    |
| Contracts accounted for.....    | 71,511     | 83,879     | 105,761    | 126,301    | 94,189     |
| Percent accounted for.....      | 65         | 67         | 78         | 78         | 74         |



FIGURE 18.—CME LARGE TRADER CONTRACT VOLUME (PURCHASES)

[In number of contracts]

|                                 | October 14 | October 15 | October 16 | October 19 | October 20 |
|---------------------------------|------------|------------|------------|------------|------------|
| BUY                             |            |            |            |            |            |
| Portfolio insurers.....         | 461        | 1,136      | 751        | 964        | 4,682      |
| Arbitrageurs.....               | 8,500      | 4,750      | 11,750     | 13,500     | 1,100      |
| Options.....                    | 3,848      | 5,725      | 8,639      | 7,804      | 5,049      |
| Locals.....                     | 47,272     | 49,911     | 49,098     | 48,487     | 24,945     |
| Other pension.....              | 582        | 504        | 2,029      | 3,816      | 9,931      |
| Trading-oriented investors..... | 9,673      | 14,823     | 25,043     | 38,482     | 37,149     |
| Foreign.....                    | 1,553      | 1,972      | 3,051      | 5,199      | 3,874      |
| Mutual funds.....               | 0          | 179        | 505        | 1,217      | 473        |
| Other financial.....            | 1,006      | 378        | 867        | 2,727      | 4,793      |
| Published total.....            | 109,740    | 124,810    | 135,344    | 162,022    | 126,562    |
| Contracts accounted for.....    | 72,895     | 79,378     | 101,733    | 122,196    | 91,996     |
| Percent accounted for.....      | 66         | 64         | 75         | 75         | 73         |

FIGURE 19.—GROSS FUTURES SALES VOLUME

[In percent]

|                                 | October 14 | October 15 | October 16 | October 19 | October 20 |
|---------------------------------|------------|------------|------------|------------|------------|
| SELL                            |            |            |            |            |            |
| Portfolio insurers.....         | 3.2        | 5.1        | 10.8       | 21.3       | 20.7       |
| Arbitrageurs.....               | 0.6        | 2.2        | 2.0        | 0.7        | 0.2        |
| Options.....                    | 3.3        | 5.3        | 7.1        | 4.7        | 4.7        |
| Locals.....                     | 43.2       | 39.9       | 36.1       | 28.9       | 19.9       |
| Other pension.....              | 0.2        | 0.9        | 1.2        | 3.3        | 3.8        |
| Trading-oriented investors..... | 11.8       | 10.9       | 17.2       | 13.6       | 20.3       |
| Foreign.....                    | 2.3        | 2.3        | 2.4        | 2.6        | 2.4        |
| Mutual funds.....               | 0.3        | 0.0        | 0.1        | 0.1        | 0.3        |
| Other financial.....            | 0.3        | 0.6        | 1.3        | 2.8        | 2.2        |
| Accounted for.....              | 65.2       | 67.2       | 78.1       | 78.0       | 74.4       |

FIGURE 20.—GROSS FUTURES PURCHASE VOLUME

[In percent]

|                                 | October 14 | October 15 | October 16 | October 19 | October 20 |
|---------------------------------|------------|------------|------------|------------|------------|
| BUY                             |            |            |            |            |            |
| Portfolio insurers.....         | 0.4        | 0.9        | 0.6        | 0.6        | 3.7        |
| Arbitrageurs.....               | 7.7        | 3.8        | 8.7        | 8.3        | 0.9        |
| Options.....                    | 3.5        | 4.6        | 6.4        | 4.8        | 4.0        |
| Locals.....                     | 43.1       | 40.0       | 36.3       | 29.9       | 19.7       |
| Other pension.....              | 0.5        | 0.4        | 1.5        | 2.4        | 7.8        |
| Trading-oriented investors..... | 8.8        | 11.9       | 18.5       | 23.8       | 29.4       |
| Foreign.....                    | 1.4        | 1.6        | 2.3        | 3.2        | 3.1        |
| Mutual funds.....               | 0.0        | 0.1        | 0.4        | 0.8        | 0.4        |
| Other financial.....            | 0.9        | 0.3        | 0.6        | 1.7        | 3.8        |
| Accounted for.....              | 66.4       | 63.6       | 75.2       | 75.4       | 72.7       |



Figure 21  
**DOW JONES, FTSE, AND NIKKEI**  
October 1, 1987 - October 30, 1987

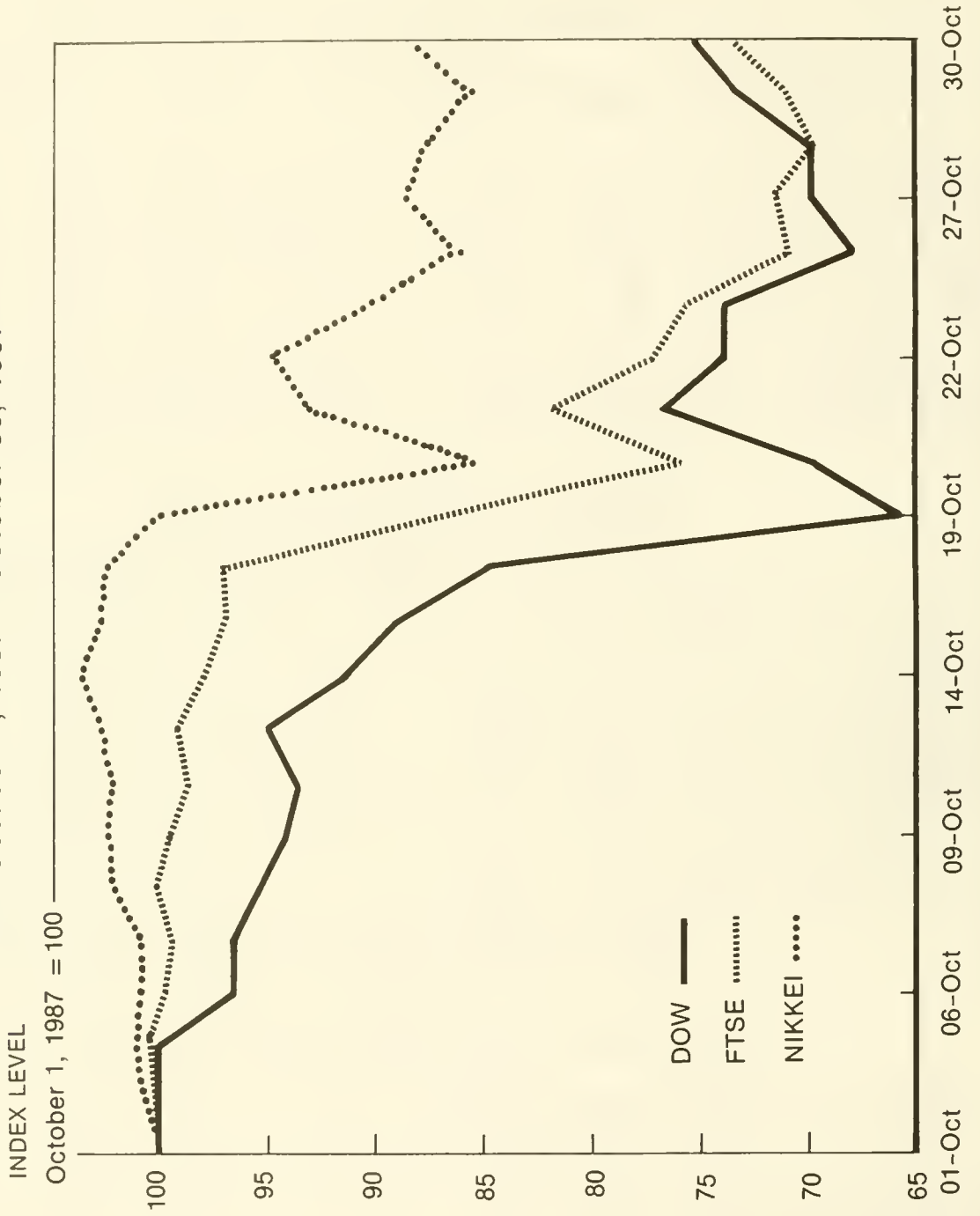
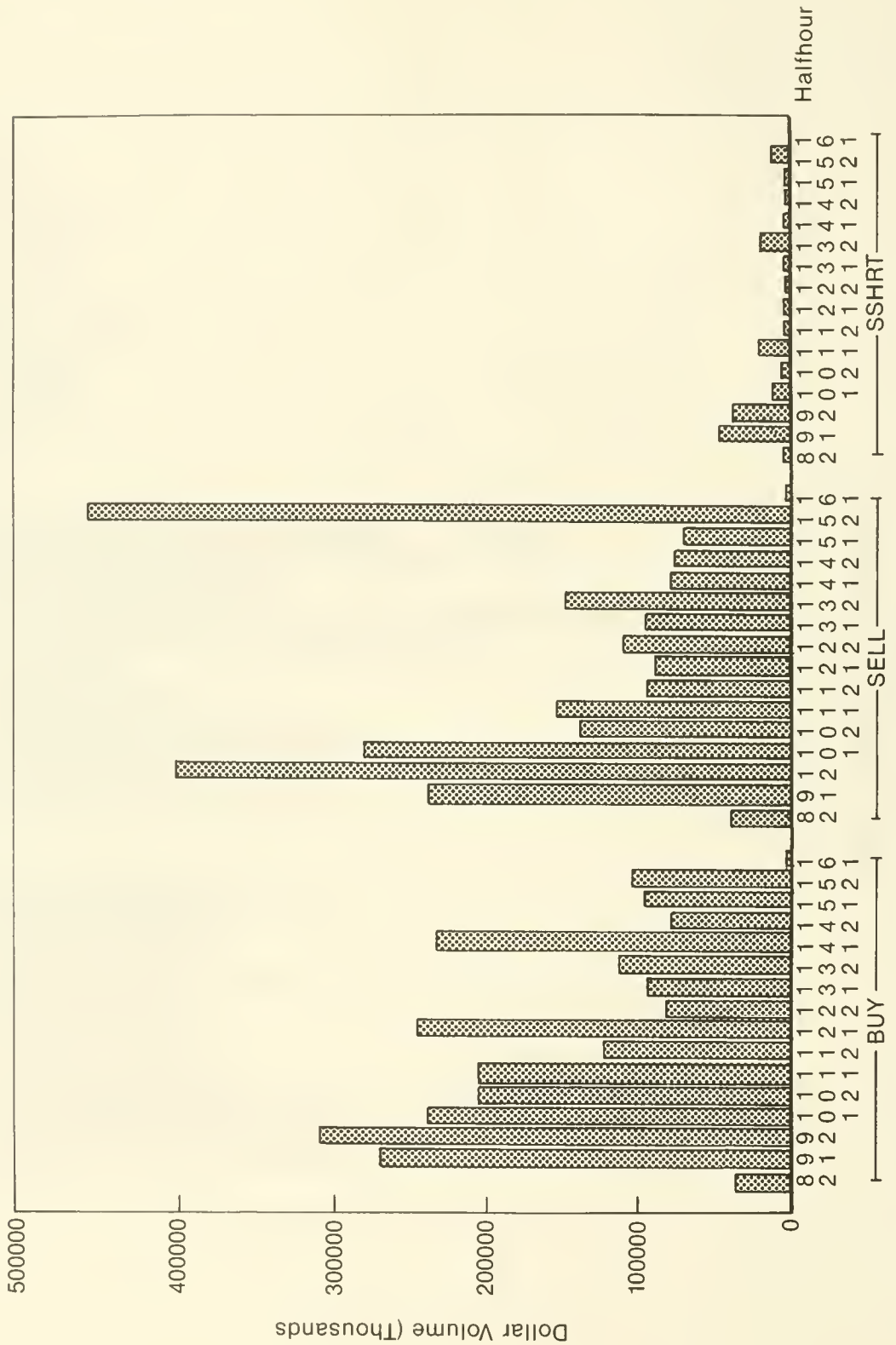


Figure 22  
**DOT ORDER SIZE**  
 October 14



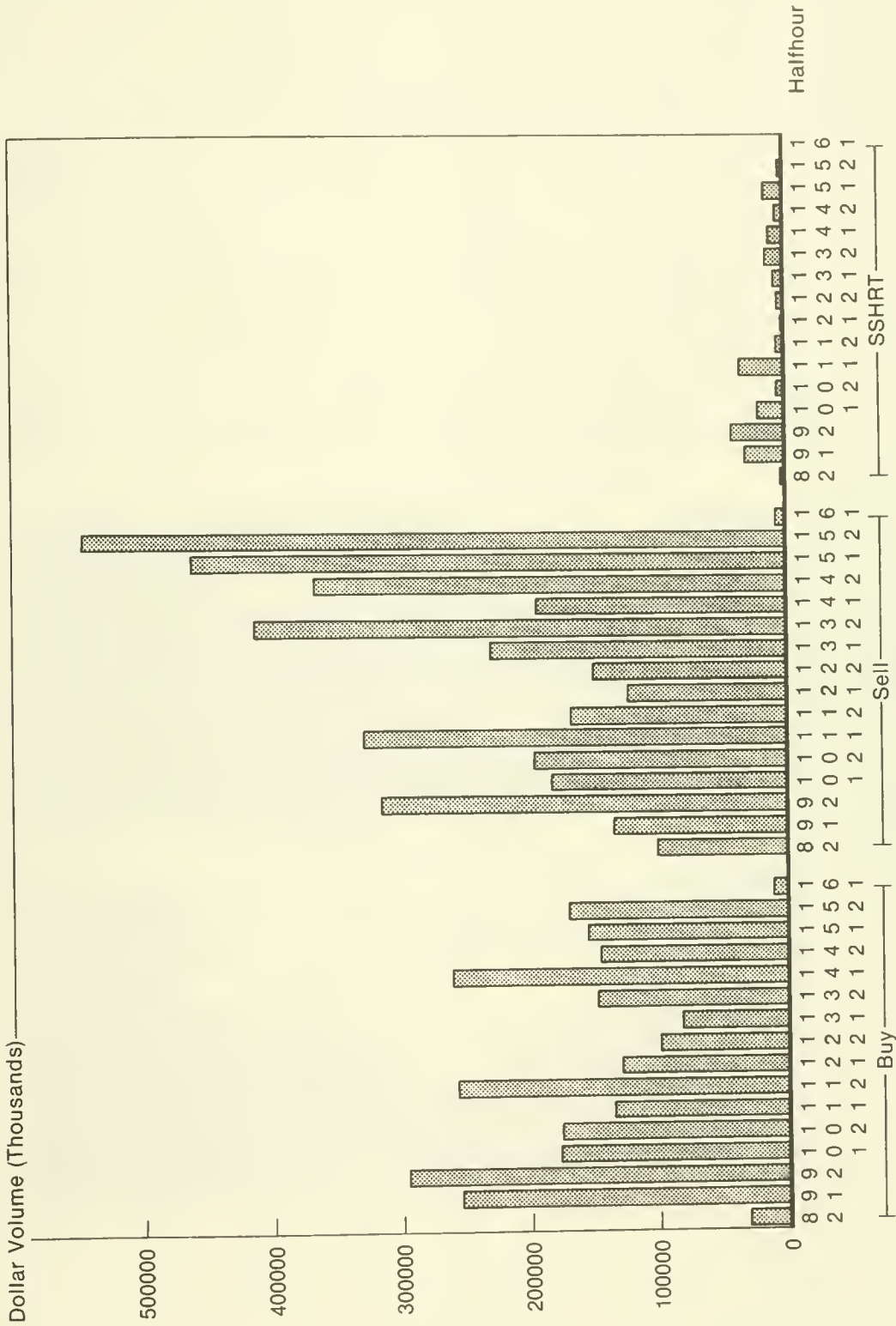
Source: SIAC

Figure 23  
**DOT ORDER SIZE**  
 October 15



Source: SIAC

Figure 24  
**DOT ORDER SIZE**  
 October 16



Source: SIAC

Figure 25  
**DOT ORDER SIZE**  
 October 19

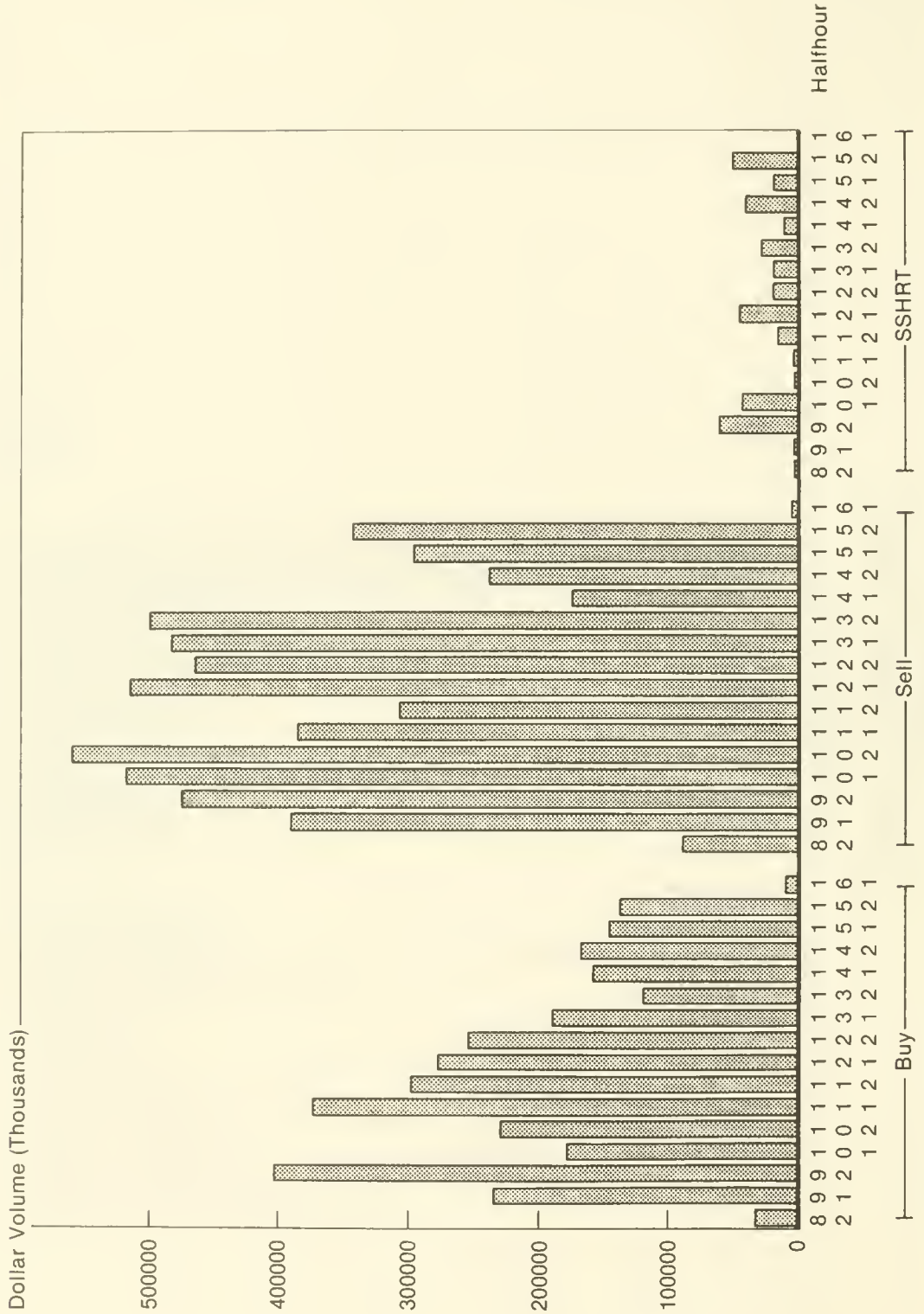




Figure 26  
**DOT ORDER SIZE**  
 October 20

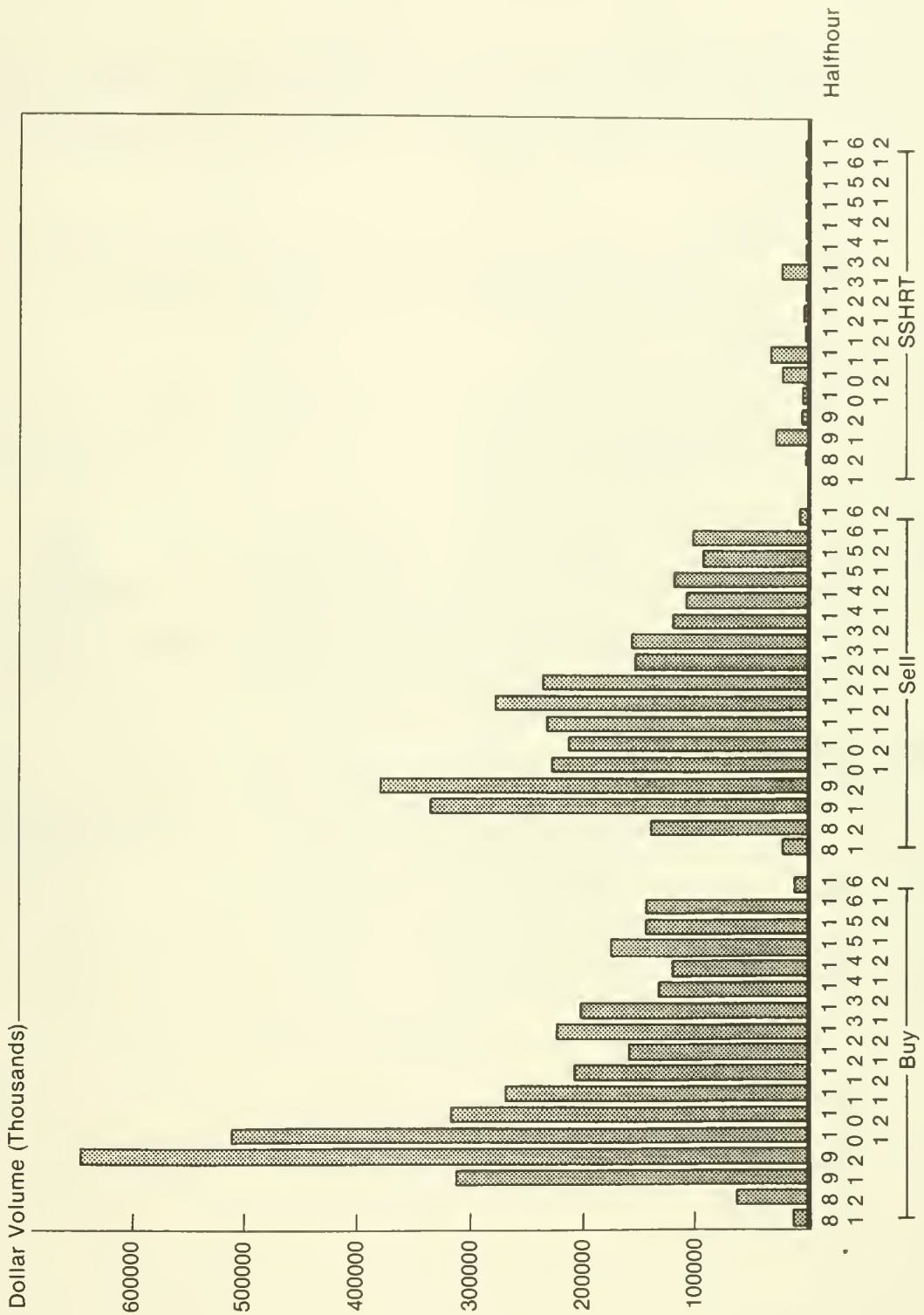


Figure 27

# TRADING CONCENTRATION IN THE FUTURES AND STOCK MARKETS

The top ten buyers and sellers as a percentage  
of total dollar volume in each market.

## Stock Market

|            | <b>Top Ten Buyers</b> | <b>Top Ten Sellers</b> |
|------------|-----------------------|------------------------|
| October 15 | 10.9%                 | 11.3%                  |
| October 16 | 9.7                   | 12.3                   |
| October 19 | 8.7                   | 15.2                   |
| October 20 | 9.7                   | 7.1                    |

## Futures Market

|            | <b>Top Ten Buyers</b> | <b>Top Ten Sellers</b> |
|------------|-----------------------|------------------------|
| October 15 | 13.0%                 | 15.5%                  |
| October 16 | 17.6                  | 23.4                   |
| October 19 | 18.7                  | 26.7                   |
| October 20 | 25.7                  | 25.3                   |

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Study IV  
**The Effect of the October Stock Market  
Decline on the Mutual Funds Industry**

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# Study IV

## The Effect of the October Stock Market Decline on the Mutual Funds Industry

Mutual funds had total assets of approximately \$800 billion before the severe decline of the Dow Jones Industrial Average ("DJIA") on Monday, October 19, 1987. Approximately one quarter of that total amount, or \$200 billion, was invested in equities. By the end of business on Tuesday, October 20, the total asset value of mutual funds had declined by only \$32 billion, or 4 percent. However, due to a combination of investors redeeming their shares in equity funds, and a reduction in the market value of these funds, the total asset value of equity funds alone was reduced by \$28 billion, or a reduction of almost 14 percent.

The effect of the market decline on equity funds is the primary focus of this study. The study is organized in the following manner:

- I. Transaction Activity on October 16, 19 and 20
- II. Overview of Activity for October 1987
- III. Background of Mutual Funds Growth

### I. Transaction Activity on October 16, 19 and 20

The mutual funds industry emerged from the October 19 decline in reasonably sound condition, despite significant selling of equity securities by a small number of major participants in the industry. Redemptions of \$2.3 billion occurred on October 19, which accounted for two percent of total equity fund assets at the beginning of the day. This represented a greater dollar volume of redemptions than on any other day in the history of mutual funds.

On October 19, mutual funds were able to meet approximately two thirds of all redemptions through cash reserves. Consequently, one third of all redemptions was achieved through the sale of stocks in which the mutual funds had invested. A survey of 80 percent of all equity-based mutual funds indicates that net sales of \$779 million occurred on October 19. This was the peak selling day for October 1987. Total redemptions of equity funds after October 19 declined to an average of \$583 million per day for the week of October 21 to 26.

A summary of the change in assets and transaction volume follows:

### SUMMARY OF TOP 30 EQUITY FUND GROUPS <sup>1</sup>

[In millions of dollars]

|                               | October 16 | October 19 | October 20 |
|-------------------------------|------------|------------|------------|
| Total net assets.....         | \$161,347  | \$137,751  | \$133,022  |
| Total liquid assets.....      | 13,539     | 12,142     | 12,036     |
| Total redemptions.....        | 1,457      | 2,313      | 1,337      |
| Total net sales of stock..... | 313        | 779        | 603        |

<sup>1</sup> Data represents 79.9 percent of total equity as assets of October 31, 1987. Provided by the Investment Company Institute (ICI) (see Tables 1 and 2).

The selling behavior of mutual fund companies to meet redemptions during the market decline was not homogeneous. On October 19, three companies alone sold \$913 million of stocks, while the rest of the industry was a net buyer of \$134 million. Given the high level of redemptions and the uncertainty about the near future, the group of three mutual fund companies sold heavily in the stock market on October 16, 19 and 20. The following numbers account for the equity transactions on the New York Stock Exchange ("NYSE") alone:

### EQUITY TRANSACTIONS ON THE NEW YORK STOCK EXCHANGE

[In millions of dollars]

| Date            | Sold  | Bought | Net sales |
|-----------------|-------|--------|-----------|
| October 16..... | \$372 | \$102  | \$270     |
| October 19..... | 963   | 30     | 913       |
| October 20..... | 424   | 186    | 240       |

Before 10:00 a.m. on Monday, October 19, the three mutual fund companies had sold \$570 million of stocks on the NYSE alone. This accounted for approximately one quarter of all trading on the NYSE for the first 30 minutes that the Exchange was open. The three companies sold in large volume in all U.S. markets at the opening on Monday, but focused their selling on the NYSE. The three mutual fund companies were heavy net sellers because of very high levels of redemptions on Friday, Saturday and Sunday (October 16, 17 and 18) and the expectation that a significant amount of



redemptions would continue throughout the early part of the week. After the \$570 million of sales were executed in the first half hour on Monday, selling by the equity mutual funds of the three companies trailed off for the rest of the day. Nonetheless, the volume of early morning selling had a significant impact on the downward direction of the market.

Despite the comparatively significant selling of the three equity mutual funds, most of the redemptions were exchanges to other funds. Redemptions for the three companies on Monday, October 19, peaked at approximately 3.5 percent of the net asset value ("NAV") of all the equity groups' funds, compared to an industry monthly average of less than two percent.

Mutual fund liquidity is usually maintained at a level equal to one month of redemptions, which generally is adequate to meet "net cash needs" on an ongoing basis. However, redemptions were higher all month, and there was not sufficient liquidity to cope with the overwhelming level of redemptions on October 16, 19 and 20. The severity of the situation differed from fund to fund.

The three companies had significant lines of credit in order to meet redemptions. However, their credit lines were either fully utilized during October 16 and 19, or they chose to sell stocks as opposed to utilizing available credit.

While numerous money managers use the indexed stock futures market to hedge their portfolios, stock index futures were found to play an insignificant role for hedging mutual funds, not only during the October market decline, but throughout the entire year. While 137 funds, or 40 percent of the industry participants, have the authority to trade in index futures, on October 19 only nine funds actually used the product, which represents an insignificant amount of the total NAV of equity-based mutual funds.

## II. Overview of Activity for October 1987<sup>1</sup>

For the entire month of October 1987, total assets of all mutual funds dropped to \$774.1 billion from \$827.3 billion at the end of September, resulting in a reduction of \$53.2 billion (or 6 percent). The reduction in total assets reflects the drop in assets of equity funds in response to sharp declines in stock prices during October.

Purchases of mutual fund shares by investors in October were divided almost evenly between stock funds and bond and income funds. Despite the October stock market decline, investors bought shares

<sup>1</sup> This data was provided by the Investment Company Institute (see Tables 3 to 6).

in stock funds totaling \$4.8 billion, up from \$5.7 billion for September and from \$4.1 billion in October of 1986. Investors purchased shares in bond and income funds amounting to \$5.2 billion in October, compared to \$5.8 billion in September and \$14.7 billion in October 1986. Even more surprisingly, the equity growth and income stock fund categories remained very popular with investors in October. A total of \$1.9 billion of shares were purchased in these categories. Investors bought shares in government income funds totaling \$1.6 billion.

Total redemptions of \$15.8 billion in October were higher than normal, compared to \$12.6 billion in September 1987 and \$5.9 billion in October 1986. In October 1987, investors sold \$5.8 billion of equity fund shares; this was the largest single investment departure ever from equity funds. Sales of shares of bond and income funds by investors was \$4.8 billion in October, compared to \$3.7 billion in September, and \$10.8 billion in October 1986.

Total purchases of mutual fund shares by investors from January through October 1987 were \$172.3 billion, compared to \$176.3 billion for the first 10 months of 1986. Stock fund purchases by investors for the first 10 months of 1987 totaled \$63.4 billion, compared to \$44.5 billion in 1986, and purchases of bond and income fund shares were \$108.9 billion, compared to \$131.9 billion for the first 10 months of 1986. The increase in purchases of equity fund shares in 1987 came largely in the beginning of the year, during the swift rise in the Dow. Purchases of mutual fund shares in the latter half of the year slowed down considerably from the record levels that were achieved at the start of 1987.

## III. Background of Mutual Funds Growth<sup>2</sup>

Through 1987, investment in mutual funds has continued along the extraordinary growth rate which began in 1982. In 1982, inflation was stemmed, interest rates began to decline and stock and bond prices entered the early stage of what turned out to be one of the longest and strongest bull markets on record. These developments, along with innovations and effective marketing by fund organizations, set the stage for sustained growth in mutual funds.

For the past five years, many people have redirected a portion of their savings and investment dollars from traditional financial products (such as bank certificates of deposit) to mutual funds, in order to reap the benefits of attractive stock and bond markets. As a result, the number of share-

<sup>2</sup> This background information was provided by the Investment Company Institute (ICI).

holder accounts, the value of assets outstanding, and the dollar volume of purchases of shares in stock, bond, and income funds have all reached new heights.

### **Factors Contributing to Mutual Fund Growth**

The economic expansion of the last five years is the major contributing factor behind the growth of mutual funds. For the five years ending in 1986, equity fund returns have advanced at an annualized rate of 17.1 percent and have continued at a similar rate through October 1987. This is especially impressive when considering that for the 25 years ending in 1986, the S&P 500 index, which closely matches the performance of equity funds, increased at a rate of between 9 percent and 10 percent per year (see Figures 1 and 2).

Fixed income securities have done even better. Long term investment grade corporate bonds advanced by over 18 percent per year over the last five years as compared to 6.6 percent historically.

### **Total Assets of All Types of Funds**

At the end of September 1987, total mutual fund assets amounted to almost \$800 billion, more than eight times the asset level at the start of this decade. Except for a slight dip in total assets in 1983, total assets have expanded in every year of the 1980's. Not only have annual dollar gains in assets been large, but percentage increases (i.e. rates of growth) have been extraordinary. In January and February 1987, total assets increased about \$80 billion, or more than 10 percent. This reflected, among other things, the sharp rise in stock prices and record purchases by investors of stock, bond, and income fund shares.

### **Purchases of Stock Fund Shares**

Purchases by investors of equity fund shares continued to increase until the sudden October decline in the stock market. Growth and income funds, by far the most popular among investors, achieved an average return of 17.6 percent in 1986, the last full year for which figures are available. That return helped boost equity fund purchases in 1986 to \$23.5 billion, more than double the level in the preceding year. The largest purchases were in the international funds. International funds generated a 53 percent return, on average, in 1986.

### **Growth in the Number and Variety of Funds**

As the financial climate during the early 1980's enhanced the competitiveness of certain investment products, the mutual fund industry responded to investors' demands by increasing the number and

types of funds. The number of funds available to the investing public has grown to over 2,000 as compared to about 550 funds of all types in existence at the beginning of the decade. The range of fund types also expanded during this period.

The expanded fund product line has broadened the customer base for funds. The greater number and varied types of investment products offered by the industry have expanded the appeal of mutual funds. This has undoubtedly attracted investors who previously were not interested in the limited types of funds available. It has also made mutual funds, and the companies offering them, a more viable alternative for the investing public. At the same time, however, the proliferation in the number and types of investment products has added a degree of complexity to the marketplace that has affected the investment behavior of many shareholders.

### **Mutual Fund Assets by Investment Objective**

Investors may now choose from over 2,000 mutual funds. Approximately 39 percent of the total value of assets under management are in money market funds and short term municipal funds. The investment mix is relatively conservative in keeping with the general objectives of mutual fund investors who prefer moderate or minimum risks.

There are numerous variations of funds within each product type. Bond funds vary by maturity and portfolio quality. Stock funds, likewise, have different risk-reward characteristics that are differentiated by their categories: aggressive growth, growth and growth and income funds. Investors may also select equity funds that specialize in specific areas or sectors, such as: precious metals, defense, high-tech, energy and many other industries. Positions in these industries may be mixed and modified (through the exchange feature available with many mutual fund organizations), depending upon the changing economic scene and the goals of investors.

In short, mutual funds organizations have tried to identify the changing needs of investors and create products to meet those needs. This has helped the fund industry establish a broader customer base and increase its penetration of the total financial services market.

### **Total Exchange Activity**

The ability of investors to exchange from one type of fund to another (within a family) has helped attract and keep investors in the mutual fund industry. Exchange activity has increased from a few billion dollars in 1980 to over \$100 billion at the end of 1986. Much of the exchange activity is concentrated in a limited number of fund organizations. The sharp rise in exchanges has to do with: greater



awareness of the exchange feature; more fund products (including sector funds) which increase the options of investors; greater volatility in financial markets; and greater reliance on advisors who tell investors when to move.

### Awareness and Ownership of Mutual Funds

The industry has been very successful in adding new customers to the shareholder population. Only about 30 percent of the 65 million households in the U.S. were aware of mutual funds in 1970. Currently, around 60 percent of the 87 million households are aware of these funds. Recent estimates of fund investors have ranged from about 16 million to 26 million, or approximately 30 percent of all U.S. households. Shareholder accounts have increased by over fourfold from approximately 10 million in 1982 to close to 46 million today.

### Fund Shareholder Profile

Today's mutual fund shareholder has a median household income level of approximately \$46,500 as compared to \$29,800 in 1984. The median age of investors is approximately 52.4 years. Over 70 percent of all shareholders are male. Over one third of all shareholders have completed graduate school. More than twice this proportion have completed

either college or technical school. This is substantially higher than for the general population, where only 17 percent of all persons 45 to 54 years of age have completed four or more years of college.

Shareholders generally have substantial household assets in addition to their fund holdings. The median household assets for current shareholders (financial assets excluding any real estate) is almost \$115,000, of which approximately \$37,500 is in mutual funds. The relatively high level of household assets reflects more advanced average age and the presence of retired shareholders who have accumulated substantial amounts in retirement and other savings plans. Almost two thirds of all current shareholders are employed and the remaining one third are retired. Finally, most shareholders view themselves as willing to take "moderate" investment risks.

Most of the increase in shareholders' household income can be attributed to rising wages for white-collar workers. Almost eight-in-ten shareholders who are employed hold white-collar positions. The largest increases in shareholders' household incomes have occurred for equity fund and money market fund owners. The household income for equity fund owners rose from \$31,300 in 1982 to \$47,500 today. The household income for fixed income fund owners also grew, but at a somewhat slower rate than for the other two fund-owner categories.

TABLE 1.—SUMMARY DATA OF TOP 30 EQUITY FUND GROUPS <sup>1</sup>

[In millions of dollars]

|                              | October 16  | October 19  | October 20  | October 21  | October 22  | October 23  | October 26  |
|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Total net assets .....       | \$161,346.9 | \$137,751.4 | \$133,022.2 | \$140,513.9 | \$135,821.0 | \$133,089.7 | \$124,933.5 |
| Total liquid assets .....    | 13,539.0    | 12,421.3    | 12,035.6    | 11,564.6    | 12,658.2    | 13,573.9    | 13,833.1    |
| Total redemptions .....      | 1,457.1     | 2,312.7     | 1,336.5     | 585.7       | 577.0       | 460.0       | 709.8       |
| Common stock sales .....     | 934.1       | 1,553.4     | 1,517.2     | 1,268.6     | 1,369.3     | 738.3       | 1,177.5     |
| Common stock purchases ..... | 620.8       | 774.3       | 913.9       | 1,003.7     | 480.5       | 438.2       | 404.9       |
| Exchanges into fund .....    | 187.3       | 236.5       | 269.1       | 618.6       | 374.3       | 130.3       | 117.6       |
| Exchanges out of fund .....  | 1,239.9     | 1,890.4     | 1,053.1     | 379.9       | 431.0       | 338.7       | 527.9       |

<sup>1</sup> Data are for funds representing 79.9 percent of total equity assets as of August 31, 1987.

Source: Investment Company Institute (ICI).

TABLE 2.—SUMMARY DATA OF TOP 30 EQUITY FUND GROUPS

[Dollar amounts in millions]

|  | October 19   | October 20  | October 21 | October 22  | October 23  | October 26  |
|--|--------------|-------------|------------|-------------|-------------|-------------|
| Change in assets .....                                   | (\$23,595.5) | (\$4,749.2) | \$7,511.7  | (\$4,692.9) | (\$2,731.3) | (\$8,156.2) |
| Change in liquid assets .....                            | (\$1,117.7)  | (\$385.7)   | (\$471.0)  | \$1,093.6   | \$915.7     | \$259.2     |
| Exchanges out as a percentage of total redemptions ..... | 81.7         | 78.8        | 64.9       | 74.7        | 73.6        | 74.4        |
| Total stock purchases less sales .....                   | (\$779.1)    | (\$603.3)   | (\$264.9)  | (\$888.8)   | (\$300.1)   | (\$772.6)   |

TABLE 3.—TOTAL ASSETS OF MUTUAL FUNDS

[In billions of dollars]

| Date               | Total assets<br>all types of<br>funds | Equity funds <sup>1</sup> | Bond and<br>income funds | Money market | Short term<br>municipal |
|--------------------|---------------------------------------|---------------------------|--------------------------|--------------|-------------------------|
| End of year:       |                                       |                           |                          |              |                         |
| 1979.....          | \$94.5                                | \$32.5                    | \$16.6                   | \$45.2       | \$0.3                   |
| 1980.....          | 134.8                                 | 41.0                      | 17.4                     | 74.5         | 1.9                     |
| 1981.....          | 241.4                                 | 38.4                      | 16.9                     | 181.9        | 4.2                     |
| 1982.....          | 296.7                                 | 50.6                      | 26.3                     | 206.6        | 13.2                    |
| 1983.....          | 292.9                                 | 73.9                      | 39.7                     | 162.5        | 16.8                    |
| 1984.....          | 370.7                                 | 78.1                      | 59.1                     | 209.7        | 23.8                    |
| 1985.....          | 495.5                                 | 109.6                     | 142.1                    | 207.5        | 36.3                    |
| 1986.....          | 716.3                                 | 152.5                     | 271.6                    | 228.3        | 63.8                    |
| 1987 end of month: |                                       |                           |                          |              |                         |
| January.....       | 766.0                                 | 174.3                     | 290.1                    | 232.5        | 69.1                    |
| February.....      | 796.3                                 | 188.5                     | 302.2                    | 235.6        | 70.1                    |
| March.....         | 811.6                                 | 196.9                     | 310.3                    | 234.2        | 70.2                    |
| April.....         | 803.5                                 | 200.8                     | 301.7                    | 235.4        | 65.6                    |
| May.....           | 805.3                                 | 203.3                     | 297.4                    | 237.5        | 67.2                    |
| June.....          | 818.4                                 | 212.0                     | 304.9                    | 234.8        | 66.7                    |
| July.....          | 837.2                                 | 224.1                     | 306.9                    | 239.2        | 67.0                    |
| August.....        | 848.4                                 | 234.3                     | 304.9                    | 242.7        | 66.5                    |
| September.....     | 827.3                                 | 233.4                     | 287.6                    | 241.4        | 64.9                    |
| October.....       | 774.1                                 | 179.1                     | 277.3                    | 255.0        | 62.7                    |

<sup>1</sup> Equity funds include aggressive growth, growth, growth and income, precious metals and international.

TABLE 4.—NET PURCHASES BY INVESTORS OF STOCK, BOND AND INCOME FUNDS

[In millions of dollars]

| Date                   | Total net purchases | Equity funds <sup>1</sup> | Bond and income<br>funds |
|------------------------|---------------------|---------------------------|--------------------------|
| End of year:           |                     |                           |                          |
| 1979.....              | (\$1,178.9)         | (\$2,247.8)               | \$1,068.9                |
| 1980.....              | 1,793.6             | 222.2                     | 1,571.4                  |
| 1981.....              | 2,240.0             | 997.6                     | 1,242.4                  |
| 1982.....              | 8,166.5             | 3,163.8                   | 5,002.7                  |
| 1983.....              | 25,647.4            | 13,215.0                  | 12,432.4                 |
| 1984.....              | 25,826.8            | 7,798.5                   | 18,028.3                 |
| 1985.....              | 80,550.2            | 9,482.2                   | 71,068.0                 |
| 1986.....              | 148,835.3           | 28,608.2                  | 120,227.0                |
| 1987 year to date..... | 72,652.8            | 31,024.6                  | 41,865.2                 |
| 1987 by month:         |                     |                           |                          |
| January.....           | 18,129.1            | 4,609.6                   | 13,519.5                 |
| February.....          | 14,731.6            | 3,718.1                   | 11,013.6                 |
| March.....             | 16,691.0            | 5,002.9                   | 11,688.1                 |
| April.....             | 12,304.1            | 6,123.9                   | 6,180.2                  |
| May.....               | 3,865.0             | 2,269.8                   | 1,595.1                  |
| June.....              | 4,975.3             | 2,188.0                   | 2,787.4                  |
| July.....              | 4,882.9             | 2,174.1                   | 2,708.8                  |
| August.....            | 4,128.6             | 3,331.8                   | 796.8                    |
| September.....         | (1,146.4)           | (2,529.0)                 | (3,675.4)                |
| October.....           | (5,808.4)           | (959.6)                   | (4,848.8)                |

<sup>1</sup> Equity funds include aggressive growth, growth, growth and income, precious metals and international.

TABLE 5.—NUMBER OF SHAREHOLDER ACCOUNTS

[In thousands of dollars]

| Date            | Total all funds | Total long term funds | Equity funds <sup>1</sup> | Bond and income funds | Money market | Short term municipal funds |
|-----------------|-----------------|-----------------------|---------------------------|-----------------------|--------------|----------------------------|
| 1979.....       | \$9,793         | \$7,482               | \$5,554                   | \$1,928               | \$2,308      | \$3                        |
| 1980.....       | 12,088          | 7,326                 | 5,811                     | 1,515                 | 4,746        | 16                         |
| 1981.....       | 17,521          | 7,175                 | 5,663                     | 1,512                 | 10,282       | 64                         |
| 1982.....       | 21,410          | 8,190                 | 6,228                     | 1,962                 | 13,063       | 157                        |
| 1983.....       | 24,605          | 12,065                | 8,872                     | 3,193                 | 12,277       | 263                        |
| 1984.....       | 28,269          | 14,424                | 10,045                    | 4,379                 | 13,556       | 289                        |
| 1985.....       | 34,780          | 19,846                | 11,506                    | 8,340                 | 14,435       | 499                        |
| 1986 quarterly: |                 |                       |                           |                       |              |                            |
| 1st.....        | 38,410          | 22,915                | 12,616                    | 10,299                | 14,952       | 543                        |
| 2d.....         | 42,328          | 26,251                | 15,311                    | 10,940                | 15,490       | 587                        |
| 3d.....         | 44,222          | 27,856                | 15,185                    | 12,671                | 15,693       | 673                        |
| 4th.....        | 46,075          | 29,817                | 15,989                    | 13,828                | 15,654       | 604                        |
| 1987 quarterly: |                 |                       |                           |                       |              |                            |
| 1st.....        | 49,703          | 33,158                | 17,864                    | 15,294                | 15,840       | 705                        |
| 2d.....         | 53,542          | 36,488                | 20,091                    | 16,397                | 16,288       | 766                        |

<sup>1</sup> Equity funds include aggressive growth, growth, growth and income, precious metals and international.

TABLE 6.—SALES OF STOCK BY MUTUAL FUNDS AS A RESULT OF EXCHANGES

[In millions of dollars]

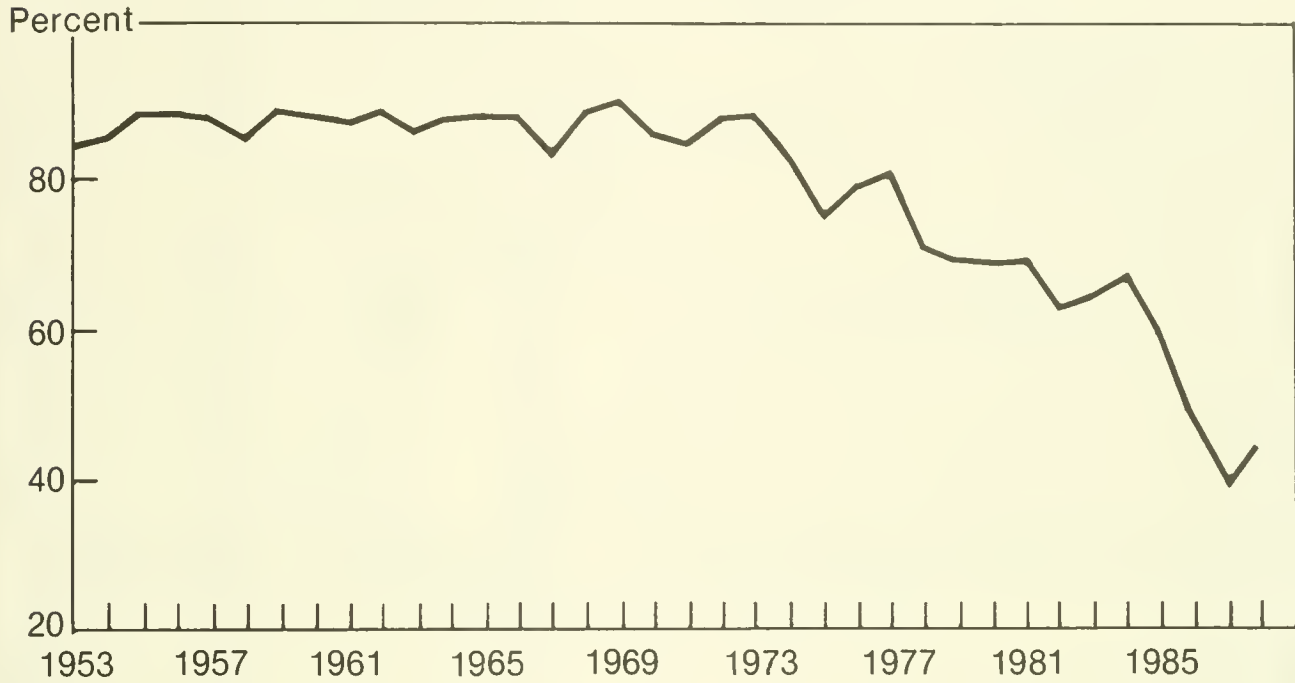
| Date                   | All types of funds | Equity funds <sup>1</sup> | Bond and income funds | Money market | Short term municipal |
|------------------------|--------------------|---------------------------|-----------------------|--------------|----------------------|
| End of year:           |                    |                           |                       |              |                      |
| 1979.....              | \$5,829.5          | \$2,038.8                 | \$1,004.8             | \$2,775.2    | \$10.7               |
| 1980.....              | 10,098.5           | 3,986.5                   | 1,433.0               | 5,370.7      | 208.3                |
| 1981.....              | 14,439.2           | 5,040.0                   | 1,449.2               | 7,653.7      | 296.3                |
| 1982.....              | 28,248.6           | 8,261.9                   | 2,832.2               | 16,110.5     | 1,044.0              |
| 1983.....              | 35,682.9           | 12,080.3                  | 4,315.6               | 17,820.2     | 1,466.8              |
| 1984.....              | 36,660.6           | 12,038.2                  | 5,137.3               | 17,432.7     | 2,052.5              |
| 1985.....              | 46,580.8           | 15,445.5                  | 9,543.2               | 17,899.2     | 3,692.9              |
| 1986.....              | 107,818.6          | 36,998.2                  | 22,116.7              | 40,908.7     | 7,795.1              |
| 1987 year to date..... | 177,708.6          | 65,851.0                  | 25,913.0              | 72,643.8     | 13,300.8             |
| 1987 by month:         |                    |                           |                       |              |                      |
| January.....           | 13,890.7           | 6,656.0                   | 2,876.3               | 3,786.2      | 572.2                |
| February.....          | 11,855.9           | 5,019.4                   | 2,233.5               | 3,978.7      | 624.4                |
| March.....             | 14,120.6           | 6,079.9                   | 2,035.3               | 5,032.4      | 973.0                |
| April.....             | 25,020.0           | 8,088.7                   | 2,869.9               | 11,035.5     | 3,025.9              |
| May.....               | 17,151.1           | 5,818.5                   | 2,404.5               | 7,318.9      | 1,609.2              |
| June.....              | 14,402.6           | 5,458.6                   | 3,408.3               | 4,507.6      | 1,028.1              |
| July.....              | 14,851.7           | 6,563.6                   | 1,866.7               | 5,536.0      | 885.4                |
| August.....            | 17,907.4           | 7,930.0                   | 2,375.2               | 6,509.9      | 1,092.2              |
| September.....         | 20,561.8           | 7,475.6                   | 1,969.4               | 9,415.8      | 1,700.9              |
| October.....           | 27,947.0           | 6,760.8                   | 3,873.8               | 15,522.9     | 1,789.5              |

<sup>1</sup> Equity funds include aggressive growth, growth, growth and income, precious metals and international.



# MUTUAL FUNDS

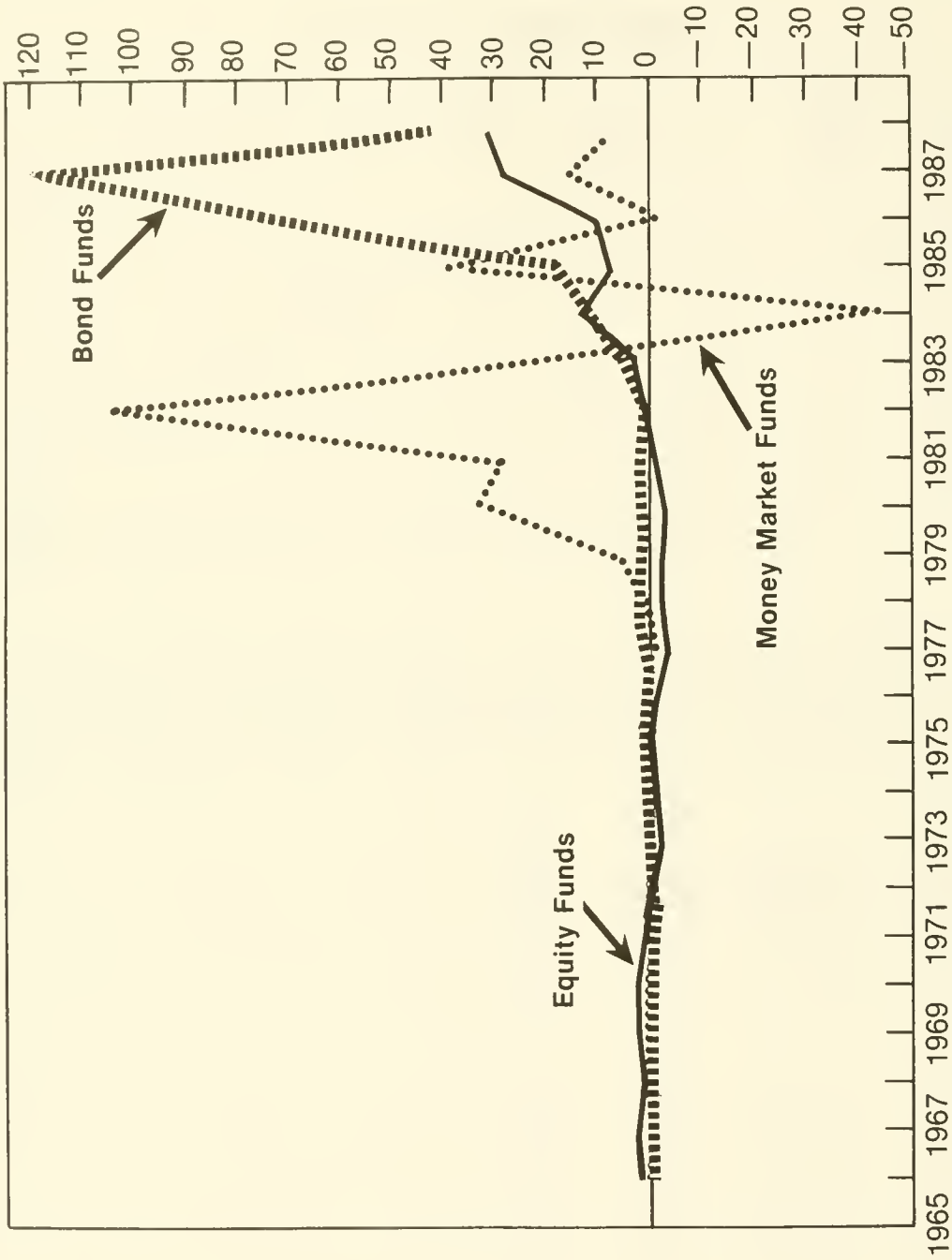
Equities as Percent of Total Financial Assets



Source: Flow of Funds, Federal Reserve.

# NET CASH FLOW INTO MUTUAL FUNDS

(Billions of Dollars)



Values for 1987 are annual rates based on data for the first ten months of the year.  
Source: Investment Company Institute.

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**Study V**  
**Surveys of Market Participants and Other**  
**Interested Parties**

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# Study V

## Surveys of Market Participants and Other Interested Parties

The purpose of this document is to review the responses received in the Task Force's surveys of market participants and other interested parties. The document is organized under three headings:

- Survey methodology;
- Highlights of survey responses;
- Appendices.

### Survey Methodology

The purpose of the survey effort was twofold. First, the surveys were designed to provide a mechanism for obtaining the perspective of a wealth of individuals and organizations representing a variety of constituencies and opinions. Second, the survey effort was designed to help provide some evidence for the Task Force's review of the activities of those individuals who were active participants in the market around October 19.

In order to accomplish these objectives, the team designed three different surveys. A short general survey was prepared for those groups which did not manage funds (273 distributed). A longer general survey was prepared for pension funds, mutual funds, and fund managers (200 distributed). Finally, a third survey was designed specifically for pension funds which addressed their use of portfolio insurance (149 distributed). In total 622 surveys were distributed. A copy of each of the three surveys is included in the Appendix.

Surveys were distributed to the following groups:

| Group and description  | Total distributed |
|--|-------------------|
| I. Regulators: Regional Federal Reserve Banks, SEC, etc .....      | 17                |
| II. Exchanges: Regional exchanges, clearing houses, etc .....      | 22                |
| III. Fortune 100 CEOs: General Motors, Exxon, etc .....            | 100               |
| IV. Mutual Funds: Fidelity, Oppenheimer, etc .....                 | 50                |
| V. Pension Funds: Largest 50 U.S. corporate pension funds .....    | 50                |
| VI. Fund Managers: Largest 100 U.S. fund managers .....            | 100               |
| VII. Trade Groups: Market Technicians Association, NASD, etc ..... | 12                |
| VIII. Commercial Banks: Largest 25 U.S. commercial banks .....     | 25                |
| IX. Investment Banks: Salomon, First Boston, etc.....              | 24                |

| Group and description  | Total distributed |
|--|-------------------|
| X. Foreign Commercial Banks: Largest 10 foreign commercial banks in U.S.....                     | 10                |
| XI. International Securities Firms: Nomura Securities, S.G. Warburg, etc.....                    | 11                |
| XII. Regional Investment Banks: Alex Brown, Edward D. Jones, etc.....                            | 25                |
| XIII. Discount Brokers: Andrew Peck Associates, Charles Schwab & Co., etc .....                  | 12                |
| XIV. Nobel Prize Winners in Economics: Nobel Memorial Prize Winners in Economics since 1973..... | 15                |
| XV. Special Pension Fund Survey Recipients: Private and public pension funds .....               | 149               |
| Total .....  | 622               |

Respondents were asked to return the surveys by December 2, 1987. In fact, all surveys returned by December 8 were included in the analysis:

| Group   | Total distributed | Received as of Dec. 8 |         |
|---|-------------------|-----------------------|---------|
|   |                   | Re-sponses            | Percent |
| I. Regulators.....                              | 17                | 9                     | 53      |
| II. Exchanges.....                              | 22                | 5                     | 23      |
| III. Fortune 100 CEOs .....                     | 100               | 43                    | 43      |
| IV. Mutual Funds.....                           | 50                | 18                    | 36      |
| V. Pension Funds .....                          | 50                | 25                    | 50      |
| VI. Fund Managers .....                         | 100               | 54                    | 54      |
| VII. Trade Groups .....                         | 12                | 3                     | 25      |
| VIII. Commercial Banks.....                     | 25                | 13                    | 52      |
| IX. Investment Banks .....                      | 24                | 8                     | 33      |
| X. Foreign Commercial Banks .....               | 10                | 4                     | 40      |
| XI. International Securities Firms...           | 11                | 6                     | 55      |
| XII. Regional Investment Banks.....             | 25                | 14                    | 56      |
| XIII. Discount Brokers .....                    | 12                | 2                     | 17      |
| XIV. Nobel Prize Winners .....                  | 15                | 7                     | 47      |
| XV. Special Pension Fund Survey Recipients..... | 149               | 80                    | 54      |
| Total.....                                      | 622               | 291                   | 47      |

Once the surveys were received, two steps were taken to synthesize results:

*Survey Processing*—The surveys were coded to facilitate data entry and processing. For example, a list of fundamental factors causing the market decline was compiled reflecting the most frequently cited responses of initial surveys, which was then



used to code subsequent surveys. Naturally, judgement was required in distilling what were often long dissertations into discrete answers.

*Survey Analysis*—To assist in the analysis of these results, a general overview of survey results was conducted which is outlined later in the document. A complete listing of all survey responses was also prepared and is provided in the Appendix.

## **Highlights of Survey Responses**

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The major highlights of survey responses were as follows:

- Some consensus existed regarding the cause of the market's decline.
- Fundamental factors were perceived to be the cause of the decline leading up to October 19.

- Technical and psychological factors were perceived to be the cause of the market decline on October 19.

- Consensus also existed on the poor performance of market mechanisms on October 19 and 20.

- Virtually all market participants reported a decline in the value of their equity portfolios. Protective strategies such as portfolio insurance programs moderated losses somewhat, but in most cases users of portfolio insurance failed to follow strategy directives fully.

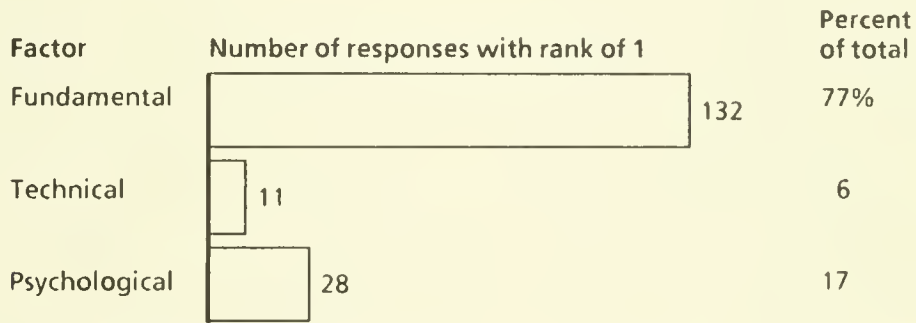
- Recommendations of survey respondents differed widely, depending on the constituencies represented.

The following review of survey responses makes no judgements as to the validity of survey responses, but instead merely records the highlights of the responses as they were submitted.

Consensus Existed Regarding Cause of Market's Decline

During the week preceding October 19, fundamental factors were perceived to be the primary cause of the market's decline.

**PERCEIVED IMPORTANCE OF FACTORS AFFECTING STOCK MARKET DECLINE DURING THE WEEK PRECEDING OCTOBER 19, 1987**



Total responses with rank of 1 = 171

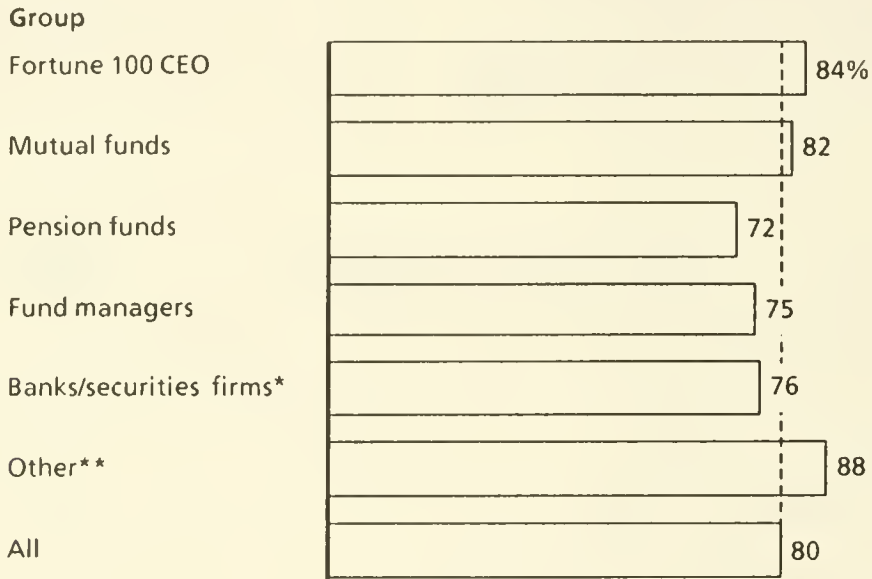
Note: This chart is a tabulation of total responses with a rank of 1 (most important factor)

Source: General survey

This did not vary significantly among survey respondent groups.

### PERCEIVED IMPORTANCE OF FUNDAMENTAL FACTORS AS A CAUSE OF THE STOCK MARKET DECLINE ON THE WEEK PRECEDING OCTOBER 19, 1987

Percent of respondents giving fundamental factors rank of 1



\* Includes foreign and domestic commercial banks, foreign and domestic investment banks, and discount brokers

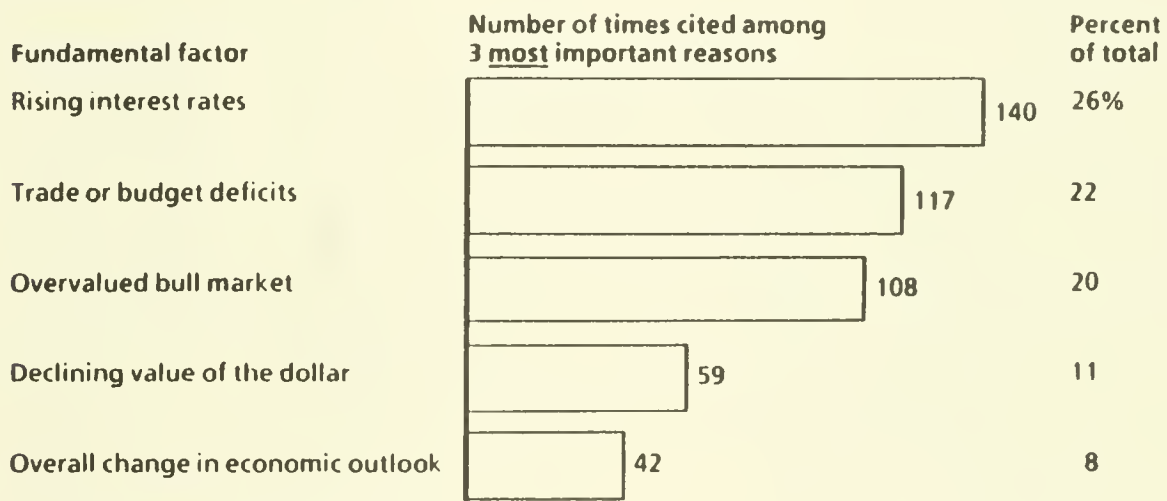
\*\* Includes regulators, exchanges, trade groups, and academics

Note: This chart is based on a tabulation of respondents who gave fundamental factors a rank of 1 (most important factor); because some respondents gave more than one factor a rank of 1 or did not give a rank to all three factors, the percent of respondents citing a factor in this chart will differ from the percent of citations for a factor in the preceding chart

Source: General survey

Among fundamental factors, respondents cited three as being most significant: rising interest rates, twin deficits, and the over-valued bull market.

**FUNDAMENTAL FACTORS MOST OFTEN  
CITED AS CAUSE OF STOCK MARKET  
DECLINE DURING THE WEEK PRECEDING  
OCTOBER 19, 1987**

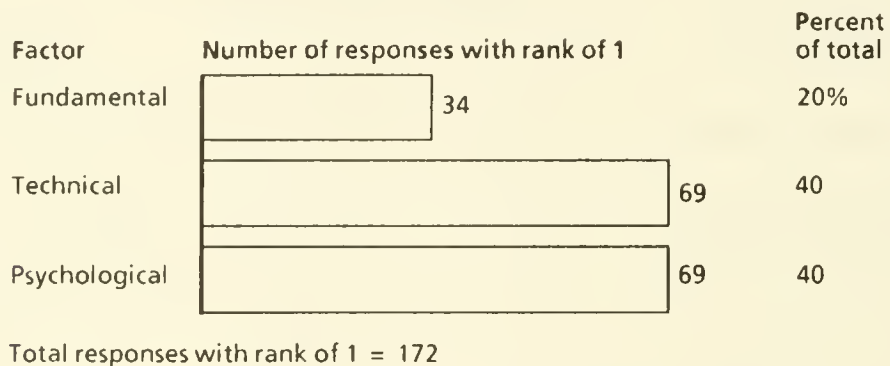


Total number of citations = 542

Source: General survey

On October 19, technical and psychological factors were perceived by respondents to be the most significant causes.

**PERCEIVED IMPORTANCE OF FACTORS  
AFFECTING STOCK MARKET DECLINE ON  
OCTOBER 19, 1987**



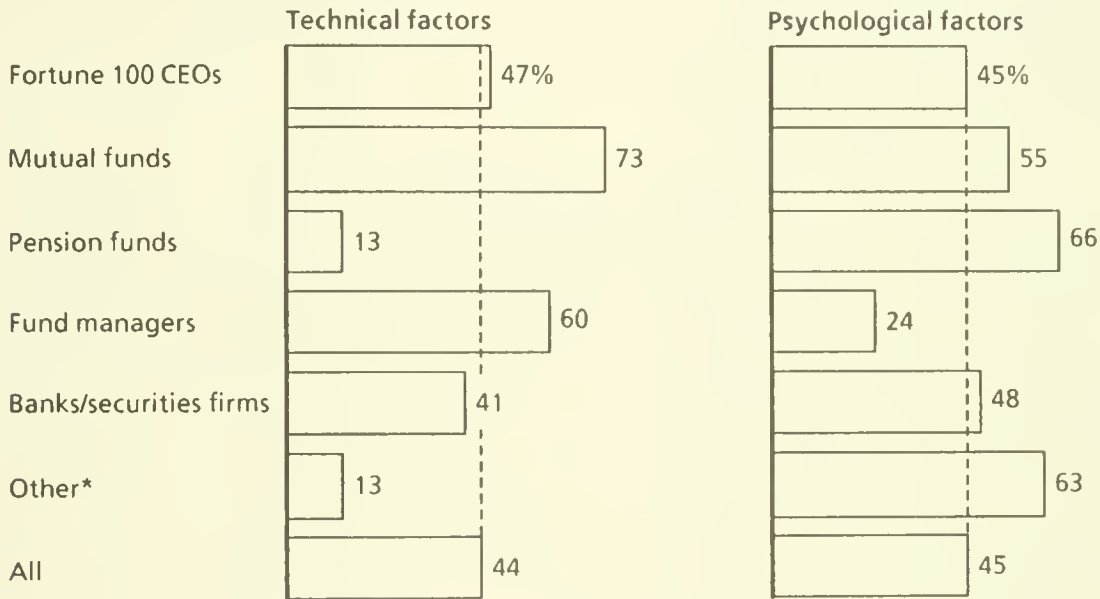
Note: This chart is a tabulation of total responses with a rank of 1 (most important factor)  
Source: General survey



These responses varied somewhat by respondent group.

**PERCEIVED IMPORTANCE OF TECHNICAL AND PSYCHOLOGICAL FACTORS AS CAUSES OF THE STOCK MARKET DECLINE ON OCTOBER 19, 1987**

Percent of respondents giving factor rank of 1



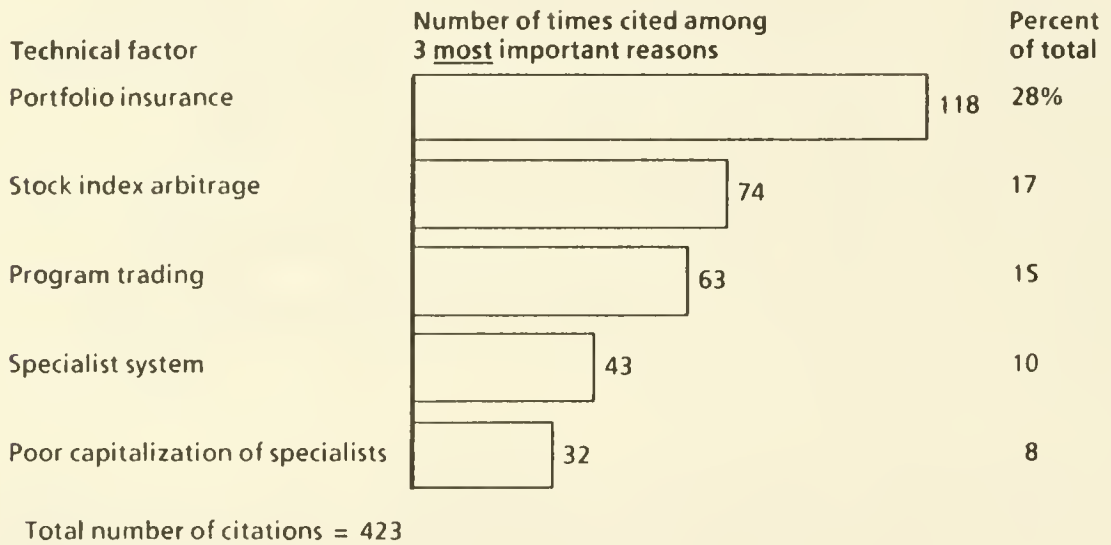
\* Other includes regulators, exchanges, trade groups, and academics

Note: This chart is based on a tabulation of respondents who gave technical and psychological factors a rank of 1 (most important factor); because some respondents gave more than one factor a rank of 1 or did not give a rank to all three factors, the percent of respondents citing a factor in this chart will differ from the percent of citations for a factor in the preceding chart

Source: General survey

Among technical factors, portfolio insurance, stock index arbitrage, program trading (obviously not mutually exclusive responses), specialist system mechanics, and poor capitalization of specialists were the five most frequently cited reasons for the market's decline on October 19.

**TECHNICAL FACTORS MOST OFTEN  
CITED AS CAUSE OF STOCK MARKET  
DECLINE ON OCTOBER 19, 1987**

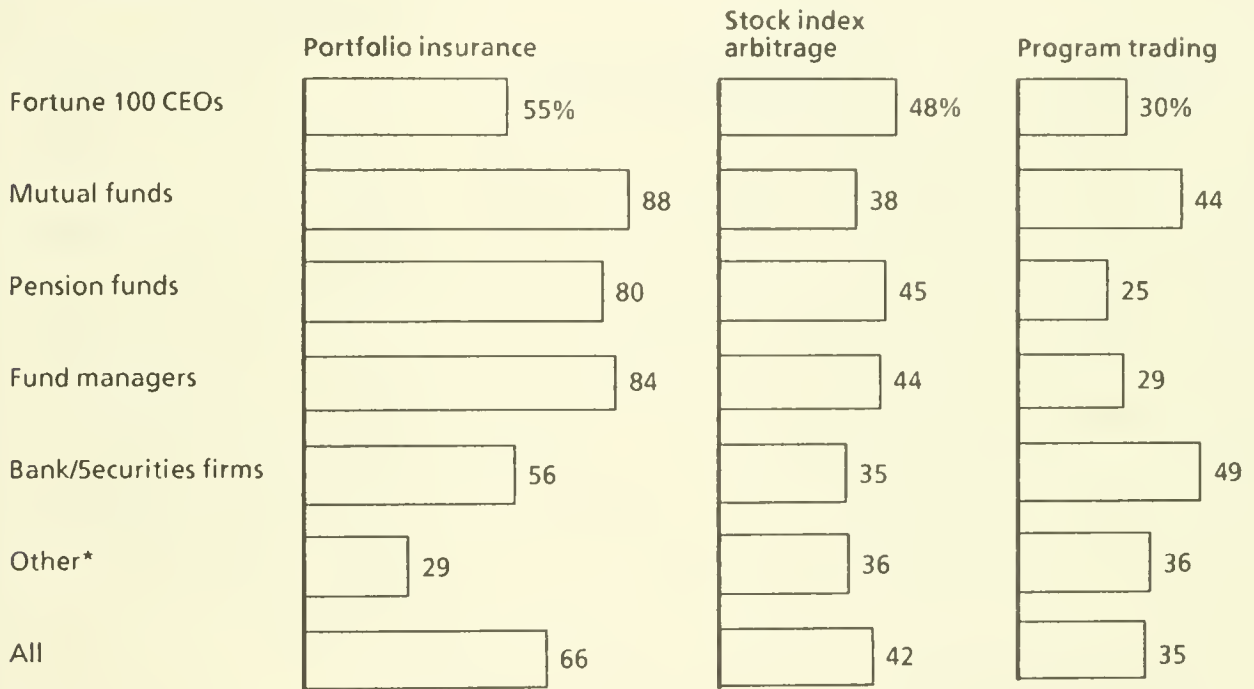


Source: General survey

Among those reasons related to stock index futures activity, the greatest differences in opinion between groups of respondents was on the role of portfolio insurance.

**TECHNICAL FACTORS MOST OFTEN MENTIONED AS A CAUSE OF THE MARKET DECLINE ON OCTOBER 19**

Percent of respondents citing factor among 3 most important



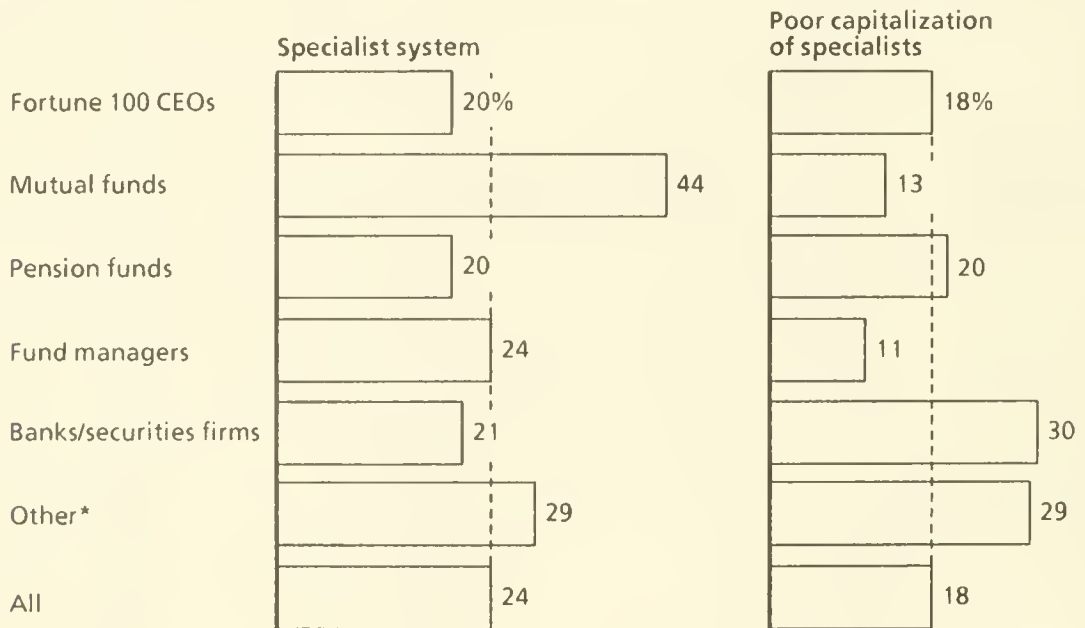
\* Other includes regulators, exchanges, trade groups, and academics

Source: General survey

In terms of those factors related to NYSE operations, mutual fund respondents cited problems with the specialist system most often, while respondents from banks and securities firms were the most concerned with problems related to poor capitalization of specialists.

**TECHNICAL FACTORS MOST OFTEN MENTIONED AS A CAUSE OF THE MARKET DECLINE ON OCTOBER 19, 1987**

Percent of respondents citing factor among 3 most important

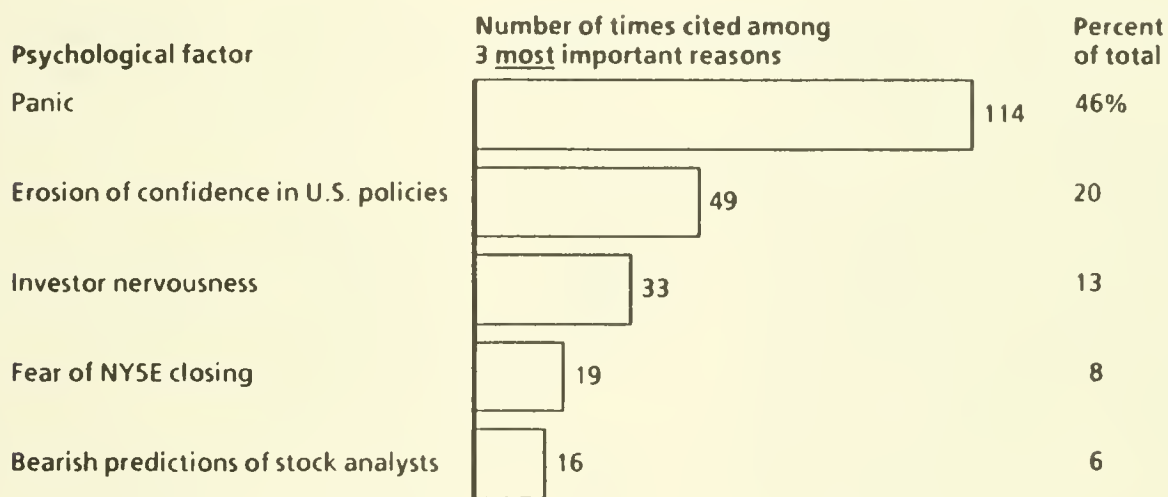


\* Other includes regulators, exchanges, trade groups, and academics

Source: General survey

Among psychological factors cited as causes of the October 19 market decline, "panic" was the dominant cause cited, followed by "an erosion of confidence in U.S. policies" and "general nervousness in markets."

**PSYCHOLOGICAL FACTORS MOST OFTEN  
CITED AS CAUSE OF STOCK MARKET  
DECLINE ON OCTOBER 19, 1987**



Total number of citations = 251

Source: General survey



Consensus Existed on  
Poor Market Performance

Most respondents who commented felt markets performed well below normal quality levels, with the OTC market being the poorest performer.

RESPONDENTS RATING OF MARKET  
 PERFORMANCE OCTOBER 19 - 20  
 AGAINST NORMAL QUALITY PERFORMANCE

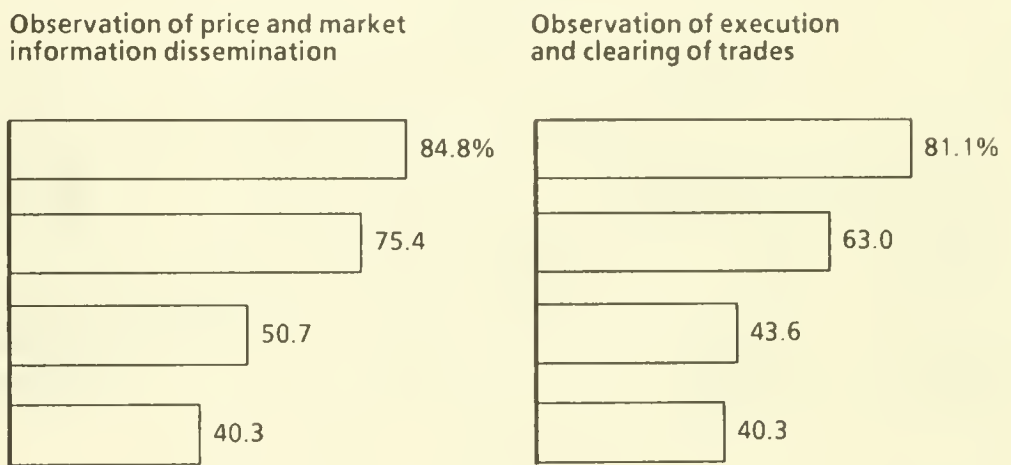
% of Respondents

|   | Excellent<br>(90% of normal<br>quality) | Good<br>(75 - 90%) | Poor<br>(50 - 75%) | Very Poor<br>(less than 50%<br>of normal quality) |
|---|---|--------------------|--------------------|---|
| Dissemination of<br>price & market<br>information |   |                    |                    |   |
| - NYSE  | 4.5%                                    | 31.8%              | 30.7%              | 33.0%   |
| - OTC   | 0.0%                                    | 9.8%               | 14.4%              | 75.8%   |
| - Index Futures                                   | 5.6%                                    | 34.6%              | 29.0%              | 30.8%   |
| - Options Markets                                 | 1.2%                                    | 21.2%              | 35.3%              | 42.3%   |
| Executing & clearing<br>trades                    |   |                    |                    |   |
| - NYSE  | 4.7%                                    | 29.2%              | 39.2%              | 26.9%   |
| - OTC   | 3.8%                                    | 10.5%              | 21.0%              | 64.7%   |
| - Index Futures                                   | 7.6%                                    | 27.2%              | 31.5%              | 33.7%   |
| - Options Markets                                 | 1.6%                                    | 23.4%              | 37.5%              | 37.5%   |

However, the NYSE was the most visible market on October 19 and October 20, with over 80% of those surveyed commenting on its performance.

**PERCENT OF RESPONDENTS WHO OBSERVED MARKET PERFORMANCE**

Percent of respondents



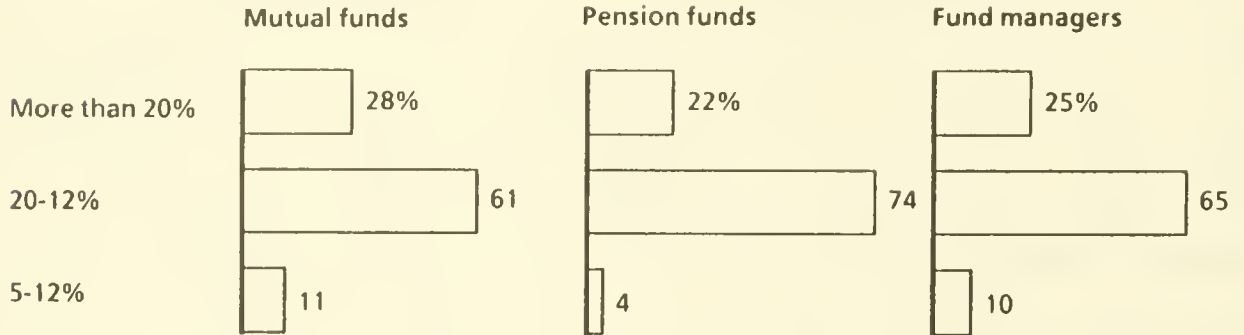
Source: General survey

Decline In Portfolio  
Values Widespread

Virtually all market participants reported significant declines in the value of their equity portfolios.

**DECLINE IN U.S. EQUITY PORTFOLIO  
VALUE ON OCTOBER 19**

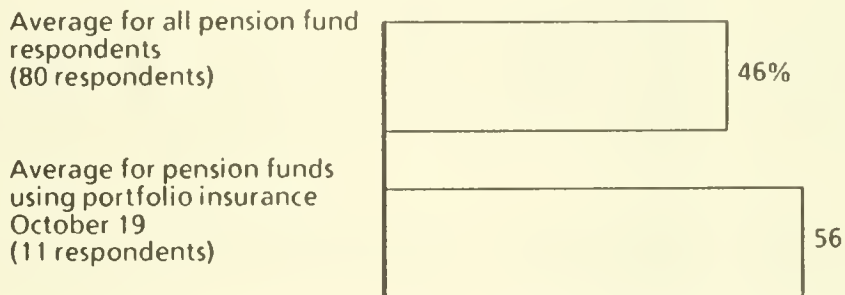
Percent of respondents to question



Those pension funds in our survey which reported using portfolio insurance, a dynamic hedging strategy designed to limit downside risk, contained a higher percentage of their assets in equities than those funds not using portfolio insurance.

**RATIO OF FUNDS IN EQUITY TO TOTAL FUNDS  
SEPTEMBER 30, 1987**

Percent

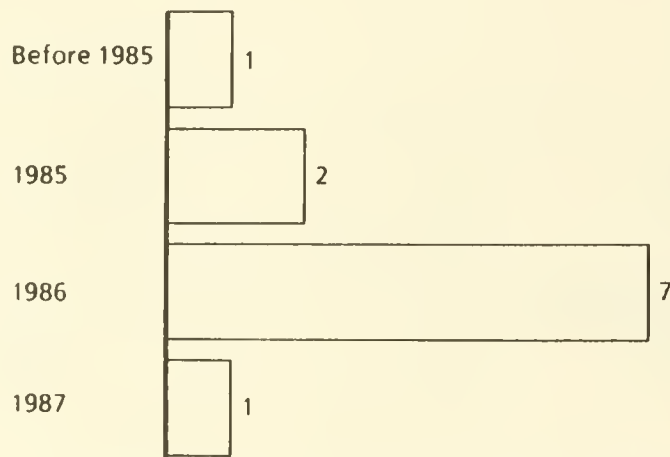


Source: Special pension fund survey

The majority of our respondents who used portfolio insurance in 1987 reported initiating the strategy in 1986. It is interesting to note that while the portfolio insurance industry grew substantially\* during 1987, a very low percentage of pension funds which returned their surveys reported initiating portfolio insurance strategies during 1987.

**DISTRIBUTION OF RESPONDENTS USING PORTFOLIO INSURANCE ON OCTOBER 19 BY YEAR OF ADOPTION OF PORTFOLIO INSURANCE PROGRAM**

Number of respondents



Total respondents using portfolio insurance October 19 = 11

Source: Special survey



Portfolio insurance moderated losses but in most cases did not meet fund manager expectations. Eleven of the eighty special pension fund surveys reported having had portfolio insurance programs in place on October 19. A review of these portfolio insurance users' surveys yields the following highlights.

- ¶ Portfolio insurance programs contributed significantly to selling activity. Several of the surveyed portfolio insurance users reported selling instruments in excess of 25 percent of their equity portfolios after October 12, with one fund selling 84 percent.
- ¶ Most portfolio insurance programs used futures contracts, although some also bought put options to hedge their position.
- ¶ In most cases, strict portfolio insurance strategy directives were not followed in full. In some cases, hedges were lagged, which limited portfolio protection. In other cases, the programs were abandoned altogether.
- ¶ A large percentage of survey respondents which used portfolio insurance earlier in 1987 subsequently terminated their strategies. Out of 13 pension funds which reported using portfolio insurance in 1987, 2 dropped the strategy prior to October 19 and 7 more eliminated their programs following the October market decline.

Portfolio insurance users were asked to provide details outlining the nature of their programs. The seven portfolio insurance users who answered this question responded as follows:

- ¶ Two portfolio insurance users' programs called for sales equalling 50% of their equity holdings in response to a 10% decline in the S&P 500 index.
- ¶ Two other funds reported a sales response to a 10% S&P 500 index decline totaling approximately 22% of their equity portfolios.
- ¶ The final three portfolio insurance users had less sensitive programs, with a 10% S&P 500 decline triggering less than a 10% reduction in their equity holdings.

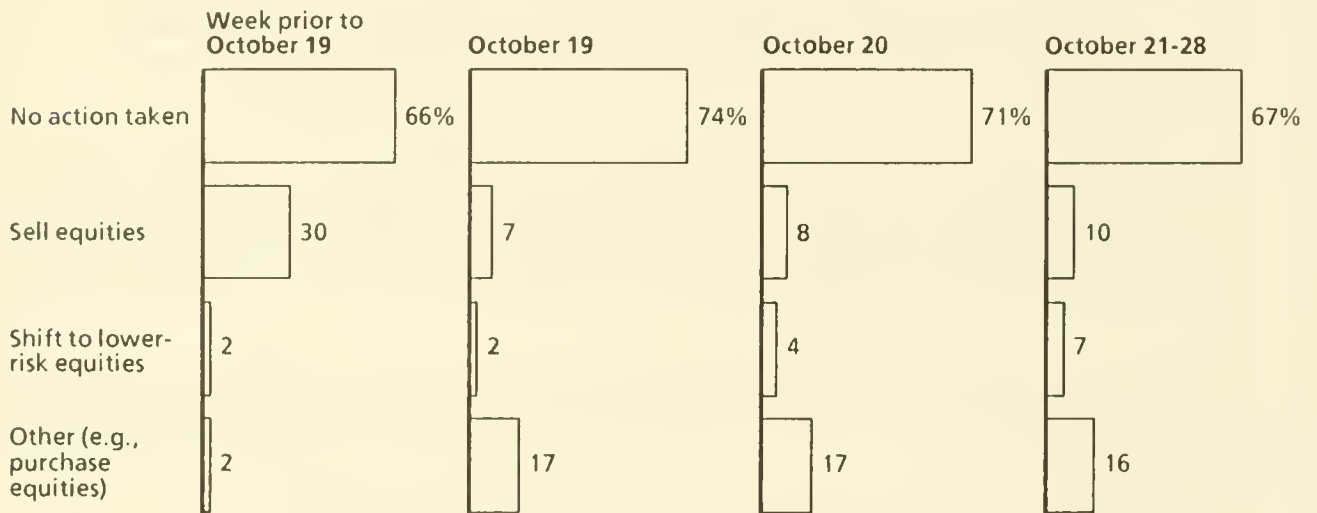
On average, a 10% decline in the S&P 500 index triggered selling among our portfolio insurance respondents totaling 23% of their equity portfolios. As noted earlier, it appeared in practice that on October 19 & 20, many funds did not follow strategy directions fully. However, very specific details were hard to glean from survey responses.

Only a small percentage of those pension funds not employing portfolio insurance during October resorted to alternative protective actions.

**PENSION FUNDS NOT USING PORTFOLIO INSURANCE OCTOBER 19, 1987**

**PRINCIPAL ACTION TAKEN TO PROTECT EQUITY PORTFOLIOS**

Percent of respondents to question

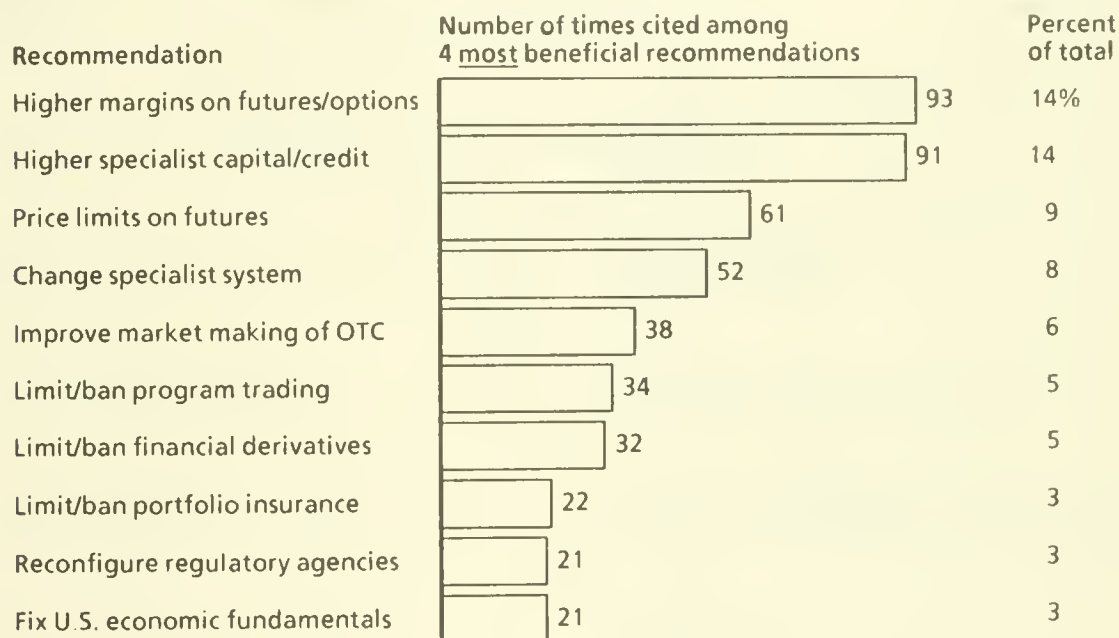


Source: Special survey

Recommendations Differ

Market participants cited changes to the futures markets (e.g., higher margins, price limits) and to the NYSE (e.g., higher specialist capital, change in specialist system) as the four most beneficial recommendations the Task Force could make.

**RECOMMENDATIONS FREQUENTLY  
CITED AS MOST BENEFICIAL**

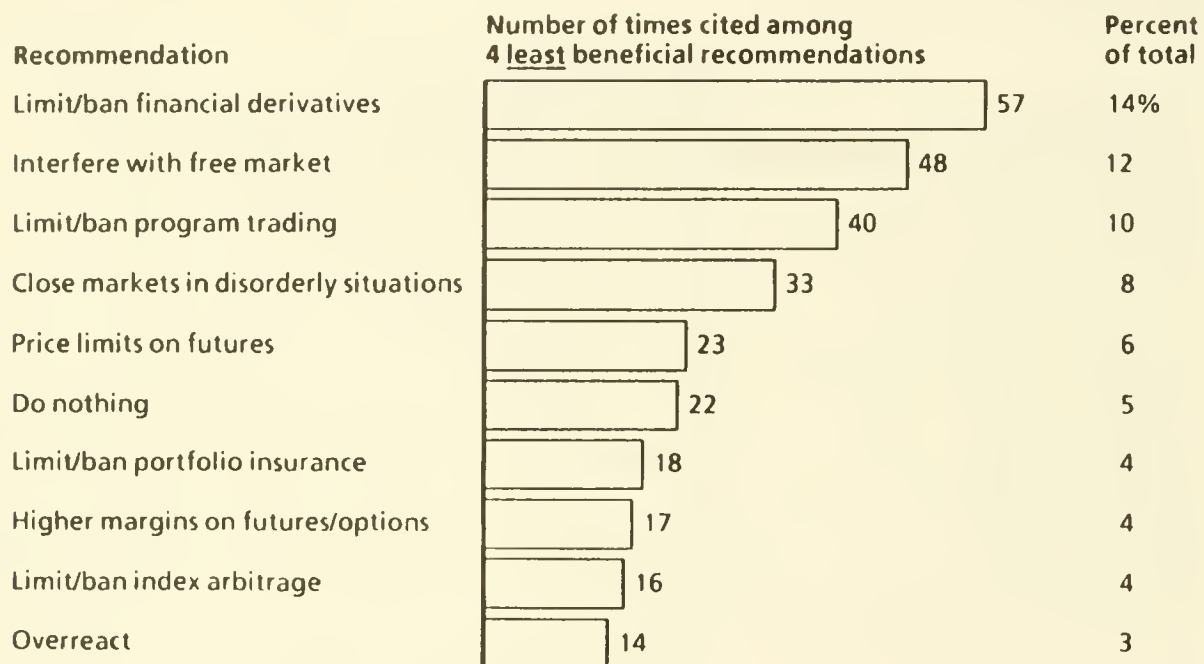


Total number of citations = 660

Source: General survey

However, recommendations which would interfere with free markets, or that would place limitations on program trading or financial derivatives, were cited as the three most inappropriate actions.

**RECOMMENDATIONS MOST OFTEN CITED AS LEAST BENEFICIAL**



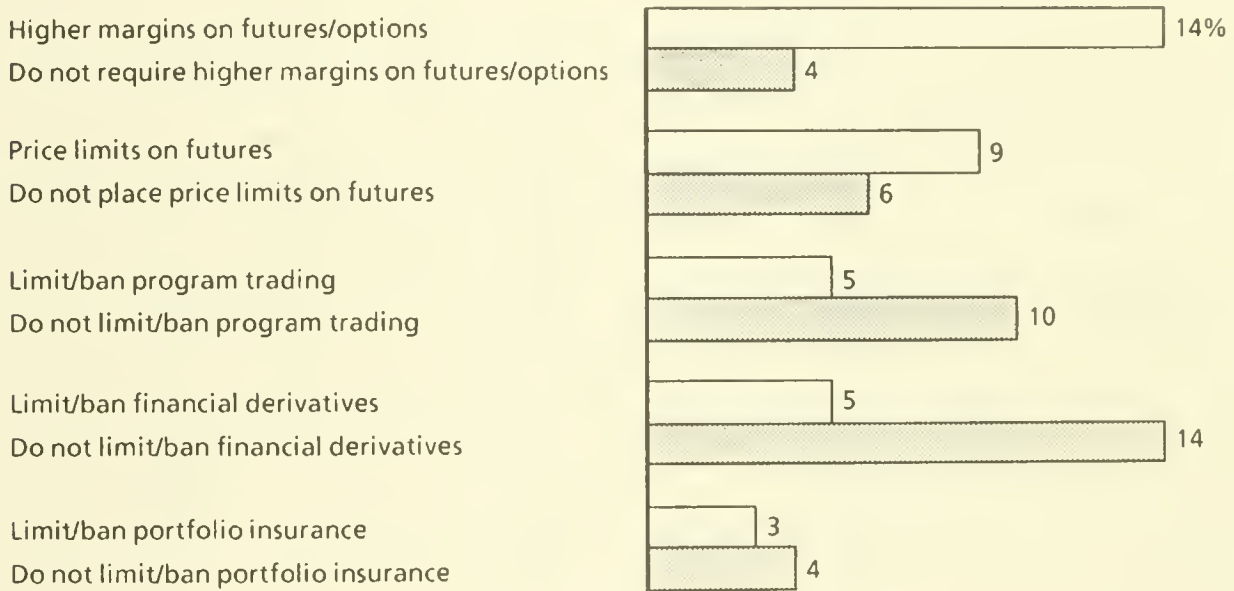
Total number of citations = 405

Source: General survey

Therefore, several possible actions were both strongly recommended and opposed by respondents. In particular, while higher margins or price limits were supported by more respondents than those who opposed such activities, there was stronger opposition to the full banning of program trading/financial derivatives/ portfolio insurance than there was support for such measures.

**RECOMMENDATIONS CITED AMONG THE TOP 10 WHICH ATTRACTED SUPPORT AND OPPOSITION**

Percent of times cited among the top 4



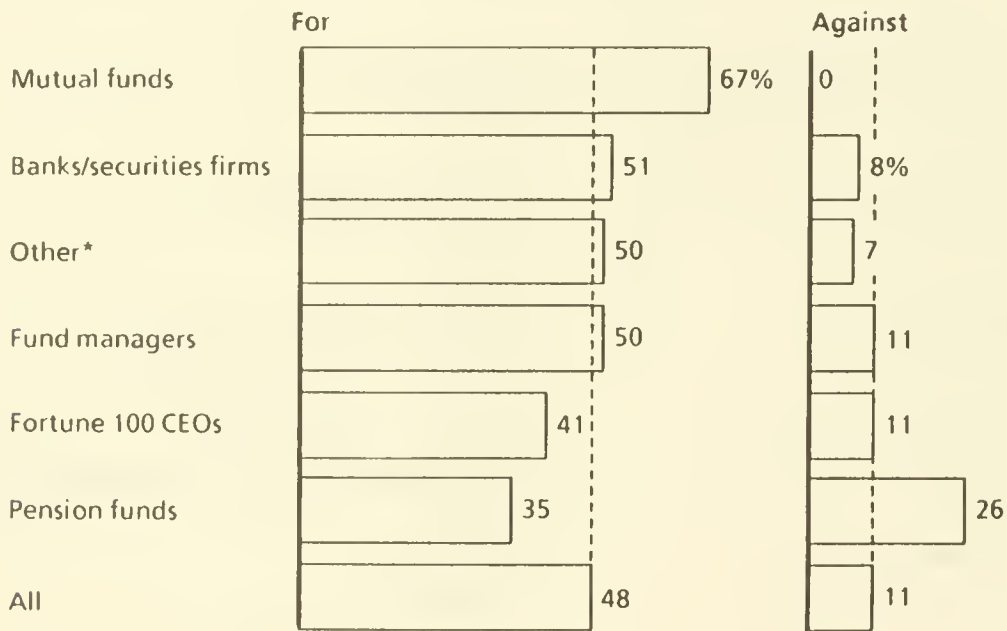
Source: General survey



The differences in opinion regarding these five controversial recommendations among respondent groups is illustrated in the following pages. It is interesting to note that with regard to all five recommendations, pension fund sponsors were the group most opposed to further restrictions or regulations. For the recommendation to increase margins on derivative products, mutual funds indicated the greatest support and pension funds the greatest opposition

### SUPPORT/OPPOSITION TO INCREASING MARGINS ON FUTURES/OPTIONS

Percent of respondents citing recommendation among the top 4



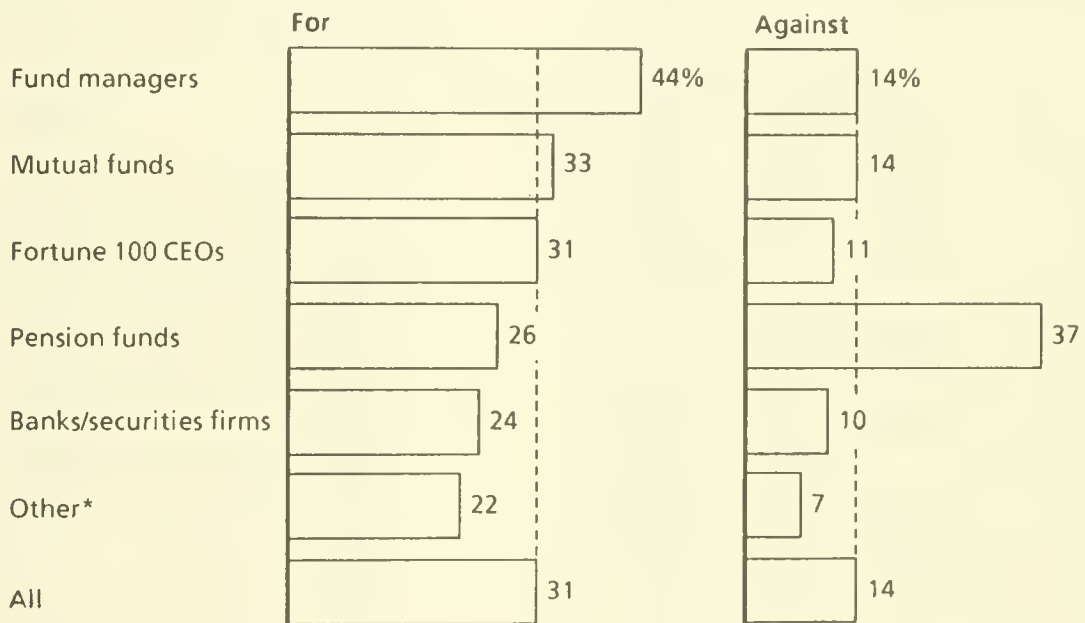
\* Other includes regulators, exchanges, trade groups, and academics

Source: General survey

With regard to price limits on futures instruments, fund managers demonstrated the greatest support while once again pension funds on balance opposed the restriction.

### SUPPORT/OPPOSITION TO PRICE LIMITS ON FUTURES INSTRUMENTS

Percent of respondents citing recommendation among the top 4



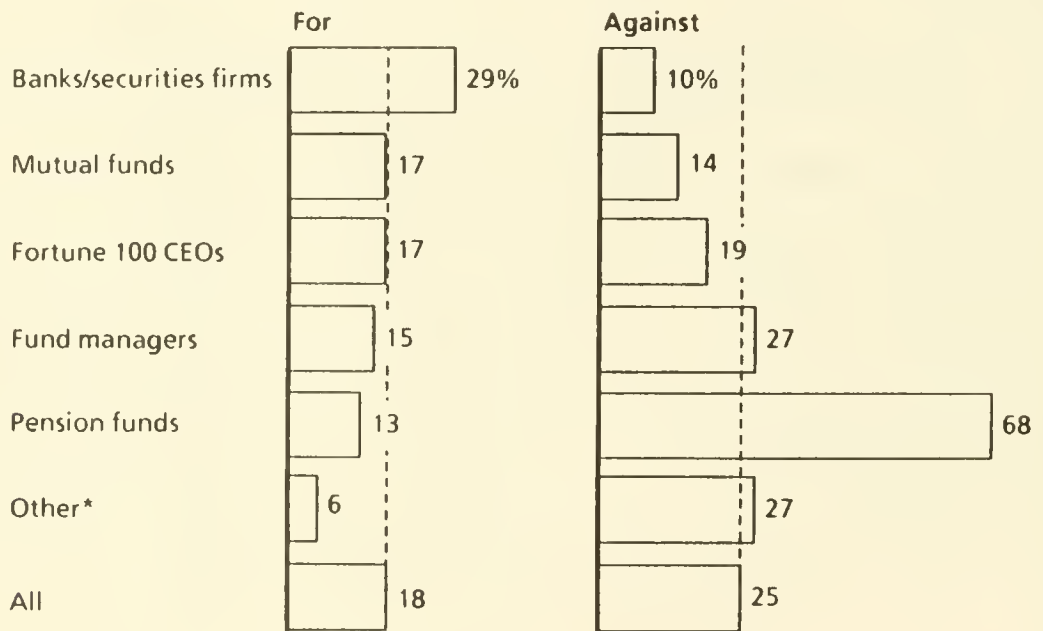
\* Other includes regulators, exchanges, trade groups, and academics

Source: General survey

To the recommendation of limiting or banning program trading, banks and securities firm respondents expressed the most support. Pension funds were strongly opposed to this possible action.

**SUPPORT/OPPOSITION TO LIMITING/  
BANNING PROGRAM TRADING**

Percent of respondents citing recommendation among the top 4



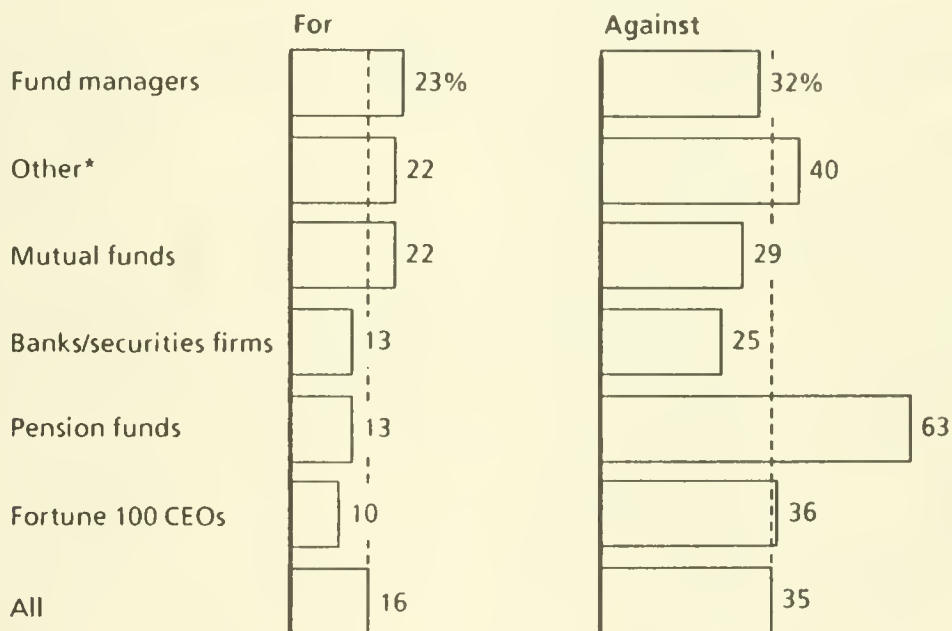
\* Other includes regulators, exchanges, trade groups, and academics

Source: General survey

The strongest opposition to limiting or banning financial instrument derivatives also came from pension fund respondents, although no group had more supporters than opposers for this possible action.

### SUPPORT/OPPOSITION TO LIMITING/ BANNING FINANCIAL INSTRUMENT DERIVATIVES

Percent of respondents citing recommendation among the top 4



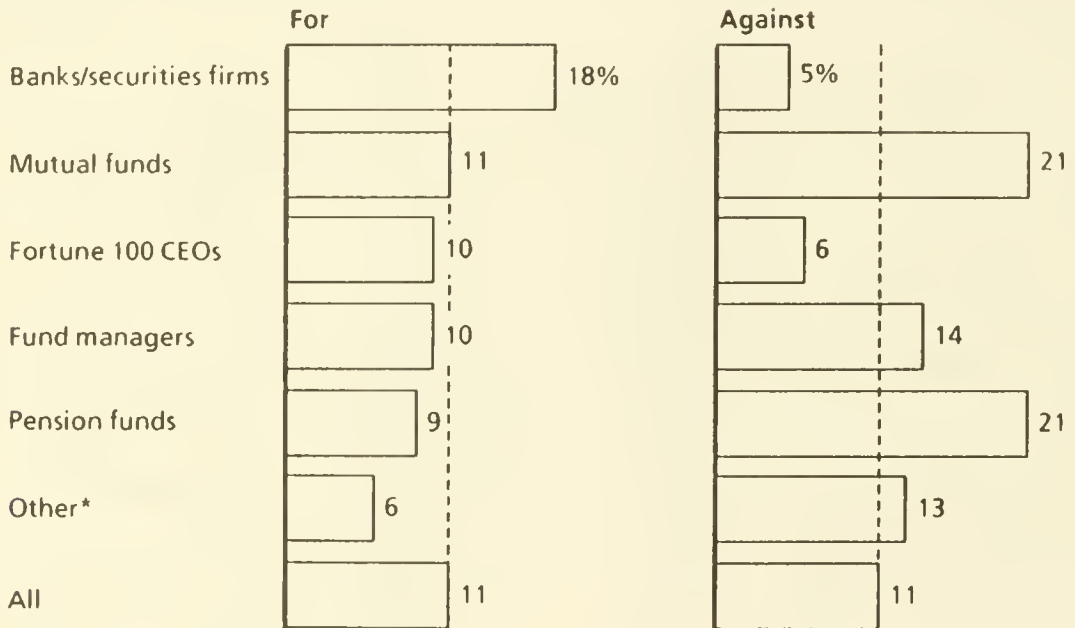
\* Other includes regulators, exchanges, trade groups, and academics

Source: General survey

Finally, the limitation or banishment of portfolio insurance was supported by banks and securities firms and opposed by mutual funds and pension funds.

**SUPPORT/OPPOSITION TO LIMITING/  
BANNING PORTFOLIO INSURANCE**

Percent of respondents citing recommendation among the top 4



\* Other includes regulators, exchanges, trade groups, and academics

Source: General survey



## Appendix—Surveys and Raw Data

Three surveys were distributed as part of the Task Force's work:

- A short general survey was prepared for those groups which did not manage funds (273 distributed).
- A longer general survey was prepared for pension funds, mutual funds, and other fund managers (200 distributed).
- Finally, a third survey was designed specifically for pension funds which addressed their use of portfolio insurance (149 distributed).

### A. General Survey

This survey is designed to assist the Task Force on Market Mechanisms' review of different perspectives on the events surrounding October 19. The survey is divided into four sections:

- Causes of Market Decline
- Analysis of Events
- Recommendations
- Other Comments.

*In the Task Force report, none of the remarks contained in your responses will be attributed to you or to your organization.* The deadline for return of this survey is 5:00 p.m. on Wednesday, December 2. We recognize the short period of time this provides for your response, but the Task Force is due to report early in January, 1988.

Responses should be delivered to:

- Market Survey Team
- Room 1116
- The Presidential Task Force on Market Mechanisms
- The Federal Reserve Bank of New York
- 33 Liberty Street
- New York, NY 10015

Name of Organization:

Name and Position of Respondent:

#### *Causes of Market Decline*

1. Please indicate in order of importance (1 = most, 3 = least) your perspective of the causes of the decline in the stock market during the week preceding October 19.

a. Fundamental factors, (e.g., changes in the economic outlook) (Please list in order of importance)

b. Technical factors, (e.g., stock index arbitrage) (Please list in order of importance)

c. Psychological factors, (e.g., investor nervousness) (Please list in order of importance)

Please elaborate on your perspective of the causes of the decline during the week preceding October 19.

2. Please indicate in order of importance (1 = most, 3 = least) your perspective of the causes of decline in the stock market on *October 19*.

a. Fundamental factors, (e.g., changes in the economic outlook) (Please list in order of importance)

b. Technical factors, (e.g., stock index arbitrage) (Please list in order of importance)

c. Psychological factors, (e.g., investor nervousness) (Please list in order of importance)

Please elaborate on your perspective of the causes of the decline during the week preceding October 19.

#### *Analysis of Events*

3. From your perspective, how efficiently was price and market information disseminated by each market to allow considered action on *October 19 and October 20*?

Please circle:

NYSE

Excellent: (90+ % of normal quality)

Good: (75-90% of normal quality)

Poor: (50-75% of normal quality)

Very Poor: (less than 50% of normal quality)

Not observed

OTC (NASDAQ)

Excellent: (90+ % of normal quality)

Good: (75-90% of normal quality)

Poor: (50-75% of normal quality)

Very Poor: (less than 50% of normal quality)

Not observed

Stock Index Futures Markets (e.g., CME)

Excellent: (90+ % of normal quality)

Good: (75-90% of normal quality)

Poor: (50-75% of normal quality)

Very Poor: (less than 50% of normal quality)

Not observed

Options Markets (e.g., CBOE)

Excellent: (90+ % of normal quality)

Good: (75-90% of normal quality)

Poor: (50-75% of normal quality)

Very Poor: (less than 50% of normal quality)

Not observed

4. From your perspective, how effective were market mechanisms in executing and clearing trades on *October 19 and October 20*? (Please be specific about each market and provide examples where appropriate)

Please circle:

NYSE

Excellent: (90+ % of normal quality)

Good: (75-90% of normal quality)

Poor: (50-75% of normal quality)

Very Poor: (less than 50% of normal quality)

Not observed

Comments:

OTC (NASDAQ)

- Excellent: (90+ % of normal quality)
- Good: (75-90% of normal quality)
- Poor: (50-75% of normal quality)
- Very Poor: (less than 50% of normal quality)
- Not observed
- Comments:

Stock Index Futures Markets (e.g., CME)

- Excellent: (90+ % of normal quality)
- Good: (75-90% of normal quality)
- Poor: (50-75% of normal quality)
- Very Poor: (less than 50% of normal quality)
- Not observed
- Comments:

Options Markets (e.g., CBOE)

- Excellent: (90+ % of normal quality)
- Good: (75-90% of normal quality)
- Poor: (50-75% of normal quality)
- Very Poor: (less than 50% of normal quality)
- Not observed
- Comments:

*Recommendations*

5. What do you believe would be the four most beneficial recommendations (in order of importance) of the Task Force, and why? (Please be specific)

Recommendation/Rationale

- a.
- b.
- c.
- d.

6. What do you believe would be the four least beneficial recommendations (in order of inappropriateness) of the Task Force, and why? (Please be specific)

Recommendation/Rationale for inappropriateness

- a.
- b.
- c.
- d.

*Other Comments*

7. Please describe any particular areas of concern which you feel the Task Force should address, and your rationale for raising this area. (Please try to limit the length of these remarks to one page). If you or your organization has a prepared point of view on the events surrounding October 19, we would appreciate receiving it along with your survey.

## B. General Survey of Fund Managers

This survey of major institutional investors is designed to assist the Task Force on Market Mechanisms' review of different market participant's perspectives on the events surrounding October 19. The survey is divided into five sections:

- Background Information
- Causes of Market Decline
- Analysis of Events
- Recommendations
- Other Comments.

*In the Task Force report, none of the remarks contained in your responses will be attributed to you or to your organization. The deadline for return of this survey is 5:00 p.m. on Wednesday, December 2. We recognize the short period of time this provides for your response, but the Task Force is due to report early in January, 1988.*

Responses should be delivered to:

- Market Survey Team
- The Presidential Task Force on Market Mechanisms
- Room 1116
- The Federal Reserve Bank of New York
- 33 Liberty Street
- New York, New York 10015

Name of Organization:

Name and Position of Respondent:

*Background Information*

To assist the Task Force in analyzing responses to this survey, please provide some basic background information about your organization.

1. Total funds under your organization's management (as of September 30, 1987) (*\$ Millions*).

2. Total U.S. Equities under your organization's management (as of September 30, 1987) (*\$ Millions*).

3. Total U.S. Equities under your organization's management which exactly or closely replicate a broad market index (e.g., the S&P 500) (as of September 30, 1987) (*\$ Millions*).

4. How much of the overall equities under your organization's management are hedged through a "portfolio insurance" program (including futures or option products as well as sales of cash equities) (*\$ Millions*).

*Causes of Market Decline*

5. Please indicate in order of importance (1=most, 3=least) your perspective of the causes of decline in the stock market during the week preceding October 19.

- a. Fundamental factors, (e.g., changes in the economic outlook) (Please list in order of importance)

b. Technical factors, (e.g., stock index arbitrage) (Please list in order of importance)

c. Psychological factors, (e.g., investor nervousness) (Please list in order of importance)

Please elaborate on your perspective of the causes of the decline during the week preceding October 19.

6. Please indicate in order of importance (1=most, 3=least) your perspective of the causes of decline in the stock market on October 19.

a. Fundamental factors, (e.g., changes in the economic outlook) (Please list in order of importance)

b. Technical factors, (e.g., stock index arbitrage) (Please list in order of importance)

c. Psychological factors, (e.g., investor nervousness) (Please list in order of importance)

Please elaborate on your perspective of the causes of the decline on October 19.

*Analysis of Events*

7. Please describe the three most important actions taken (in order of importance) to protect the value of the portfolios under your organization's management and the effectiveness of those actions. Action/Satisfaction with effectiveness of action (High, Medium, Low)

- 1.
- 2.
- 3.

8. Would you characterize the market value impact of the events of October 19 on the equity portfolios under your organization's management as (please circle)

- More than 20% decline
- 20%-12% decline
- 12%-5% decline
- Less than 5% decline

9. Events in the market: From your perspective, how efficiently was price and market information disseminated by each market to allow considered action on October 19 and October 20?

Please circle:

NYSE

- Excellent: (90%+ of normal quality)
- Good: (75-90% of normal quality)
- Poor: (50-75% of normal quality)
- Very Poor: (less than 50% of normal quality)
- Not observed

Comments:

OTC (NASDAQ)

- Excellent: (90%+ of normal quality)
- Good: (75-90% of normal quality)
- Poor: (50-75% of normal quality)
- Very Poor: (less than 50% of normal quality)
- Not observed

Comments:

Stock Index Futures Markets (e.g., CME)

Excellent: (90%+ of normal quality)

Good: (75-90% of normal quality)

Poor: (50-75% of normal quality)

Very Poor: (less than 50% of normal quality)

Not observed

Options Market (e.g., CBOE)

Excellent: (90%+ of normal quality)

Good: (75-90% of normal quality)

Poor: (50-75% of normal quality)

Very Poor: (less than 50% of normal quality)

Not observed

10. From your perspective, how effective were market mechanisms in executing and clearing trades on October 19 and October 20? (Please be specific about each market and provide examples where appropriate.)

Please circle:

NYSE

Excellent: (90%+ of normal quality)

Good: (75-90% of normal quality)

Poor: (50-75% of normal quality)

Very Poor: (less than 50% of normal quality)

Not observed

Comments:

OTC (NASDAQ)

Excellent: (90%+ of normal quality)

Good: (75-90% of normal quality)

Poor: (50-75% of normal quality)

Very Poor: (less than 50% of normal quality)

Not observed

Comments:

Stock Index Futures Markets (e.g., CME)

Excellent: (90%+ of normal quality)

Good: (75-90% of normal quality)

Poor: (50-75% of normal quality)

Very Poor: (less than 50% of normal quality)

Not observed

Comments:

Options Markets (e.g., CBOE)

Excellent: (90%+ of normal quality)

Good: (75-90% of normal quality)

Poor: (50-75% of normal quality)

Very Poor: (less than 50% of normal quality)

Not observed

Comments:

*Recommendations*

11. What do you believe would be the four most beneficial recommendations (in order of importance) of the Task Force, and why? (Please be specific)

Recommendation/Rationale

- a.
- b.
- c.



d.

12. What do you believe would be the four *least* beneficial recommendations (in order of inappropriateness) of the Task Force and why? (Please be specific)

Recommendation/Rationale for inappropriateness

a.

b.

c.

d.

*Other Comments*

13. Please describe any particular areas of concern which you feel the Task Force should address, and your rationale for raising this area. (Please try to limit the length of these remarks to one page.) If you or your organization has a prepared point of view on the events surrounding October 19, we would appreciate receiving it along with your survey.

**C. Special Survey of Pension Funds**

The purpose of this survey is to collect information on pension funds' use of equity portfolio insurance techniques<sup>1</sup> during 1986 and 1987. This special survey *supplements* the general survey the Task Force has sent to many pension funds. Even if you did not use portfolio insurance, please complete this special survey as far as possible and return it to our offices.

*In the Task Force report, none of the remarks contained in your responses will be attributed to you or to your organization. The deadline for return of this survey is 5:00 p.m. on Wednesday, December 2. We recognize the short period of time this provides for your response but the Task Force is due to report early in January, 1988.*

Responses should be delivered to:

Market Survey Team  
 The Presidential Task Force on Market Mechanisms  
 Room 1116  
 The Federal Reserve Bank of New York  
 33 Liberty Street  
 New York, NY 10045

Name of Organization:

Name and Position of respondent:

*Questions*

1. Total funds in pension fund (\$ million):
  - As of December 31, 1985
  - As of December 31, 1986

<sup>1</sup> I.e., strategies that call for predetermined asset trades as a result of market movement—e.g., dynamic asset allocation, dynamic hedging, etc.

As of June 30, 1987

As of September 30, 1987

2. Total U.S. equities in pension fund (excluding value of derivative instruments such as futures) (\$ millions):

As of December 31, 1985

As of December 31, 1986

As of June 30, 1987

As of September 30, 1987

3. Average beta of U.S. equity portfolio:

As of December 31, 1985

As of December 31, 1986

As of June 30, 1987

As of September 30, 1987

4. Did you employ some form of "portfolio insurance" strategy using derivative instruments such as stock index futures and/or options to protect some or all of the value of your U.S. equity holdings. (Please circle):

In 1985 (Yes/No)

In 1986 (Yes/No)

In 1987 (Yes/No)

If the answer to the above is Yes, when exactly, did you introduce this portfolio insurance? (Date)

5. If you did use "portfolio insurance", was this "portfolio insurance" strategy administrated by the same organization that managed some or all of the underlying equities in your fund? (Please circle) (Yes/No)

6. If you did use "portfolio insurance," what was the \$ value of the U.S. equities covered by the portfolio insurance? (\$ millions)

As of December 31, 1985

As of December 31, 1986

As of June 30, 1987

As of September 30, 1987

7. If you did use "portfolio insurance," what were the characteristics of the coverage in terms of (i) time horizon and (ii) performance minimum (If the strategy was operated in this manner):

Time horizon

As of December 31, 1985

From

To

Performance Minimum (%)

As of December 31, 1986

From

To

Performance Minimum (%)

As of June 30, 1987

From

To

Performance Minimum (%)

As of September 30, 1987

From

To

Performance Minimum (%)

In general, during this period, did you raise the "trigger" points for your insurance as the equity market rose in value? (Please circle) (Yes/No)

8. To implement this insurance, what effective percent of the U.S. equity holdings of the fund had to be sold (through sales of stocks or futures) for a 10% decline in the S&P 500 index?

As of December 31, 1985 (percent)

As of December 31, 1986 (percent)

As of June 30, 1987 (percent)

As of September 30, 1987 (percent)

9. What actions did your organization and/or your fund managers take in *the week preceding October 19* to protect the value of its U.S. equity holdings?

Actions: (Please outline \$ amounts involved in any programs).

Please comment on the effectiveness of this strategy:

10. What actions did your organization and/or your fund managers take on *October 19* to protect the value of its U.S. equity holdings?

Actions: (Please outline \$ amounts involved in any programs).

Please comment on the effectiveness of this strategy:

11. What actions did your organization and/or your fund managers take on *October 20* to protect the value of its U.S. equity holdings?

Actions: (Please outline \$ amounts involved in any programs).

Please comment on the effectiveness of this strategy:

12. What actions did your organization and/or your fund managers take in the period of *October 21*

to 28 to protect the value of its U.S. equity holdings?

Actions: (Please outline \$ amounts involved in any programs).

Please comment on the effectiveness of this strategy:

13. Subsequent to the events of this period, what changes to your portfolio insurance programs have you made—e.g.:

Is the program still in effect at all? (Please circle) (Yes/No)

Does it still cover the same percentage of your equity portfolio as it did on September 30, 1987? (Please circle) (Yes/No)

Have the trigger points for the strategy been altered? (Please circle) (Yes/No)

Please describe the changes you have made to your portfolio insurance strategy below.

14. Please describe any particular areas of concern which you feel the Task Force should address relating to portfolio insurance. (Please try to limit the length of these remarks to one page.)

## D. Survey Output

Survey Output—The raw output from the Task Force's survey effort that follows has been organized by survey type:

- General Survey Output—provides results from both the long and short general surveys, by respondent group.

- Special Survey Output—provides responses to the special survey for pension funds which addressed their use of portfolio insurance.



Study I'

| NUMBER OF SURVEYS  | 211       | 9          | 5         | 43                  | 18           | 25            | 54            | 3               |
|--|-----------|------------|-----------|---------------------|--------------|---------------|---------------|-----------------|
| Question/Responses   | Total     | Regulators | Exchanges | Fortune<br>100 CEDs | Mutual Funds | Pension Funds | Fund Managers | Trade<br>Groups |
| * TOTAL MANAGED FUNDS  |           |            |           |                     |              |               |               |                 |
| (\$ Million)   | 1,351,543 |            |           |                     | 322,124      | 206,123       | 823,297       |                 |
| * TOTAL U.S. EQUITIES MANAGED                                    |           |            |           |                     |              |               |               |                 |
| (\$ Million)   | 572,279   |            |           |                     | 93,657       | 110,686       | 367,937       |                 |
| * TOTAL STOCK INDEX FUNDS  |           |            |           |                     |              |               |               |                 |
| (\$ Million)   | 117,972   |            |           |                     | 9,270        | 31,487        | 77,215        |                 |
| * TOTAL EQUITIES PORTFOLIO INSURED                               |           |            |           |                     |              |               |               |                 |
| (\$ Million)   | 57,415    |            |           |                     | 0            | 26,025        | 31,390        |                 |
| IMPORTANCE OF FUNDAMENTAL FACTORS - WEEK PRECEDING<br>OCTOBER 19 |           |            |           |                     |              |               |               |                 |
| High   | 132       | 8          | 3         | 31                  | 9            | 13            | 33            | 2               |
| Medium   | 14        | 0          | 0         | 1                   | 1            | 2             | 4             | 0               |
| Low  | 19        | 0          | 0         | 5                   | 1            | 3             | 4             | 1               |
| FIRST CITED FUNDAMENTAL FACTOR                                   |           |            |           |                     |              |               |               |                 |
| Change in economic outlook (recession/inflation?)                | 11        | 0          | 0         | 3                   | 0            | 0             | 4             | 1               |
| Rising interest rates  | 62        | 2          | 1         | 18                  | 7            | 5             | 13            | 1               |
| Declining value of dollar  | 8         | 0          | 0         | 0                   | 0            | 1             | 3             | 1               |
| Overvalued bull market   | 67        | 1          | 0         | 8                   | 8            | 13            | 25            | 0               |
| Poor business earnings outlook                                   | 0         | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Trade deficit  | 9         | 3          | 0         | 2                   | 0            | 0             | 2             | 0               |
| Budget deficit   | 8         | 0          | 2         | 1                   | 1            | 0             | 0             | 0               |
| Twin deficits  | 20        | 1          | 1         | 8                   | 1            | 2             | 2             | 0               |
| Tax bill (limits interest deduction on takeovers)                | 6         | 0          | 0         | 0                   | 1            | 0             | 1             | 0               |
| Protectionist trade bill   | 1         | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Persian Gulf   | 0         | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Baker comments   | 1         | 0          | 0         | 1                   | 0            | 0             | 0             | 0               |
| Iran/Contra affair   | 1         | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Third World debt crisis  | 0         | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Other fundamental factor   | 1         | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Breakdown in international cooperation                           | 2         | 1          | 0         | 0                   | 0            | 0             | 1             | 0               |
| SECOND CITED FUNDAMENTAL FACTOR                                  |           |            |           |                     |              |               |               |                 |
| Change in economic outlook (recession/inflation?)                | 17        | 0          | 0         | 4                   | 0            | 1             | 8             | 0               |
| Rising interest rates  | 56        | 4          | 0         | 13                  | 6            | 8             | 19            | 1               |
| Declining value of dollar  | 27        | 2          | 2         | 7                   | 2            | 2             | 2             | 0               |
| Overvalued bull market   | 24        | 1          | 0         | 6                   | 3            | 3             | 5             | 1               |
| Poor business earnings outlook                                   | 0         | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Trade deficit  | 18        | 1          | 0         | 3                   | 0            | 1             | 4             | 0               |
| Budget deficit   | 10        | 0          | 0         | 4                   | 2            | 0             | 1             | 0               |
| Twin deficits  | 11        | 0          | 1         | 2                   | 1            | 3             | 1             | 0               |

\* Applicable for long surveys only

| NUMBER OF SURVEYS  | 211   | 9          | 5         | 43                  | 18              | 25               | 54               | 3               |
|--|-------|------------|-----------|---------------------|-----------------|------------------|------------------|-----------------|
| Question/Responses   | Total | Regulators | Exchanges | Fortune<br>100 CEOs | Mutual<br>Funds | Pension<br>Funds | Fund<br>Managers | Trade<br>Groups |
| <b>SECOND CITED FUNDAMENTAL FACTOR</b>                                 |       |            |           |                     |                 |                  |                  |                 |
| Tax bill (limits interest deduction on takeovers)                      | 11    | 0          | 0         | 1                   | 1               | 0                | 5                | 1               |
| Protectionist trade bill   | 2     | 0          | 1         | 0                   | 0               | 0                | 0                | 0               |
| Persian Gulf   | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Baker comments   | 4     | 0          | 0         | 0                   | 2               | 2                | 0                | 0               |
| Iran/Contra affair   | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Third World debt crisis  | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Other fundamental factor   | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Breakdown in international cooperation                                 | 2     | 0          | 0         | 0                   | 0               | 1                | 0                | 0               |
| <b>THIRD CITED FUNDAMENTAL FACTOR</b>                                  |       |            |           |                     |                 |                  |                  |                 |
| Change in economic outlook (recession/inflation?)                      | 14    | 0          | 1         | 3                   | 3               | 2                | 1                | 0               |
| Rising interest rates  | 22    | 1          | 0         | 2                   | 2               | 2                | 5                | 0               |
| Declining value of dollar  | 24    | 2          | 0         | 7                   | 2               | 1                | 8                | 0               |
| Overvalued bull market   | 17    | 2          | 1         | 6                   | 0               | 1                | 5                | 0               |
| Poor business earnings outlook   | 2     | 0          | 0         | 1                   | 0               | 1                | 0                | 0               |
| Trade deficit  | 11    | 0          | 0         | 0                   | 2               | 2                | 4                | 0               |
| Budget deficit   | 11    | 0          | 0         | 2                   | 1               | 0                | 4                | 0               |
| Twin deficits  | 19    | 0          | 0         | 9                   | 3               | 1                | 1                | 3               |
| Tax bill (limits interest deduction on takeovers)                      | 21    | 1          | 1         | 1                   | 4               | 5                | 4                | 0               |
| Protectionist trade bill   | 2     | 0          | 0         | 0                   | 0               | 0                | 2                | 0               |
| Persian Gulf   | 3     | 0          | 1         | 0                   | 0               | 0                | 0                | 0               |
| Baker comments   | 5     | 1          | 0         | 1                   | 0               | 1                | 1                | 0               |
| Iran/Contra affair   | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Third World debt crisis  | 1     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Other fundamental factor   | 3     | 0          | 0         | 2                   | 0               | 0                | 1                | 0               |
| Breakdown in international cooperation                                 | 8     | 1          | 0         | 2                   | 0               | 1                | 2                | 0               |
| <b>IMPORTANCE OF TECHNICAL FACTORS - WEEK PRECEDING<br/>OCTOBER 19</b> |       |            |           |                     |                 |                  |                  |                 |
| High   | 11    | 0          | 0         | 4                   | 0               | 1                | 4                | 0               |
| Medium   | 57    | 0          | 1         | 15                  | 4               | 4                | 14               | 2               |
| Low  | 93    | 8          | 2         | 18                  | 7               | 13               | 22               | 1               |
| <b>FIRST CITED TECHNICAL FACTOR</b>                                    |       |            |           |                     |                 |                  |                  |                 |
| Stock index arbitrage  | 23    | 0          | 1         | 2                   | 4               | 2                | 7                | 1               |
| Portfolio insurance  | 51    | 1          | 2         | 7                   | 5               | 11               | 18               | 2               |
| Program trading  | 27    | 1          | 1         | 9                   | 2               | 0                | 7                | 0               |
| Volatility stemming from futures market                                | 11    | 0          | 0         | 5                   | 0               | 1                | 1                | 0               |
| Poor capitalization of specialist system                               | 5     | 0          | 0         | 2                   | 1               | 0                | 1                | 0               |
| Other specialist related problem                                       | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Poor performance of super DOT system                                   | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| General inability to receive accurate prices                           | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Margin call forced selling   | 2     | 0          | 0         | 1                   | 0               | 1                | 0                | 0               |
| Other technical factor   | 15    | 1          | 0         | 4                   | 0               | 2                | 3                | 0               |

| NUMBER OF SURVEYS   | 211   | 9          | 5         | 43       | 18           | 25            | 54            | 3      |
|---|-------|------------|-----------|----------|--------------|---------------|---------------|--------|
| Question/Responses  | Total | Regulators | Exchanges | Fortune  |              |               | Fund Managers | Trade  |
|   |       |            |           | 100 CEOs | Mutual Funds | Pension Funds |               | Groups |
| <b>SECOND CITED TECHNICAL FACTOR</b>                                  |       |            |           |          |              |               |               |        |
| Stock index arbitrage   | 27    | 1          | 0         | 6        | 1            | 6             | 11            | 0      |
| Portfolio insurance   | 23    | 0          | 1         | 6        | 0            | 1             | 7             | 1      |
| Program trading   | 11    | 0          | 0         | 1        | 2            | 4             | 2             | 0      |
| Volatility stemming from futures market                               | 8     | 0          | 0         | 2        | 1            | 1             | 3             | 0      |
| Poor capitalization of specialist system                              | 3     | 0          | 0         | 0        | 0            | 0             | 2             | 0      |
| Other specialist related problem                                      | 3     | 0          | 0         | 0        | 0            | 0             | 1             | 1      |
| Poor performance of super DOT system                                  | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| General inability to receive accurate prices                          | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Margin call forced selling  | 4     | 0          | 0         | 2        | 0            | 0             | 1             | 0      |
| Other technical factor  | 10    | 0          | 0         | 3        | 2            | 0             | 1             | 0      |
| <b>THIRD CITED TECHNICAL FACTOR</b>                                   |       |            |           |          |              |               |               |        |
| Stock index arbitrage   | 5     | 0          | 0         | 1        | 0            | 2             | 0             | 0      |
| Portfolio insurance   | 4     | 0          | 0         | 1        | 0            | 0             | 2             | 0      |
| Program trading   | 3     | 0          | 0         | 0        | 0            | 1             | 2             | 0      |
| Volatility stemming from futures market                               | 3     | 0          | 0         | 1        | 0            | 1             | 0             | 0      |
| Poor capitalization of specialist system                              | 1     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Other specialist related problem                                      | 1     | 0          | 0         | 0        | 0            | 0             | 1             | 0      |
| Poor performance of super DOT system                                  | 1     | 0          | 0         | 0        | 0            | 0             | 1             | 0      |
| General inability to receive accurate prices                          | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Margin call forced selling  | 4     | 0          | 0         | 1        | 0            | 0             | 3             | 0      |
| Other technical factor  | 14    | 0          | 0         | 4        | 3            | 1             | 4             | 1      |
| <b>IMPORTANCE OF PSYCHOLOGICAL FACTOR - WEEK PRECEDING OCTOBER 19</b> |       |            |           |          |              |               |               |        |
| High  | 28    | 0          | 0         | 5        | 2            | 4             | 7             | 1      |
| Medium  | 89    | 8          | 2         | 20       | 7            | 12            | 19            | 1      |
| Low   | 43    | 0          | 1         | 11       | 2            | 2             | 13            | 1      |
| <b>FIRST CITED PSYCHOLOGICAL FACTOR</b>                               |       |            |           |          |              |               |               |        |
| Investor nervousness  | 68    | 2          | 3         | 19       | 8            | 8             | 13            | 0      |
| Fear of NYSE closing  | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Sheer panic   | 6     | 0          | 0         | 2        | 1            | 0             | 2             | 0      |
| Analyst's bearish predictions   | 14    | 0          | 0         | 2        | 1            | 2             | 4             | 1      |
| Erosion of confidence in U.S. policies both domestic and foreign      | 56    | 2          | 1         | 8        | 4            | 3             | 15            | 2      |
| Lack of statement from White House during market free-fall            | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Other psychological factor  | 1     | 0          | 0         | 0        | 0            | 0             | 1             | 0      |
| <b>SECOND CITED PSYCHOLOGICAL FACTOR</b>                              |       |            |           |          |              |               |               |        |
| Investor nervousness  | 19    | 1          | 1         | 2        | 1            | 2             | 6             | 1      |
| Fear of NYSE closing  | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Sheer panic   | 3     | 0          | 0         | 1        | 1            | 0             | 1             | 0      |
| Analyst's bearish predictions   | 10    | 1          | 1         | 3        | 0            | 0             | 2             | 1      |
| Erosion of confidence in U.S. policies both domestic and foreign      | 37    | 1          | 0         | 9        | 5            | 5             | 9             | 0      |

| NUMBER OF SURVEYS  | 211   | 9          | 5         | 43                  | 18           | 25            | 54            | 3               |
|--|-------|------------|-----------|---------------------|--------------|---------------|---------------|-----------------|
| Question/Responses   | Total | Regulators | Exchanges | Fortune<br>100 CEOs | Mutual Funds | Pension Funds | Fund Managers | Trade<br>Groups |
| <b>SECOND CITED PSYCHOLOGICAL FACTOR</b>                         |       |            |           |                     |              |               |               |                 |
| Lack of statement from White House during market free-fall       | 1     | 0          | 0         | 1                   | 0            | 0             | 0             | 0               |
| Other psychological factor                                       | 3     | 0          | 0         | 1                   | 1            | 0             | 1             | 0               |
| <b>THIRD CITED PSYCHOLOGICAL FACTOR</b>                          |       |            |           |                     |              |               |               |                 |
| Investor nervousness   | 1     | 0          | 0         | 0                   | 0            | 0             | 0             | 1               |
| Fear of NYSE closing   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Sheer panic  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Analyst's bearish predictions                                    | 1     | 0          | 0         | 1                   | 0            | 0             | 0             | 0               |
| Erosion of confidence in U.S. policies both domestic and foreign | 2     | 1          | 0         | 0                   | 0            | 0             | 0             | 1               |
| Lack of statement from White House during market free-fall       | 2     | 0          | 0         | 1                   | 0            | 0             | 1             | 0               |
| Other psychological factor                                       | 6     | 0          | 0         | 1                   | 2            | 1             | 1             | 0               |
| <b>IMPORTANCE OF FUNDAMENTAL FACTORS - ON OCTOBER 19</b>         |       |            |           |                     |              |               |               |                 |
| High   | 34    | 3          | 0         | 6                   | 1            | 4             | 9             | 1               |
| Medium   | 21    | 1          | 1         | 3                   | 1            | 1             | 7             | 0               |
| Low  | 98    | 4          | 2         | 25                  | 9            | 10            | 21            | 2               |
| <b>FIRST CITED FUNDAMENTAL FACTOR</b>                            |       |            |           |                     |              |               |               |                 |
| Change in economic outlook (recession/inflation?)                | 12    | 0          | 0         | 4                   | 0            | 1             | 3             | 1               |
| Rising interest rates  | 27    | 1          | 0         | 8                   | 2            | 1             | 6             | 1               |
| Declining value of dollar  | 4     | 0          | 1         | 0                   | 1            | 1             | 0             | 0               |
| Overvalued bull market   | 51    | 3          | 0         | 8                   | 2            | 11            | 16            | 0               |
| Poor business earnings outlook                                   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Trade deficit  | 4     | 1          | 0         | 2                   | 0            | 0             | 1             | 0               |
| Budget deficit   | 8     | 0          | 0         | 2                   | 1            | 1             | 1             | 0               |
| Twin deficits  | 14    | 1          | 1         | 4                   | 2            | 2             | 2             | 0               |
| Tax bill (limits interest deduction on takeovers)                | 2     | 0          | 0         | 1                   | 0            | 0             | 0             | 0               |
| Protectionist trade bill   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Persian Gulf   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Baker comments   | 12    | 0          | 1         | 1                   | 1            | 0             | 5             | 0               |
| Iran/Contra affair   | 1     | 0          | 0         | 1                   | 0            | 0             | 0             | 0               |
| Third World debt crisis  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Other fundamental factor   | 5     | 0          | 0         | 1                   | 1            | 0             | 0             | 0               |
| Breakdown in international cooperation                           | 5     | 1          | 0         | 1                   | 0            | 0             | 2             | 0               |
| <b>SECOND CITED FUNDAMENTAL FACTOR</b>                           |       |            |           |                     |              |               |               |                 |
| Change in economic outlook (recession/inflation?)                | 12    | 0          | 0         | 4                   | 0            | 1             | 5             | 0               |
| Rising interest rates  | 35    | 4          | 0         | 8                   | 2            | 7             | 8             | 0               |
| Declining value of dollar  | 20    | 1          | 0         | 1                   | 2            | 1             | 9             | 0               |
| Overvalued bull market   | 9     | 0          | 0         | 0                   | 1            | 1             | 2             | 0               |
| Poor business earnings outlook                                   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Trade deficit  | 10    | 1          | 0         | 2                   | 0            | 2             | 0             | 0               |
| Budget deficit   | 7     | 0          | 0         | 4                   | 1            | 0             | 0             | 0               |

| NUMBER OF SURVEYS                                      | 211   | 9          | 5         | 43                  | 18              | 25               | 54               | 3               |
|--|-------|------------|-----------|---------------------|-----------------|------------------|------------------|-----------------|
| Question/Responses                                     | Total | Regulators | Exchanges | Fortune<br>100 CEOs | Mutual<br>Funds | Pension<br>Funds | Fund<br>Managers | Trade<br>Groups |
| <b>SECOND CITED FUNDAMENTAL FACTOR</b>                 |       |            |           |                     |                 |                  |                  |                 |
| Twin deficits  | 6     | 1          | 0         | 2                   | 0               | 1                | 0                | 0               |
| Tax bill (limits interest deduction on takeovers)      | 4     | 0          | 0         | 1                   | 0               | 0                | 1                | 1               |
| Protectionist trade bill                               | 2     | 0          | 1         | 0                   | 1               | 0                | 0                | 0               |
| Persian Gulf   | 1     | 0          | 0         | 0                   | 0               | 0                | 1                | 0               |
| Baker comments   | 6     | 0          | 0         | 1                   | 2               | 2                | 1                | 0               |
| Iran/Contra affair                                     | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Third World debt crisis                                | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Other fundamental factor                               | 1     | 0          | 0         | 0                   | 0               | 0                | 1                | 0               |
| Breakdown in international cooperation                 | 4     | 0          | 2         | 0                   | 1               | 0                | 1                | 0               |
| <b>THIRD CITED FUNDAMENTAL FACTOR</b>                  |       |            |           |                     |                 |                  |                  |                 |
| Change in economic outlook (recession/inflation?)      | 12    | 0          | 0         | 3                   | 1               | 3                | 2                | 0               |
| Rising interest rates                                  | 11    | 1          | 0         | 1                   | 1               | 3                | 1                | 0               |
| Declining value of dollar                              | 17    | 2          | 0         | 5                   | 1               | 3                | 4                | 0               |
| Overvalued bull market                                 | 9     | 0          | 0         | 2                   | 2               | 0                | 2                | 0               |
| Poor business earnings outlook                         | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Trade deficit  | 2     | 0          | 0         | 0                   | 0               | 0                | 2                | 0               |
| Budget deficit   | 8     | 0          | 0         | 2                   | 0               | 0                | 2                | 0               |
| Twin deficits  | 7     | 0          | 0         | 3                   | 1               | 0                | 0                | 1               |
| Tax bill (limits interest deduction on takeovers)      | 11    | 1          | 1         | 1                   | 1               | 3                | 1                | 0               |
| Protectionist trade bill                               | 2     | 0          | 0         | 0                   | 0               | 0                | 2                | 0               |
| Persian Gulf   | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Baker comments   | 5     | 2          | 0         | 0                   | 0               | 0                | 2                | 0               |
| Iran/Contra affair                                     | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Third World debt crisis                                | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Other fundamental factor                               | 3     | 0          | 0         | 2                   | 1               | 0                | 0                | 0               |
| Breakdown in international cooperation                 | 6     | 0          | 0         | 1                   | 0               | 1                | 3                | 0               |
| <b>IMPORTANCE OF TECHNICAL FACTORS - ON OCTOBER 19</b> |       |            |           |                     |                 |                  |                  |                 |
| High   | 69    | 1          | 1         | 17                  | 8               | 2                | 23               | 1               |
| Medium   | 63    | 4          | 2         | 12                  | 2               | 11               | 12               | 2               |
| Low  | 24    | 3          | 0         | 7                   | 1               | 3                | 3                | 0               |
| <b>FIRST CITED TECHNICAL FACTOR</b>                    |       |            |           |                     |                 |                  |                  |                 |
| Stock index arbitrage                                  | 37    | 1          | 2         | 8                   | 4               | 2                | 8                | 2               |
| Portfolio insurance                                    | 67    | 0          | 0         | 11                  | 7               | 14               | 24               | 0               |
| Program trading  | 34    | 1          | 0         | 10                  | 3               | 2                | 3                | 1               |
| Volatility stemming from futures market                | 4     | 0          | 0         | 2                   | 0               | 1                | 0                | 0               |
| Poor capitalization of specialist system               | 8     | 0          | 0         | 2                   | 0               | 0                | 2                | 0               |
| Other specialist related problem                       | 5     | 0          | 1         | 2                   | 1               | 0                | 1                | 0               |
| Poor performance of super ODT system                   | 5     | 1          | 0         | 2                   | 1               | 0                | 1                | 0               |
| General inability to receive accurate prices           | 5     | 2          | 0         | 2                   | 0               | 0                | 0                | 0               |
| Margin call forced selling                             | 5     | 1          | 0         | 1                   | 0               | 0                | 2                | 0               |
| Other technical factor                                 | 8     | 0          | 0         | 0                   | 0               | 1                | 4                | 0               |
| <b>SECOND CITED TECHNICAL FACTOR</b>                   |       |            |           |                     |                 |                  |                  |                 |



| NUMBER OF SURVEYS  | 211   | 9          | 5         | 43                  | 18           | 25            | 54            | 3               |
|--|-------|------------|-----------|---------------------|--------------|---------------|---------------|-----------------|
| Question/Responses   | Total | Regulators | Exchanges | Fortune<br>100 CEOs | Mutual Funds | Pension Funds | Fund Managers | Trade<br>Groups |
| <b>SECOND CITED TECHNICAL FACTOR</b>                             |       |            |           |                     |              |               |               |                 |
| Stock index arbitrage  | 30    | 0          | 0         | 8                   | 2            | 4             | 11            | 0               |
| Portfolio insurance  | 41    | 0          | 1         | 9                   | 6            | 2             | 10            | 2               |
| Program trading  | 20    | 1          | 0         | 2                   | 2            | 3             | 7             | 0               |
| Volatility stemming from futures market                          | 5     | 0          | 0         | 1                   | 0            | 1             | 3             | 0               |
| Poor capitalization of specialist system                         | 12    | 1          | 0         | 4                   | 0            | 1             | 2             | 0               |
| Other specialist related problem                                 | 10    | 1          | 0         | 1                   | 1            | 2             | 0             | 0               |
| Poor performance of super OOT system                             | 5     | 1          | 0         | 1                   | 1            | 0             | 2             | 0               |
| General inability to receive accurate prices                     | 3     | 1          | 0         | 2                   | 0            | 0             | 0             | 0               |
| Margin call forced selling                                       | 12    | 0          | 1         | 3                   | 1            | 3             | 1             | 0               |
| Other technical factor   | 9     | 0          | 0         | 2                   | 1            | 1             | 3             | 1               |
| <b>THIRD CITED TECHNICAL FACTOR</b>                              |       |            |           |                     |              |               |               |                 |
| Stock index arbitrage  | 7     | 0          | 0         | 3                   | 0            | 3             | 1             | 0               |
| Portfolio insurance  | 10    | 0          | 0         | 2                   | 1            | 0             | 4             | 0               |
| Program trading  | 9     | 0          | 1         | 0                   | 2            | 0             | 3             | 0               |
| Volatility stemming from futures market                          | 4     | 0          | 0         | 2                   | 1            | 0             | 1             | 0               |
| Poor capitalization of specialist system                         | 12    | 0          | 0         | 1                   | 2            | 3             | 1             | 0               |
| Other specialist related problem                                 | 28    | 2          | 0         | 5                   | 5            | 2             | 10            | 0               |
| Poor performance of super OOT system                             | 3     | 0          | 0         | 1                   | 0            | 0             | 1             | 0               |
| General inability to receive accurate prices                     | 4     | 0          | 0         | 2                   | 1            | 1             | 0             | 0               |
| Margin call forced selling                                       | 13    | 1          | 0         | 4                   | 0            | 0             | 6             | 1               |
| Other technical factor   | 8     | 0          | 0         | 3                   | 0            | 1             | 3             | 0               |
| <b>IMPORTANCE OF PSYCHOLOGICAL FACTOR - ON OCTOBER 19</b>        |       |            |           |                     |              |               |               |                 |
| High   | 69    | 5          | 2         | 16                  | 6            | 10            | 9             | 1               |
| Medium   | 63    | 2          | 0         | 18                  | 5            | 5             | 18            | 1               |
| Low  | 21    | 1          | 1         | 1                   | 0            | 0             | 10            | 1               |
| <b>FIRST CITED PSYCHOLOGICAL FACTOR</b>                          |       |            |           |                     |              |               |               |                 |
| Investor nervousness   | 25    | 3          | 0         | 6                   | 2            | 1             | 6             | 0               |
| Fear of NYSE closing   | 5     | 0          | 1         | 1                   | 0            | 1             | 2             | 0               |
| Sheer panic  | 109   | 3          | 2         | 27                  | 13           | 8             | 23            | 3               |
| Analyst's bearish predictions                                    | 3     | 0          | 0         | 0                   | 0            | 1             | 1             | 0               |
| Erosion of confidence in U.S. policies both domestic and foreign | 17    | 0          | 0         | 4                   | 0            | 4             | 4             | 0               |
| Lack of statement from White House during market free-fall       | 1     | 0          | 0         | 0                   | 1            | 0             | 0             | 0               |
| Other psychological factor                                       | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| <b>SECOND CITED PSYCHOLOGICAL FACTOR</b>                         |       |            |           |                     |              |               |               |                 |
| Investor nervousness   | 8     | 0          | 0         | 2                   | 0            | 4             | 1             | 0               |
| Fear of NYSE closing   | 13    | 2          | 0         | 3                   | 1            | 1             | 3             | 0               |
| Sheer panic  | 5     | 0          | 1         | 0                   | 0            | 1             | 2             | 0               |
| Analyst's bearish predictions                                    | 12    | 0          | 1         | 4                   | 0            | 0             | 3             | 0               |
| Erosion of confidence in U.S. policies both domestic and foreign | 24    | 0          | 0         | 4                   | 1            | 2             | 6             | 2               |
| Lack of statement from White House during market free-fall       | 1     | 0          | 0         | 0                   | 0            | 0             | 1             | 0               |

| NUMBER OF SURVEYS   | 211   | 9          | 5         | 43                  | 18              | 25               | 54               | 3               |
|---|-------|------------|-----------|---------------------|-----------------|------------------|------------------|-----------------|
| Question/Responses  | Total | Regulators | Exchanges | Fortune<br>100 CEOs | Mutual<br>Funds | Pension<br>Funds | Fund<br>Managers | Trade<br>Groups |
| <b>SECOND CITED PSYCHOLOGICAL FACTOR</b>  |       |            |           |                     |                 |                  |                  |                 |
| Other psychological factor  | 8     | 0          | 0         | 3                   | 3               | 0                | 2                | 0               |
| <b>THIRD CITED PSYCHOLOGICAL FACTOR</b>   |       |            |           |                     |                 |                  |                  |                 |
| Investor nervousness  | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Fear of NYSE closing  | 1     | 0          | 0         | 1                   | 0               | 0                | 0                | 0               |
| Sheer panic   | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Analyst's bearish predictions   | 1     | 0          | 0         | 1                   | 0               | 0                | 0                | 0               |
| Erosion of confidence in U.S. policies both<br>domestic and foreign                         | 8     | 0          | 0         | 1                   | 0               | 0                | 4                | 0               |
| Lack of statement from White House during market<br>free-fall                               | 4     | 0          | 0         | 2                   | 0               | 0                | 1                | 0               |
| Other psychological factor  | 6     | 0          | 0         | 2                   | 3               | 0                | 0                | 0               |
| <b>* MOST IMPORTANT PROTECTIVE ACTION TAKEN</b>   |       |            |           |                     |                 |                  |                  |                 |
| Traditionally low equity position   | 0     |            |           |                     | 0               | 0                | 0                |                 |
| Reduced equity position during 1987   | 37    |            |           |                     | 8               | 6                | 23               |                 |
| Reduced equity position in 2 months prior to<br>October 19                                  | 7     |            |           |                     | 0               | 2                | 5                |                 |
| Portfolio insurance: hedged position as planned   | 2     |            |           |                     | 0               | 1                | 1                |                 |
| Portfolio insurance: lagged hedge on expectation<br>of recovery                             | 0     |            |           |                     | 0               | 0                | 0                |                 |
| On October 19, portfolio insurance: with futures  | 3     |            |           |                     | 1               | 1                | 1                |                 |
| On October 19, portfolio insurance: with options  | 0     |            |           |                     | 0               | 0                | 0                |                 |
| On October 19, portfolio insurance: with cash market  | 0     |            |           |                     | 0               | 0                | 0                |                 |
| On October 19, reduction of equity position<br>(independent of portfolio insurance program) | 4     |            |           |                     | 1               | 0                | 3                |                 |
| Flight to quality (shifted equity to higher<br>quality/lower risk stocks)                   | 5     |            |           |                     | 1               | 2                | 2                |                 |
| Increased equity position   | 3     |            |           |                     | 1               | 1                | 1                |                 |
| Other protective action taken   | 17    |            |           |                     | 3               | 7                | 7                |                 |
| No protective action taken  | 13    |            |           |                     | 1               | 4                | 8                |                 |
| <b>* SATISFACTION WITH EFFECTIVENESS</b>  |       |            |           |                     |                 |                  |                  |                 |
| High  | 41    |            |           |                     | 7               | 12               | 22               |                 |
| Medium  | 22    |            |           |                     | 3               | 6                | 13               |                 |
| Low   | 9     |            |           |                     | 2               | 2                | 5                |                 |
| <b>* SECOND MOST IMPORTANT PROTECTIVE ACTION TAKEN</b>                                      |       |            |           |                     |                 |                  |                  |                 |
| Traditionally low equity position   | 1     |            |           |                     | 1               | 0                | 0                |                 |
| Reduced equity position during 1987   | 3     |            |           |                     | 0               | 3                | 0                |                 |
| Reduced equity position in 2 months prior to<br>October 19                                  | 1     |            |           |                     | 0               | 0                | 1                |                 |
| Portfolio insurance: hedged position as planned   | 6     |            |           |                     | 1               | 0                | 5                |                 |
| Portfolio insurance: lagged hedge on expectation<br>of recovery                             | 0     |            |           |                     | 0               | 0                | 0                |                 |
| On October 19, portfolio insurance: with futures  | 1     |            |           |                     | 0               | 0                | 1                |                 |

\* Applicable for long surveys only

| NUMBER OF SURVEYS   | 211   | 9          | 5         | 43                  | 18              | 25               | 54               | 3               |
|---|-------|------------|-----------|---------------------|-----------------|------------------|------------------|-----------------|
| Question/Responses  | Total | Regulators | Exchanges | Fortune<br>100 CEOs | Mutual<br>Funds | Pension<br>Funds | Fund<br>Managers | Trade<br>Groups |
| <b>* SECOND MOST IMPORTANT PROTECTIVE ACTION TAKEN</b>                                      |       |            |           |                     |                 |                  |                  |                 |
| On October 19, portfolio insurance: with options  | 4     |            |           |                     | 2               | 1                | 1                |                 |
| On October 19, portfolio insurance: with cash market  | 1     |            |           |                     | 0               | 1                | 0                |                 |
| On October 19, reduction of equity position<br>(independent of portfolio insurance program) | 4     |            |           |                     | 1               | 1                | 2                |                 |
| Flight to quality (shifted equity to higher<br>quality/lower risk stocks)                   | 9     |            |           |                     | 1               | 1                | 7                |                 |
| Increased equity position   | 1     |            |           |                     | 0               | 0                | 1                |                 |
| Other protective action taken   | 28    |            |           |                     | 5               | 8                | 15               |                 |
| No protective action taken  | 8     |            |           |                     | 1               | 3                | 4                |                 |
| <b>* SATISFACTION WITH EFFECTIVENESS</b>  |       |            |           |                     |                 |                  |                  |                 |
| High  | 21    |            |           |                     | 5               | 6                | 10               |                 |
| Medium  | 28    |            |           |                     | 3               | 10               | 15               |                 |
| Low   | 8     |            |           |                     | 2               | 1                | 5                |                 |
| <b>* THIRD MOST IMPORTANT PROTECTIVE ACTION TAKEN</b>                                       |       |            |           |                     |                 |                  |                  |                 |
| Traditionally low equity position   | 0     |            |           |                     | 0               | 0                | 0                |                 |
| Reduced equity position during 1987   | 0     |            |           |                     | 0               | 0                | 0                |                 |
| Reduced equity position in 2 months prior to<br>October 19                                  | 1     |            |           |                     | 0               | 0                | 1                |                 |
| Portfolio insurance: hedged position as planned   | 3     |            |           |                     | 0               | 2                | 1                |                 |
| Portfolio insurance: lagged hedge on expectation<br>of recovery                             | 0     |            |           |                     | 0               | 0                | 0                |                 |
| On October 19, portfolio insurance: with futures  | 2     |            |           |                     | 0               | 1                | 1                |                 |
| On October 19, portfolio insurance: with options  | 1     |            |           |                     | 1               | 0                | 0                |                 |
| On October 19, portfolio insurance: with cash market  | 0     |            |           |                     | 0               | 0                | 0                |                 |
| On October 19, reduction of equity position<br>(independent of portfolio insurance program) | 0     |            |           |                     | 0               | 0                | 0                |                 |
| Flight to quality (shifted equity to higher<br>quality/lower risk stocks)                   | 4     |            |           |                     | 0               | 1                | 3                |                 |
| Increased equity position   | 3     |            |           |                     | 0               | 2                | 1                |                 |
| Other protective action taken   | 21    |            |           |                     | 5               | 6                | 10               |                 |
| No protective action taken  | 2     |            |           |                     | 0               | 1                | 1                |                 |
| <b>* SATISFACTION WITH EFFECTIVENESS</b>  |       |            |           |                     |                 |                  |                  |                 |
| High  | 6     |            |           |                     | 1               | 1                | 4                |                 |
| Medium  | 19    |            |           |                     | 3               | 7                | 9                |                 |
| Low   | 7     |            |           |                     | 0               | 4                | 3                |                 |
| <b>* IMPACT OF EVENTS ON ORGANIZATION'S PORTFOLIO UNDER<br/>MANAGEMENT</b>                  |       |            |           |                     |                 |                  |                  |                 |
| More than 20% decline   | 23    |            |           |                     | 5               | 5                | 13               |                 |
| 10-12% decline  | 61    |            |           |                     | 11              | 17               | 33               |                 |
| 12-5% decline   | 8     |            |           |                     | 2               | 1                | 5                |                 |
| Less than 5% decline  | 0     |            |           |                     | 0               | 0                | 0                |                 |

\* Applicable for long surveys only

| NUMBER OF SURVEYS  | 211   | 9          | 5         | 43                  | 18              | 25               | 54               | 3               |
|--|-------|------------|-----------|---------------------|-----------------|------------------|------------------|-----------------|
| Question/Responses   | Total | Regulators | Exchanges | Fortune<br>100 CEOs | Mutual<br>Funds | Pension<br>Funds | Fund<br>Managers | Trade<br>Groups |
| <b>NYSE EFFICIENCY IN PRICE AND MARKET INFORMATION<br/>DISSEMINATION</b>                       |       |            |           |                     |                 |                  |                  |                 |
| Excellent  | 8     | 1          | 0         | 0                   | 2               | 0                | 2                | 0               |
| Good   | 57    | 0          | 3         | 5                   | 6               | 7                | 17               | 2               |
| Poor   | 55    | 1          | 1         | 11                  | 4               | 6                | 16               | 1               |
| Very poor  | 59    | 0          | 0         | 23                  | 6               | 5                | 18               | 0               |
| Not observed   | 14    | 3          | 0         | 2                   | 0               | 4                | 0                | 0               |
| <b>OTC EFFICIENCY IN PRICE AND MARKET INFORMATION<br/>DISSEMINATION</b>                        |       |            |           |                     |                 |                  |                  |                 |
| Excellent  | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Good   | 15    | 1          | 0         | 0                   | 2               | 0                | 6                | 1               |
| Poor   | 22    | 0          | 2         | 1                   | 3               | 2                | 5                | 1               |
| Very poor  | 116   | 1          | 1         | 23                  | 12              | 13               | 39               | 1               |
| Not observed   | 38    | 3          | 1         | 16                  | 1               | 6                | 3                | 0               |
| <b>STOCK INDEX FUTURES MARKET EFFICIENCY IN PRICE AND<br/>MARKET INFORMATION DISSEMINATION</b> |       |            |           |                     |                 |                  |                  |                 |
| Excellent  | 6     | 0          | 0         | 1                   | 0               | 0                | 3                | 0               |
| Good   | 37    | 0          | 1         | 8                   | 3               | 8                | 6                | 0               |
| Poor   | 31    | 0          | 3         | 4                   | 2               | 3                | 8                | 2               |
| Very poor  | 33    | 0          | 0         | 11                  | 1               | 4                | 9                | 0               |
| Not observed   | 74    | 5          | 0         | 16                  | 10              | 5                | 23               | 1               |
| <b>OPTIONS MARKETS EFFICIENCY IN PRICE AND MARKET<br/>INFORMATION DISSEMINATION</b>            |       |            |           |                     |                 |                  |                  |                 |
| Excellent  | 1     | 0          | 0         | 0                   | 0               | 0                | 1                | 0               |
| Good   | 18    | 0          | 3         | 1                   | 1               | 3                | 2                | 0               |
| Poor   | 30    | 1          | 1         | 7                   | 4               | 2                | 3                | 2               |
| Very poor  | 36    | 0          | 0         | 10                  | 2               | 3                | 10               | 0               |
| Not observed   | 97    | 4          | 0         | 22                  | 10              | 11               | 34               | 1               |
| <b>NYSE EFFICIENCY IN EXECUTING AND CLEARING TRADES</b>  |       |            |           |                     |                 |                  |                  |                 |
| Excellent  | 8     | 0          | 0         | 0                   | 0               | 1                | 4                | 0               |
| Good   | 50    | 0          | 2         | 5                   | 6               | 3                | 14               | 3               |
| Poor   | 67    | 0          | 1         | 19                  | 7               | 5                | 18               | 0               |
| Very poor  | 46    | 0          | 0         | 14                  | 5               | 8                | 16               | 0               |
| Not observed   | 17    | 5          | 0         | 3                   | 0               | 5                | 0                | 0               |
| <b>OTC EFFICIENCY IN EXECUTING AND CLEARING TRADES</b>   |       |            |           |                     |                 |                  |                  |                 |
| Excellent  | 5     | 0          | 0         | 0                   | 0               | 1                | 1                | 0               |
| Good   | 14    | 0          | 0         | 0                   | 2               | 1                | 7                | 1               |
| Poor   | 28    | 0          | 1         | 4                   | 4               | 3                | 6                | 1               |
| Very poor  | 86    | 0          | 1         | 14                  | 11              | 9                | 32               | 1               |
| Not observed   | 54    | 5          | 1         | 22                  | 1               | 8                | 6                | 0               |

\* Applicable for long surveys only

| NUMBER OF SURVEYS   | 211   | 9          | 5         | 43                  | 18              | 25               | 54            | 3               |
|---|-------|------------|-----------|---------------------|-----------------|------------------|---------------|-----------------|
| Question/Responses  | Total | Regulators | Exchanges | Fortune<br>100 CEOs | Mutual<br>Funds | Pension<br>Funds | Fund Managers | Trade<br>Groups |
| <b>STOCK INDEX FUTURES MARKET EFFICIENCY IN EXECUTING AND CLEARING TRADES</b>                                 |       |            |           |                     |                 |                  |               |                 |
| Excellent   | 7     | 0          | 0         | 2                   | 0               | 1                | 4             | 0               |
| Good  | 25    | 0          | 1         | 3                   | 2               | 2                | 7             | 0               |
| Poor  | 29    | 0          | 1         | 3                   | 1               | 5                | 5             | 1               |
| Very poor   | 31    | 0          | 0         | 10                  | 2               | 5                | 8             | 0               |
| Not observed  | 89    | 5          | 1         | 22                  | 11              | 7                | 26            | 2               |
| <b>OPTIONS MARKETS EFFICIENCY IN EXECUTING AND CLEARING TRADES</b>  |       |            |           |                     |                 |                  |               |                 |
| Excellent   | 1     | 0          | 0         | 0                   | 0               | 1                | 0             | 0               |
| Good  | 15    | 0          | 3         | 0                   | 2               | 0                | 3             | 0               |
| Poor  | 24    | 0          | 0         | 2                   | 2               | 1                | 6             | 1               |
| Very poor   | 24    | 0          | 0         | 8                   | 2               | 2                | 3             | 0               |
| Not observed  | 117   | 5          | 0         | 30                  | 11              | 15               | 38            | 2               |
| <b>MOST BENEFICIAL RECOMMENDATION</b>   |       |            |           |                     |                 |                  |               |                 |
| Keep status quo   | 10    | 1          | 0         | 0                   | 1               | 4                | 2             | 0               |
| Interfere with free market system   | 0     | 0          | 0         | 0                   | 0               | 0                | 0             | 0               |
| Don't overreact   | 2     | 1          | 0         | 0                   | 0               | 0                | 0             | 0               |
| Limit/ban financial instrument derivatives  | 16    | 0          | 0         | 2                   | 4               | 1                | 5             | 0               |
| Limit/ban portfolio insurance   | 4     | 0          | 0         | 0                   | 0               | 1                | 1             | 0               |
| Limit/ban program trading   | 13    | 0          | 0         | 4                   | 1               | 0                | 2             | 0               |
| Limit/ban index arbitrage   | 2     | 0          | 0         | 1                   | 0               | 0                | 1             | 0               |
| Limit/ban foreign investment in U.S. markets  | 0     | 0          | 0         | 0                   | 0               | 0                | 0             | 0               |
| Limit/ban U.S. investment in foreign markets  | 0     | 0          | 0         | 0                   | 0               | 0                | 0             | 0               |
| Higher margins on futures   | 33    | 0          | 1         | 7                   | 4               | 3                | 10            | 0               |
| Price limits on futures   | 19    | 0          | 0         | 5                   | 2               | 1                | 7             | 0               |
| Price limits on cash markets  | 0     | 0          | 0         | 0                   | 0               | 0                | 0             | 0               |
| Bolster specialist capital/access to credit   | 20    | 1          | 0         | 3                   | 2               | 3                | 4             | 2               |
| Require portfolio insurers to hold underlying stock   | 0     | 0          | 0         | 0                   | 0               | 0                | 0             | 0               |
| Downtick rule for futures   | 2     | 0          | 0         | 0                   | 0               | 0                | 0             | 1               |
| Reconfigure regulatory agencies such that Futures and underlying cash market fall under the same jurisdiction | 6     | 0          | 1         | 1                   | 0               | 1                | 2             | 0               |
| Change specialist system  | 19    | 1          | 0         | 6                   | 1               | 4                | 4             | 0               |
| Ban closing of markets  | 0     | 0          | 0         | 0                   | 0               | 0                | 0             | 0               |
| Improve communication between exchanges   | 2     | 1          | 0         | 1                   | 0               | 0                | 0             | 0               |
| Improve market making of OTC  | 2     | 0          | 0         | 0                   | 0               | 0                | 0             | 0               |
| Formalize market closing to allow information to be disseminated  | 1     | 0          | 0         | 0                   | 0               | 0                | 0             | 0               |
| Improve dissemination of key information (i.e., prices)   | 1     | 0          | 0         | 0                   | 0               | 0                | 1             | 0               |
| Close markets in disorderly situations  | 0     | 0          | 0         | 0                   | 0               | 0                | 0             | 0               |
| Adjust systems to promote long-term investment and discourage speculation                                     | 7     | 0          | 1         | 2                   | 1               | 0                | 1             | 0               |
| Fix U.S. economic fundamentals  | 17    | 1          | 1         | 5                   | 1               | 2                | 3             | 1               |
| Other   | 19    | 0          | 0         | 5                   | 1               | 3                | 5             | 0               |

\* Applicable for long surveys only



| NUMBER OF SURVEYS   | 211   | 9          | 5         | 43                  | 18           | 25            | 54            | 3               |
|---|-------|------------|-----------|---------------------|--------------|---------------|---------------|-----------------|
| Question/Responses  | Total | Regulators | Exchanges | Fortune<br>100 CEOs | Mutual Funds | Pension Funds | Fund Managers | Trade<br>Groups |
| <b>SECOND MOST BENEFICIAL RECOMMENDATION</b>  |       |            |           |                     |              |               |               |                 |
| Keep status quo   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Interfere with free market system   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Don't overreact   | 2     | 1          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Limit/ban financial instrument derivatives  | 8     | 0          | 0         | 1                   | 0            | 1             | 3             | 1               |
| Limit/ban portfolio insurance   | 7     | 0          | 0         | 1                   | 0            | 1             | 1             | 0               |
| Limit/ban program trading   | 13    | 0          | 0         | 3                   | 0            | 2             | 3             | 0               |
| Limit/ban index arbitrage   | 3     | 0          | 0         | 1                   | 1            | 0             | 1             | 0               |
| Limit/ban foreign investment in U.S. markets  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Limit/ban U.S. investment in foreign markets  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Higher margins on futures   | 28    | 2          | 0         | 4                   | 3            | 3             | 8             | 1               |
| Price limits on futures   | 16    | 0          | 1         | 2                   | 1            | 1             | 6             | 0               |
| Price limits on cash markets  | 4     | 0          | 0         | 0                   | 0            | 2             | 0             | 0               |
| Bolster specialist capital/access to credit   | 33    | 3          | 0         | 8                   | 5            | 3             | 6             | 0               |
| Require portfolio insurers to hold underlying stock   | 1     | 0          | 0         | 0                   | 0            | 0             | 1             | 0               |
| Downtick rule for futures   | 5     | 0          | 0         | 1                   | 3            | 0             | 0             | 0               |
| Reconfigure regulatory agencies such that Futures and underlying cash market fall under the same jurisdiction | 3     | 0          | 0         | 0                   | 1            | 0             | 1             | 1               |
| Change specialist system  | 16    | 0          | 0         | 7                   | 1            | 4             | 3             | 0               |
| Ban closing of markets  | 1     | 0          | 0         | 1                   | 0            | 0             | 0             | 0               |
| Improve communication between exchanges   | 1     | 0          | 0         | 1                   | 0            | 0             | 0             | 0               |
| Improve market making of OTC  | 13    | 0          | 1         | 2                   | 0            | 2             | 3             | 0               |
| Formalize market closing to allow information to be disseminated  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Improve dissemination of key information (i.e., prices)   | 1     | 0          | 0         | 1                   | 0            | 0             | 0             | 0               |
| Close markets in disorderly situations  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Adjust systems to promote long-term investment and discourage speculation                                     | 1     | 0          | 0         | 0                   | 0            | 0             | 1             | 0               |
| Fix U.S. economic fundamentals  | 4     | 0          | 0         | 1                   | 0            | 0             | 0             | 0               |
| Other   | 23    | 0          | 2         | 6                   | 1            | 1             | 8             | 0               |
| <b>THIRD MOST BENEFICIAL RECOMMENDATION</b>   |       |            |           |                     |              |               |               |                 |
| Keep status quo   | 1     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Interfere with free market system   | 1     | 0          | 0         | 0                   | 0            | 1             | 0             | 0               |
| Don't overreact   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Limit/ban financial instrument derivatives  | 5     | 0          | 1         | 0                   | 0            | 0             | 3             | 0               |
| Limit/ban portfolio insurance   | 5     | 0          | 0         | 2                   | 0            | 0             | 1             | 0               |
| Limit/ban program trading   | 4     | 0          | 0         | 0                   | 1            | 0             | 1             | 0               |
| Limit/ban index arbitrage   | 4     | 0          | 0         | 2                   | 1            | 1             | 0             | 0               |
| Limit/ban foreign investment in U.S. markets  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Limit/ban U.S. investment in foreign markets  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Higher margins on futures   | 24    | 2          | 0         | 4                   | 4            | 2             | 5             | 1               |
| Price limits on futures   | 14    | 1          | 0         | 5                   | 1            | 2             | 4             | 1               |
| Price limits on cash markets  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Bolster specialist capital/access to credit   | 24    | 0          | 1         | 6                   | 2            | 1             | 6             | 0               |
| Require portfolio insurers to hold underlying stock   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Downtick rule for futures   | 8     | 0          | 0         | 0                   | 0            | 2             | 3             | 0               |
| Reconfigure regulatory agencies such that Futures and underlying cash market fall under the same jurisdiction | 1     | 0          | 0         | 0                   | 0            | 0             | 1             | 0               |

| NUMBER OF SURVEYS   | 211   | 9          | 5         | 43                  | 18           | 25            | 54            | 3               |
|---|-------|------------|-----------|---------------------|--------------|---------------|---------------|-----------------|
| Question/Responses  | Total | Regulators | Exchanges | Fortune<br>100 CEOs | Mutual Funds | Pension Funds | Fund Managers | Trade<br>Groups |
| <b>THIRD MOST BENEFICIAL RECOMMENDATION</b>   |       |            |           |                     |              |               |               |                 |
| Change specialist system  | 11    | 1          | 0         | 2                   | 0            | 4             | 2             | 0               |
| Ban closing of markets  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Improve communication between exchanges   | 5     | 0          | 0         | 3                   | 0            | 0             | 1             | 0               |
| Improve market making of OTC  | 10    | 0          | 0         | 0                   | 3            | 0             | 3             | 1               |
| Formalize market closing to allow information to be disseminated  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Improve dissemination of key information (i.e., prices)   | 6     | 0          | 0         | 5                   | 0            | 0             | 1             | 0               |
| Close markets in disorderly situations  | 1     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Adjust systems to promote long-term investment and discourage speculation                                     | 2     | 0          | 0         | 1                   | 1            | 0             | 0             | 0               |
| Fix U.S. economic fundamentals  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Other   | 37    | 1          | 2         | 6                   | 2            | 6             | 11            | 0               |
| <b>FOURTH MOST BENEFICIAL RECOMMENDATION</b>  |       |            |           |                     |              |               |               |                 |
| Keep status quo   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Interfere with free market system   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Don't overreact   | 1     | 0          | 0         | 0                   | 0            | 1             | 0             | 0               |
| Limit/ban financial instrument derivatives  | 3     | 0          | 0         | 1                   | 0            | 1             | 0             | 0               |
| Limit/ban portfolio insurance   | 6     | 0          | 0         | 1                   | 2            | 0             | 2             | 0               |
| Limit/ban program trading   | 4     | 1          | 0         | 0                   | 1            | 1             | 1             | 0               |
| Limit/ban index arbitrage   | 2     | 0          | 0         | 2                   | 0            | 0             | 0             | 0               |
| Limit/ban foreign investment in U.S. markets  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Limit/ban U.S. investment in foreign markets  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Higher margins on futures   | 8     | 0          | 0         | 2                   | 1            | 0             | 1             | 1               |
| Price limits on futures   | 12    | 1          | 0         | 1                   | 2            | 2             | 4             | 0               |
| Price limits on cash markets  | 1     | 0          | 0         | 1                   | 0            | 0             | 0             | 0               |
| Bolster specialist capital/access to credit   | 14    | 0          | 0         | 5                   | 1            | 2             | 5             | 0               |
| Require portfolio insurers to hold underlying stock   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Downtick rule for futures   | 3     | 0          | 0         | 0                   | 0            | 0             | 3             | 0               |
| Reconfigure regulatory agencies such that futures and underlying cash market fall under the same jurisdiction | 11    | 1          | 0         | 1                   | 1            | 2             | 0             | 1               |
| Change specialist system  | 6     | 0          | 2         | 2                   | 0            | 1             | 1             | 0               |
| Ban closing of markets  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Improve communication between exchanges   | 5     | 0          | 0         | 2                   | 0            | 1             | 2             | 0               |
| Improve market making of OTC  | 13    | 0          | 1         | 0                   | 1            | 0             | 4             | 0               |
| Formalize market closing to allow information to be disseminated  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Improve dissemination of key information (i.e., prices)   | 1     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Close markets in disorderly situations  | 1     | 0          | 0         | 1                   | 0            | 0             | 0             | 0               |
| Adjust systems to promote long-term investment and discourage speculation                                     | 3     | 0          | 0         | 2                   | 1            | 0             | 0             | 0               |
| Fix U.S. economic fundamentals  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Other   | 26    | 1          | 1         | 5                   | 2            | 0             | 9             | 0               |

| NUMBER OF SURVEYS   | 211   | 9          | 5         | 43                  | 18           | 25            | 54            | 3               |
|---|-------|------------|-----------|---------------------|--------------|---------------|---------------|-----------------|
| Question/Responses  | Total | Regulators | Exchanges | Fortune<br>100 CEOs | Mutual Funds | Pension Funds | Fund Managers | Trade<br>Groups |
| <b>MOST INAPPROPRIATE RECOMMENDATION</b>  |       |            |           |                     |              |               |               |                 |
| Keep status quo   | 14    | 0          | 1         | 4                   | 2            | 1             | 2             | 1               |
| Interfere with free market system   | 29    | 2          | 1         | 9                   | 2            | 4             | 4             | 1               |
| Don't overreact   | 10    | 0          | 0         | 1                   | 1            | 0             | 1             | 0               |
| Limit/ban financial instrument derivatives  | 26    | 3          | 0         | 4                   | 2            | 5             | 7             | 0               |
| Limit/ban portfolio insurance   | 4     | 0          | 0         | 0                   | 1            | 0             | 3             | 0               |
| Limit/ban program trading   | 19    | 1          | 0         | 3                   | 1            | 6             | 6             | 0               |
| Limit/ban index arbitrage   | 4     | 0          | 0         | 0                   | 0            | 1             | 1             | 0               |
| Limit/ban foreign investment in U.S. markets  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Limit/ban U.S. investment in foreign markets  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Higher margins on futures   | 1     | 0          | 0         | 0                   | 0            | 1             | 0             | 0               |
| Price limits on futures   | 7     | 0          | 0         | 1                   | 0            | 1             | 1             | 0               |
| Price limits on cash markets  | 1     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Bolster specialist capital/access to credit   | 1     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Require portfolio insurers to hold underlying stock   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Downtick rule for futures   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Reconfigure regulatory agencies such that Futures and underlying cash market fall under the same jurisdiction | 1     | 0          | 0         | 0                   | 0            | 0             | 0             | 1               |
| Change specialist system  | 5     | 0          | 0         | 0                   | 2            | 0             | 1             | 0               |
| Ban closing of markets  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Improve communication between exchanges   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Improve market making of OTC  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Formalize market closing to allow information to be disseminated  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Improve dissemination of key information (i.e., prices)   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Close markets in disorderly situations  | 15    | 0          | 1         | 8                   | 1            | 0             | 3             | 0               |
| Adjust systems to promote long-term investment and discourage speculation                                     | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Fix U.S. economic fundamentals  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Other   | 24    | 0          | 0         | 6                   | 2            | 0             | 8             | 0               |
| <b>SECOND MOST INAPPROPRIATE RECOMMENDATION</b>   |       |            |           |                     |              |               |               |                 |
| Keep status quo   | 4     | 0          | 0         | 2                   | 1            | 0             | 1             | 0               |
| Interfere with free market system   | 11    | 0          | 0         | 2                   | 1            | 0             | 1             | 2               |
| Don't overreact   | 3     | 0          | 0         | 0                   | 0            | 0             | 1             | 0               |
| Limit/ban financial instrument derivatives  | 18    | 0          | 2         | 5                   | 0            | 4             | 4             | 0               |
| Limit/ban portfolio insurance   | 5     | 1          | 0         | 0                   | 2            | 1             | 0             | 0               |
| Limit/ban program trading   | 16    | 2          | 0         | 2                   | 1            | 5             | 4             | 0               |
| Limit/ban index arbitrage   | 5     | 1          | 0         | 1                   | 0            | 0             | 1             | 0               |
| Limit/ban foreign investment in U.S. markets  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Limit/ban U.S. investment in foreign markets  | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Higher margins on futures   | 9     | 0          | 0         | 3                   | 0            | 2             | 3             | 0               |
| Price limits on futures   | 6     | 0          | 0         | 2                   | 1            | 2             | 1             | 0               |
| Price limits on cash markets  | 5     | 0          | 1         | 1                   | 1            | 0             | 1             | 0               |
| Bolster specialist capital/access to credit   | 3     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Require portfolio insurers to hold underlying stock   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Downtick rule for futures   | 0     | 0          | 0         | 0                   | 0            | 0             | 0             | 0               |
| Reconfigure regulatory agencies such that Futures and underlying cash market fall under the same jurisdiction | 1     | 0          | 0         | 0                   | 1            | 0             | 0             | 0               |

| NUMBER OF SURVEYS   | 211   | 9          | 5         | 43       | 18           | 25            | 54            | 3      |
|---|-------|------------|-----------|----------|--------------|---------------|---------------|--------|
| Question/Responses  | Total | Regulators | Exchanges | Fortune  |              |               | Trade         |        |
|   |       |            |           | 100 CEOs | Mutual Funds | Pension Funds | Fund Managers | Groups |
| <b>SECOND MOST INAPPROPRIATE RECOMMENDATION</b>   |       |            |           |          |              |               |               |        |
| Change specialist system  | 1     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Ban closing of markets  | 1     | 0          | 0         | 1        | 0            | 0             | 0             | 0      |
| Improve communication between exchanges   | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Improve market making of DTC  | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Formalize market closing to allow information to be disseminated  | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Improve dissemination of key information (i.e., prices)   | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Close markets in disorderly situations  | 8     | 0          | 0         | 2        | 0            | 0             | 2             | 1      |
| Adjust systems to promote long-term investment and discourage speculation                                     | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Fix U.S. economic fundamentals  | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Other   | 26    | 2          | 0         | 8        | 3            | 1             | 6             | 0      |
| <b>THIRD MOST INAPPROPRIATE RECOMMENDATION</b>  |       |            |           |          |              |               |               |        |
| Keep status quo   | 2     | 0          | 0         | 1        | 0            | 0             | 1             | 0      |
| Interfere with free market system   | 5     | 0          | 0         | 1        | 0            | 1             | 3             | 0      |
| Don't overreact   | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Limit/ban financial instrument derivatives  | 10    | 1          | 0         | 4        | 1            | 2             | 0             | 0      |
| Limit/ban portfolio insurance   | 7     | 1          | 0         | 1        | 0            | 2             | 2             | 0      |
| Limit/ban program trading   | 5     | 0          | 0         | 2        | 0            | 2             | 0             | 1      |
| Limit/ban index arbitrage   | 5     | 0          | 0         | 3        | 1            | 1             | 0             | 0      |
| Limit/ban foreign investment in U.S. markets  | 1     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Limit/ban U.S. investment in foreign markets  | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Higher margins on futures   | 6     | 1          | 0         | 1        | 0            | 2             | 1             | 0      |
| Price limits on futures   | 7     | 0          | 0         | 1        | 1            | 2             | 3             | 0      |
| Price limits on cash markets  | 1     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Bolster specialist capital/access to credit   | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Require portfolio insurers to hold underlying stock   | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Downtick rule for futures   | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Reconfigure regulatory agencies such that Futures and underlying cash market fall under the same jurisdiction | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Change specialist system  | 1     | 0          | 0         | 0        | 0            | 0             | 1             | 0      |
| Ban closing of markets  | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Improve communication between exchanges   | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Improve market making of DTC  | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Formalize market closing to allow information to be disseminated  | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Improve dissemination of key information (i.e., prices)   | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Close markets in disorderly situations  | 5     | 0          | 0         | 1        | 0            | 1             | 1             | 0      |
| Adjust systems to promote long-term investment and discourage speculation                                     | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Fix U.S. economic fundamentals  | 0     | 0          | 0         | 0        | 0            | 0             | 0             | 0      |
| Other   | 22    | 2          | 3         | 5        | 3            | 0             | 1             | 1      |

| NUMBER OF SURVEYS   | 211   | 9          | 5         | 43                  | 18              | 25               | 54               | 3               |
|---|-------|------------|-----------|---------------------|-----------------|------------------|------------------|-----------------|
| Question/Responses  | Total | Regulators | Exchanges | Fortune<br>100 CEOs | Mutual<br>Funds | Pension<br>Funds | Fund<br>Managers | Trade<br>Groups |
| FOURTH MOST INAPPROPRIATE RECOMMENDATION  |       |            |           |                     |                 |                  |                  |                 |
| Keep status quo   | 2     | 0          | 0         | 1                   | 0               | 0                | 1                | 0               |
| Interfere with free market system   | 3     | 0          | 0         | 0                   | 1               | 1                | 1                | 0               |
| Don't overreact   | 1     | 0          | 0         | 0                   | 0               | 1                | 0                | 0               |
| Limit/ban financial instrument derivatives  | 3     | 0          | 0         | 0                   | 1               | 1                | 1                | 0               |
| Limit/ban portfolio insurance   | 2     | 0          | 0         | 1                   | 0               | 1                | 0                | 0               |
| Limit/ban program trading   | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Limit/ban index arbitrage   | 2     | 0          | 1         | 1                   | 0               | 0                | 0                | 0               |
| Limit/ban foreign investment in U.S. markets  | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Limit/ban U.S. investment in foreign markets  | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Higher margins on futures   | 1     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Price limits on futures   | 3     | 1          | 0         | 0                   | 0               | 2                | 0                | 0               |
| Price limits on cash markets  | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Bolster specialist capital/access to credit   | 1     | 0          | 0         | 0                   | 0               | 0                | 0                | 1               |
| Require portfolio insurers to hold underlying stock   | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Downtick rule for futures   | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Reconfigure regulatory agencies such that Futures<br>and underlying cash market fall under the same<br>jurisdiction | 1     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Change specialist system  | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Ban closing of markets  | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Improve communication between exchanges   | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Improve market making of OTC  | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Formalize market closing to allow information to be<br>disseminated   | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Improve dissemination of key information (i.e.,<br>prices)  | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Close markets in disorderly situations  | 5     | 0          | 0         | 2                   | 1               | 1                | 1                | 0               |
| Adjust systems to promote long-term investment and<br>discourage speculation  | 3     | 1          | 0         | 1                   | 0               | 0                | 0                | 0               |
| Fix U.S. economic fundamentals  | 0     | 0          | 0         | 0                   | 0               | 0                | 0                | 0               |
| Other   | 18    | 1          | 1         | 3                   | 1               | 1                | 3                | 1               |



| NUMBER OF SURVEYS  | 13                  | 8                   | 4                              | 6                   | 14                              | 2                   | 7         |
|--|---------------------|---------------------|--------------------------------|---------------------|---------------------------------|---------------------|-----------|
| Question/Response  | Commercial<br>Banks | Investment<br>Banks | Foreign<br>Commercial<br>Banks | Int'l<br>Securities | Regional<br>Investment<br>Banks | Discount<br>Brokers | Academics |
| * TOTAL MANAGED FUNDS  |                     |                     |                                |                     |                                 |                     |           |
| (\$ Million)   |                     |                     |                                |                     |                                 |                     |           |
| * TOTAL U.S. EQUITIES MANAGED                                    |                     |                     |                                |                     |                                 |                     |           |
| (\$ Million)   |                     |                     |                                |                     |                                 |                     |           |
| * TOTAL STOCK INDEX FUNDS  |                     |                     |                                |                     |                                 |                     |           |
| (\$ Million)   |                     |                     |                                |                     |                                 |                     |           |
| * TOTAL EQUITIES PORTFOLIO INSURED                               |                     |                     |                                |                     |                                 |                     |           |
| (\$ Million)   |                     |                     |                                |                     |                                 |                     |           |
| IMPORTANCE OF FUNDAMENTAL FACTORS - WEEK PRECEDING<br>OCTOBER 19 |                     |                     |                                |                     |                                 |                     |           |
| High   | 8                   | 4                   | 3                              | 2                   | 12                              | 2                   | 2         |
| Medium   | 3                   | 1                   | 1                              | 1                   | 0                               | 0                   | 0         |
| Low  | 0                   | 1                   | 0                              | 2                   | 1                               | 0                   | 1         |
| FIRST CITEO FUNDAMENTAL FACTOR                                   |                     |                     |                                |                     |                                 |                     |           |
| Change in economic outlook (recession/inflation?)                | 2                   | 0                   | 0                              | 0                   | 1                               | 0                   | 0         |
| Rising interest rates  | 5                   | 1                   | 1                              | 3                   | 3                               | 0                   | 2         |
| Declining value of dollar  | 0                   | 1                   | 0                              | 1                   | 1                               | 0                   | 0         |
| Overvalued bull market   | 5                   | 3                   | 1                              | 0                   | 2                               | 0                   | 1         |
| Poor business earnings outlook                                   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Trade deficit  | 0                   | 0                   | 1                              | 0                   | 1                               | 0                   | 0         |
| Budget deficit   | 1                   | 0                   | 1                              | 0                   | 1                               | 1                   | 0         |
| Twin deficits  | 0                   | 1                   | 0                              | 1                   | 2                               | 1                   | 0         |
| Tax bill (limits interest deduction on takeovers)                | 0                   | 2                   | 0                              | 1                   | 0                               | 0                   | 1         |
| Protectionist trade bill   | 0                   | 0                   | 0                              | 0                   | 1                               | 0                   | 0         |
| Persian Gulf   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Baker comments   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Iran/Contra affair   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 1         |
| Third World debt crisis  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Other fundamental factor   | 0                   | 0                   | 0                              | 0                   | 1                               | 0                   | 0         |
| Breakdown in international cooperation                           | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| SECOND CITED FUNDAMENTAL FACTOR                                  |                     |                     |                                |                     |                                 |                     |           |
| Change in economic outlook (recession/inflation?)                | 1                   | 2                   | 0                              | 0                   | 1                               | 0                   | 0         |
| Rising interest rates  | 2                   | 0                   | 1                              | 1                   | 1                               | 0                   | 0         |
| Declining value of dollar  | 2                   | 1                   | 1                              | 1                   | 3                               | 1                   | 1         |
| Overvalued bull market   | 1                   | 0                   | 0                              | 2                   | 1                               | 0                   | 1         |
| Poor business earnings outlook                                   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Trade deficit  | 3                   | 1                   | 1                              | 0                   | 3                               | 1                   | 0         |
| Budget deficit   | 1                   | 0                   | 1                              | 0                   | 0                               | 0                   | 1         |
| Twin deficits  | 1                   | 1                   | 0                              | 1                   | 0                               | 0                   | 0         |

\* Applicable for long surveys only

Study V

| NUMBER OF SURVEYS  | 13                  |                     | 8                   |                     | 4                   |   | 6                   |           | 14 |  | 2 |  | 7 |  |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|---|---------------------|-----------|----|--|---|--|---|--|
| Question/Response  | Commercial<br>Banks | Investment<br>Banks | Foreign             |                     | Regional            |   | Discount<br>Brokers | Academics |    |  |   |  |   |  |
|  |                     |                     | Commercial<br>Banks | Int'l<br>Securities | Investment<br>Banks |   |                     |           |    |  |   |  |   |  |
| SECOND CITED FUNDAMENTAL FACTOR                                |                     |                     |                     |                     |                     |   |                     |           |    |  |   |  |   |  |
| Tax bill (limits interest deduction on takeovers)              | 0                   | 1                   | 0                   | 1                   | 1                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Protectionist trade bill                                       | 0                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 1         |    |  |   |  |   |  |
| Persian Gulf   | 0                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Baker comments   | 0                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Iran/Contra affair   | 0                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Third World debt crisis  | 0                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Other fundamental factor                                       | 0                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Breakdown in international cooperation                         | 1                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| THIRD CITED FUNDAMENTAL FACTOR                                 |                     |                     |                     |                     |                     |   |                     |           |    |  |   |  |   |  |
| Change in economic outlook (recession/inflation?)              | 1                   | 0                   | 0                   | 1                   | 0                   | 0 | 0                   | 2         |    |  |   |  |   |  |
| Rising interest rates  | 2                   | 0                   | 0                   | 2                   | 5                   | 1 | 0                   | 0         |    |  |   |  |   |  |
| Declining value of dollar                                      | 1                   | 1                   | 1                   | 0                   | 1                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Overvalued bull market   | 0                   | 0                   | 0                   | 1                   | 1                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Poor business earnings outlook                                 | 0                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Trade deficit  | 1                   | 0                   | 1                   | 1                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Budget deficit   | 3                   | 0                   | 0                   | 0                   | 1                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Twin deficits  | 0                   | 1                   | 0                   | 0                   | 1                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Tax bill (limits interest deduction on takeovers)              | 1                   | 2                   | 1                   | 0                   | 1                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Protectionist trade bill                                       | 0                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Persian Gulf   | 0                   | 0                   | 0                   | 1                   | 0                   | 0 | 1                   | 0         |    |  |   |  |   |  |
| Baker comments   | 0                   | 1                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Iran/Contra affair   | 0                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Third World debt crisis  | 0                   | 0                   | 0                   | 0                   | 0                   | 1 | 0                   | 0         |    |  |   |  |   |  |
| Other fundamental factor                                       | 0                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Breakdown in international cooperation                         | 1                   | 1                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| IMPORTANCE OF TECHNICAL FACTORS - WEEK PRECEDING<br>OCTOBER 19 |                     |                     |                     |                     |                     |   |                     |           |    |  |   |  |   |  |
| High   | 0                   | 0                   | 1                   | 0                   | 1                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Medium   | 3                   | 2                   | 1                   | 3                   | 6                   | 1 | 1                   | 1         |    |  |   |  |   |  |
| Low  | 7                   | 4                   | 2                   | 2                   | 5                   | 1 | 1                   | 1         |    |  |   |  |   |  |
| FIRST CITED TECHNICAL FACTOR                                   |                     |                     |                     |                     |                     |   |                     |           |    |  |   |  |   |  |
| Stock index arbitrage  | 1                   | 1                   | 0                   | 1                   | 3                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Portfolio insurance  | 2                   | 1                   | 0                   | 1                   | 1                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Program trading  | 1                   | 1                   | 1                   | 1                   | 2                   | 0 | 1                   | 0         |    |  |   |  |   |  |
| Volatility stemming from futures market                        | 2                   | 1                   | 0                   | 1                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Poor capitalization of specialist system                       | 0                   | 0                   | 0                   | 1                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Other specialist related problem                               | 0                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Poor performance of super DDT system                           | 0                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| General inability to receive accurate prices                   | 0                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Margin call forced selling                                     | 0                   | 0                   | 0                   | 0                   | 0                   | 0 | 0                   | 0         |    |  |   |  |   |  |
| Other technical factor   | 2                   | 0                   | 1                   | 1                   | 1                   | 0 | 0                   | 0         |    |  |   |  |   |  |

| NUMBER OF SURVEYS  | 13                  | 8                   | 4                              | 6                   | 14                              | 2                   | 7         |
|--|---------------------|---------------------|--------------------------------|---------------------|---------------------------------|---------------------|-----------|
| Question/Response  | Commercial<br>Banks | Investment<br>Banks | Foreign<br>Commercial<br>Banks | Int'l<br>Securities | Regional<br>Investment<br>Banks | Discount<br>Brokers | Academics |
| <b>SECOND CITED TECHNICAL FACTOR</b>                                       |                     |                     |                                |                     |                                 |                     |           |
| Stock index arbitrage  | 1                   | 1                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Portfolio insurance  | 2                   | 0                   | 0                              | 2                   | 3                               | 0                   | 0         |
| Program trading  | 0                   | 0                   | 0                              | 1                   | 1                               | 0                   | 0         |
| Volatility stemming from futures market                                    | 1                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Poor capitalization of specialist system                                   | 1                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Other specialist related problem   | 0                   | 0                   | 0                              | 1                   | 0                               | 0                   | 0         |
| Poor performance of super OOT system                                       | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| General inability to receive accurate prices                               | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Margin call forced selling   | 0                   | 0                   | 0                              | 0                   | 1                               | 0                   | 0         |
| Other technical factor   | 1                   | 2                   | 1                              | 0                   | 0                               | 0                   | 0         |
| <b>THIRD CITED TECHNICAL FACTOR</b>  |                     |                     |                                |                     |                                 |                     |           |
| Stock index arbitrage  | 1                   | 0                   | 0                              | 1                   | 0                               | 0                   | 0         |
| Portfolio insurance  | 0                   | 1                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Program trading  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Volatility stemming from futures market                                    | 0                   | 0                   | 0                              | 1                   | 0                               | 0                   | 0         |
| Poor capitalization of specialist system                                   | 0                   | 0                   | 0                              | 0                   | 1                               | 0                   | 0         |
| Other specialist related problem   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Poor performance of super OOT system                                       | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| General inability to receive accurate prices                               | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Margin call forced selling   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Other technical factor   | 0                   | 0                   | 0                              | 0                   | 1                               | 0                   | 0         |
| <b>IMPORTANCE OF PSYCHOLOGICAL FACTOR - WEEK PRECEEDING<br/>OCTOBER 19</b> |                     |                     |                                |                     |                                 |                     |           |
| High   | 3                   | 2                   | 0                              | 3                   | 0                               | 0                   | 1         |
| Medium   | 7                   | 3                   | 2                              | 1                   | 6                               | 1                   | 0         |
| Low  | 1                   | 1                   | 2                              | 1                   | 6                               | 1                   | 1         |
| <b>FIRST CITED PSYCHOLOGICAL FACTOR</b>                                    |                     |                     |                                |                     |                                 |                     |           |
| Investor nervousness   | 7                   | 1                   | 1                              | 2                   | 3                               | 0                   | 1         |
| Fear of NYSE closing   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Sheer panic  | 0                   | 0                   | 0                              | 1                   | 0                               | 0                   | 0         |
| Analyst's bearish predictions  | 0                   | 0                   | 1                              | 0                   | 2                               | 0                   | 1         |
| Erosion of confidence in U.S. policies both<br>domestic and foreign        | 4                   | 5                   | 1                              | 3                   | 5                               | 1                   | 2         |
| Lack of statement from White House during market<br>free-fall              | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Other psychological factor   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| <b>SECOND CITED PSYCHOLOGICAL FACTOR</b>                                   |                     |                     |                                |                     |                                 |                     |           |
| Investor nervousness   | 1                   | 1                   | 2                              | 0                   | 1                               | 0                   | 0         |
| Fear of NYSE closing   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Sheer panic  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Analyst's bearish predictions  | 1                   | 1                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Erosion of confidence in U.S. policies both<br>domestic and foreign        | 3                   | 0                   | 0                              | 2                   | 3                               | 0                   | 0         |

| NUMBER OF SURVEYS  |                  |                  | 13                       | 8                | 4                         | 6                | 14        | 2 | 7 |
|--|------------------|------------------|--------------------------|------------------|---------------------------|------------------|-----------|---|---|
| Question/Response  | Commercial Banks | Investment Banks | Foreign Commercial Banks | Int'l Securities | Regional Investment Banks | Discount Brokers | Academics |   |   |
| <b>SECOND CITED PSYCHOLOGICAL FACTOR</b>                         |                  |                  |                          |                  |                           |                  |           |   |   |
| Lack of statement from White House during market free-fall       | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Other psychological factor                                       | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| <b>THIRD CITED PSYCHOLOGICAL FACTOR</b>                          |                  |                  |                          |                  |                           |                  |           |   |   |
| Investor nervousness   | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Fear of NYSE closing   | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Sheer panic  | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Analyst's bearish predictions                                    | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Erosion of confidence in U.S. policies both domestic and foreign | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Lack of statement from White House during market free-fall       | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Other psychological factor                                       | 0                | 0                | 1                        | 0                | 0                         | 0                | 0         |   |   |
| <b>IMPORTANCE OF FUNDAMENTAL FACTORS - ON OCTOBER 19</b>         |                  |                  |                          |                  |                           |                  |           |   |   |
| High   | 2                | 1                | 1                        | 1                | 4                         | 1                | 0         |   |   |
| Medium   | 2                | 1                | 0                        | 0                | 4                         | 0                | 0         |   |   |
| Low  | 6                | 4                | 3                        | 4                | 5                         | 1                | 2         |   |   |
| <b>FIRST CITED FUNDAMENTAL FACTOR</b>                            |                  |                  |                          |                  |                           |                  |           |   |   |
| Change in economic outlook (recession/inflation?)                | 1                | 0                | 0                        | 1                | 1                         | 0                | 0         |   |   |
| Rising interest rates  | 3                | 1                | 0                        | 2                | 1                         | 0                | 1         |   |   |
| Declining value of dollar  | 0                | 1                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Overvalued bull market   | 5                | 2                | 0                        | 0                | 2                         | 0                | 2         |   |   |
| Poor business earnings outlook                                   | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Trade deficit  | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Budget deficit   | 0                | 1                | 0                        | 0                | 2                         | 0                | 0         |   |   |
| Twin deficits  | 0                | 0                | 0                        | 1                | 1                         | 0                | 0         |   |   |
| Tax bill (limits interest deduction on takeovers)                | 0                | 1                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Protectionist trade bill   | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Persian Gulf   | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Baker comments   | 0                | 0                | 1                        | 1                | 1                         | 1                | 0         |   |   |
| Iran/Contra affair   | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Third World debt crisis  | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Other fundamental factor   | 0                | 0                | 1                        | 0                | 2                         | 0                | 0         |   |   |
| Breakdown in international cooperation                           | 1                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| <b>SECOND CITED FUNDAMENTAL FACTOR</b>                           |                  |                  |                          |                  |                           |                  |           |   |   |
| Change in economic outlook (recession/inflation?)                | 0                | 2                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Rising interest rates  | 5                | 0                | 0                        | 0                | 1                         | 0                | 0         |   |   |
| Declining value of dollar  | 0                | 0                | 1                        | 2                | 1                         | 1                | 1         |   |   |
| Overvalued bull market   | 1                | 0                | 0                        | 2                | 2                         | 0                | 0         |   |   |
| Poor business earnings outlook                                   | 0                | 0                | 0                        | 0                | 0                         | 0                | 0         |   |   |
| Trade deficit  | 2                | 0                | 0                        | 0                | 3                         | 0                | 0         |   |   |
| Budget deficit   | 1                | 1                | 0                        | 0                | 0                         | 0                | 0         |   |   |

NUMBER OF SURVEYS 13 8 4 6 14 2 7

| Question/Response | Foreign          |                  | Regional         |                  |                  |                  |
|-------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|                   | Commercial Banks | Investment Banks | Commercial Banks | Int'l Securities | Investment Banks | Discount Brokers |

SECOND CITED FUNDAMENTAL FACTOR

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| Twin deficits                                     | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| Tax bill (limits interest deduction on takeovers) | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Protectionist trade bill                          | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Persian Gulf                                      | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Baker comments                                    | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Iran/Contra affair                                | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Third World debt crisis                           | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other fundamental factor                          | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Breakdown in international cooperation            | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

THIRD CITED FUNDAMENTAL FACTOR

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| Change in economic outlook (recession/inflation?) | 2 | 0 | 0 | 1 | 0 | 0 | 0 |
| Rising interest rates                             | 1 | 0 | 0 | 1 | 2 | 0 | 0 |
| Declining value of dollar                         | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Overvalued bull market                            | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Poor business earnings outlook                    | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Trade deficit                                     | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Budget deficit                                    | 3 | 0 | 0 | 0 | 1 | 0 | 0 |
| Twin deficits                                     | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| Tax bill (limits interest deduction on takeovers) | 0 | 1 | 0 | 0 | 2 | 0 | 0 |
| Protectionist trade bill                          | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Persian Gulf                                      | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Baker comments                                    | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Iran/Contra affair                                | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Third World debt crisis                           | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other fundamental factor                          | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Breakdown in international cooperation            | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

IMPORTANCE OF TECHNICAL FACTORS - ON OCTOBER 19

|        |   |   |   |   |   |   |   |
|--------|---|---|---|---|---|---|---|
| High   | 3 | 2 | 2 | 3 | 5 | 1 | 0 |
| Medium | 4 | 3 | 1 | 2 | 5 | 1 | 2 |
| Low    | 3 | 1 | 1 | 0 | 2 | 0 | 0 |

FIRST CITED TECHNICAL FACTOR

|  |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|
| Stock index arbitrage                        | 3 | 3 | 0 | 2 | 2 | 0 | 0 |
| Portfolio insurance                          | 3 | 3 | 1 | 0 | 3 | 0 | 1 |
| Program trading                              | 4 | 1 | 2 | 1 | 4 | 1 | 1 |
| Volatility stemming from futures market      | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Poor capitalization of specialist system     | 1 | 1 | 0 | 2 | 0 | 0 | 0 |
| Other specialist related problem             | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Poor performance of super DOT system         | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| General inability to receive accurate prices | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Margin call forced selling                   | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Other technical factor                       | 1 | 0 | 0 | 0 | 2 | 0 | 0 |



Study V

| NUMBER OF SURVEYS | 13                  |                     | 8                   |                     | 4                   |  | 6                   |           | 14 |  | 2 |  | 7 |  |
|-------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--|---------------------|-----------|----|--|---|--|---|--|
| Question/Response | Commercial<br>Banks | Investment<br>Banks | Foreign             |                     | Regional            |  | Discount<br>Brokers | Academics |    |  |   |  |   |  |
|                   |                     |                     | Commercial<br>Banks | Int'l<br>Securities | Investment<br>Banks |  |                     |           |    |  |   |  |   |  |

SECOND CITED TECHNICAL FACTOR

|  |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|
| Stock index arbitrage                        | 1 | 2 | 0 | 1 | 1 | 0 | 0 |
| Portfolio insurance                          | 4 | 1 | 0 | 2 | 4 | 0 | 0 |
| Program trading                              | 1 | 1 | 0 | 0 | 3 | 0 | 0 |
| Volatility stemming from futures market      | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Poor capitalization of specialist system     | 1 | 0 | 0 | 0 | 1 | 2 | 0 |
| Other specialist related problem             | 0 | 1 | 0 | 2 | 2 | 0 | 0 |
| Poor performance of super DOT system         | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| General inability to receive accurate prices | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Margin call forced selling                   | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| Other technical factor                       | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

THIRD CITED TECHNICAL FACTOR

|  |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|
| Stock index arbitrage                        | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Portfolio insurance                          | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| Program trading                              | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Volatility stemming from futures market      | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Poor capitalization of specialist system     | 1 | 1 | 0 | 0 | 3 | 0 | 0 |
| Other specialist related problem             | 1 | 2 | 0 | 1 | 0 | 0 | 0 |
| Poor performance of super DOT system         | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| General inability to receive accurate prices | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Margin call forced selling                   | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Other technical factor                       | 0 | 0 | 0 | 1 | 0 | 0 | 0 |

IMPORTANCE OF PSYCHOLOGICAL FACTOR - ON OCTOBER 19

|        |   |   |   |   |   |   |   |
|--------|---|---|---|---|---|---|---|
| High   | 6 | 4 | 1 | 2 | 4 | 1 | 2 |
| Medium | 3 | 2 | 3 | 2 | 3 | 1 | 0 |
| Low    | 1 | 0 | 0 | 1 | 5 | 0 | 0 |

FIRST CITED PSYCHOLOGICAL FACTOR

|  |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|
| Investor nervousness   | 2 | 0 | 1 | 1 | 1 | 0 | 2 |
| Fear of NYSE closing   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sheer panic  | 8 | 6 | 2 | 4 | 8 | 1 | 1 |
| Analyst's bearish predictions                                    | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Erosion of confidence in U.S. policies both domestic and foreign | 1 | 1 | 0 | 0 | 2 | 1 | 0 |
| Lack of statement from White House during market free-fall       | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other psychological factor                                       | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

SECOND CITED PSYCHOLOGICAL FACTOR

|  |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|
| Investor nervousness   | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fear of NYSE closing   | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| Sheer panic  | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Analyst's bearish predictions                                    | 2 | 0 | 1 | 1 | 0 | 0 | 0 |
| Erosion of confidence in U.S. policies both domestic and foreign | 2 | 1 | 0 | 2 | 3 | 1 | 0 |
| Lack of statement from White House during market free-fall       | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| NUMBER OF SURVEYS | 13               | 8                | 4                        | 6                | 14                        | 2                | 7         |
|-------------------|------------------|------------------|--------------------------|------------------|---------------------------|------------------|-----------|
| Question/Response | Commercial Banks | Investment Banks | Foreign Commercial Banks | Int'l Securities | Regional Investment Banks | Discount Brokers | Academics |

SECOND CITED PSYCHOLOGICAL FACTOR

|                            |   |   |   |   |   |   |   |
|----------------------------|---|---|---|---|---|---|---|
| Other psychological factor | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|----------------------------|---|---|---|---|---|---|---|

THIRD CITED PSYCHOLOGICAL FACTOR

|  |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|
| Investor nervousness   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fear of NYSE closing   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sheer panic  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Analyst's bearish predictions                                    | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Erosion of confidence in U.S. policies both domestic and foreign | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| Lack of statement from White House during market free-fall       | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Other psychological factor                                       | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

\* MOST IMPORTANT PROTECTIVE ACTION TAKEN

- Traditionally low equity position
- Reduced equity position during 1987
- Reduced equity position in 2 months prior to October 19
- Portfolio insurance: hedged position as planned
- Portfolio insurance: lagged hedge on expectation of recovery
- On October 19, portfolio insurance: with futures
- On October 19, portfolio insurance: with options
- On October 19, portfolio insurance: with cash market
- On October 19, reduction of equity position (independent of portfolio insurance program)
- Flight to quality (shifted equity to higher quality/lower risk stocks)
- Increased equity position
- Other protective action taken
- No protective action taken

\* SATISFACTION WITH EFFECTIVENESS

- High
- Medium
- Low

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- Traditionally low equity position
- Reduced equity position during 1987
- Reduced equity position in 2 months prior to October 19
- Portfolio insurance: hedged position as planned
- Portfolio insurance: lagged hedge on expectation of recovery
- On October 19, portfolio insurance: with futures

\* Applicable for long surveys only

NUMBER OF SURVEYS 13 8 4 6 14 2 7

| Question/Response | Foreign          |                  | Regional         |                  | Discount         |         | Academics |
|-------------------|------------------|------------------|------------------|------------------|------------------|---------|-----------|
|                   | Commercial Banks | Investment Banks | Commercial Banks | Int'l Securities | Investment Banks | Brokers |           |

\* SECOND MOST IMPORTANT PROTECTIVE ACTION TAKEN

- On October 19, portfolio insurance: with options
- On October 19, portfolio insurance: with cash market
- On October 19, reduction of equity position (independent of portfolio insurance program)
- Flight to quality (shifted equity to higher quality/lower risk stocks)
- Increased equity position
- Other protective action taken
- No protective action taken

\* SATISFACTION WITH EFFECTIVENESS

- High
- Medium
- Low

\* THIRD MOST IMPORTANT PROTECTIVE ACTION TAKEN

- Traditionally low equity position
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- On October 19, reduction of equity position (independent of portfolio insurance program)
- Flight to quality (shifted equity to higher quality/lower risk stocks)
- Increased equity position
- Other protective action taken
- No protective action taken

\* SATISFACTION WITH EFFECTIVENESS

- High
- Medium
- Low

\* IMPACT OF EVENTS ON ORGANIZATION'S PORTFOLIO UNDER MANAGEMENT

- More than 20% decline
- 10-12% decline
- 12-5% decline
- Less than 5% decline

\* Applicable for long surveys only

| NUMBER OF SURVEYS  | 13                  | 8                   | 4                              | 6                   | 14                              | 2                   | 7         |
|--|---------------------|---------------------|--------------------------------|---------------------|---------------------------------|---------------------|-----------|
| Question/Response  | Commercial<br>Banks | Investment<br>Banks | Foreign<br>Commercial<br>Banks | Int'l<br>Securities | Regional<br>Investment<br>Banks | Discount<br>Brokers | Academics |
| <b>NYSE EFFICIENCY IN PRICE AND MARKET INFORMATION<br/>DISSEMINATION</b>                       |                     |                     |                                |                     |                                 |                     |           |
| Excellent  | 1                   | 0                   | 0                              | 0                   | 1                               | 0                   | 1         |
| Good   | 3                   | 4                   | 1                              | 3                   | 4                               | 1                   | 1         |
| Poor   | 5                   | 2                   | 0                              | 2                   | 5                               | 1                   | 0         |
| Very poor  | 1                   | 2                   | 1                              | 1                   | 2                               | 0                   | 0         |
| Not observed   | 1                   | 0                   | 1                              | 0                   | 1                               | 0                   | 2         |
| <b>OTC EFFICIENCY IN PRICE AND MARKET INFORMATION<br/>DISSEMINATION</b>                        |                     |                     |                                |                     |                                 |                     |           |
| Excellent  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Good   | 1                   | 1                   | 0                              | 0                   | 3                               | 0                   | 0         |
| Poor   | 2                   | 1                   | 0                              | 0                   | 3                               | 1                   | 1         |
| Very poor  | 7                   | 6                   | 2                              | 5                   | 5                               | 1                   | 0         |
| Not observed   | 1                   | 0                   | 1                              | 1                   | 2                               | 0                   | 3         |
| <b>STOCK INDEX FUTURES MARKET EFFICIENCY IN PRICE AND<br/>MARKET INFORMATION DISSEMINATION</b> |                     |                     |                                |                     |                                 |                     |           |
| Excellent  | 1                   | 0                   | 0                              | 0                   | 1                               | 0                   | 0         |
| Good   | 1                   | 4                   | 0                              | 0                   | 4                               | 1                   | 1         |
| Poor   | 2                   | 1                   | 1                              | 3                   | 2                               | 0                   | 0         |
| Very poor  | 2                   | 3                   | 1                              | 1                   | 1                               | 0                   | 0         |
| Not observed   | 3                   | 0                   | 1                              | 2                   | 5                               | 1                   | 2         |
| <b>OPTIONS MARKETS EFFICIENCY IN PRICE AND MARKET<br/>INFORMATION DISSEMINATION</b>            |                     |                     |                                |                     |                                 |                     |           |
| Excellent  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Good   | 2                   | 4                   | 0                              | 0                   | 2                               | 0                   | 0         |
| Poor   | 3                   | 0                   | 1                              | 1                   | 2                               | 2                   | 1         |
| Very poor  | 0                   | 4                   | 1                              | 3                   | 3                               | 0                   | 0         |
| Not observed   | 4                   | 0                   | 1                              | 2                   | 6                               | 0                   | 2         |
| <b>NYSE EFFICIENCY IN EXECUTING AND CLEARING TRADES</b>  |                     |                     |                                |                     |                                 |                     |           |
| Excellent  | 1                   | 1                   | 0                              | 0                   | 1                               | 0                   | 0         |
| Good   | 6                   | 2                   | 1                              | 1                   | 5                               | 1                   | 1         |
| Poor   | 2                   | 4                   | 0                              | 5                   | 5                               | 1                   | 0         |
| Very poor  | 0                   | 1                   | 1                              | 0                   | 1                               | 0                   | 0         |
| Not observed   | 1                   | 0                   | 1                              | 0                   | 1                               | 0                   | 1         |
| <b>OTC EFFICIENCY IN EXECUTING AND CLEARING TRADES</b>   |                     |                     |                                |                     |                                 |                     |           |
| Excellent  | 1                   | 1                   | 0                              | 0                   | 1                               | 0                   | 0         |
| Good   | 1                   | 0                   | 0                              | 0                   | 2                               | 0                   | 0         |
| Poor   | 2                   | 3                   | 0                              | 0                   | 3                               | 1                   | 0         |
| Very poor  | 5                   | 4                   | 1                              | 4                   | 3                               | 1                   | 0         |
| Not observed   | 1                   | 0                   | 2                              | 2                   | 4                               | 0                   | 2         |

| NUMBER OF SURVEYS   | 13                  |                     | 8                              |                     | 4                               |                     | 6         |   | 14 |   | 2 |   | 7 |   |
|---|---------------------|---------------------|--------------------------------|---------------------|---------------------------------|---------------------|-----------|---|----|---|---|---|---|---|
| Question/Response   | Commercial<br>Banks | Investment<br>Banks | Foreign<br>Commercial<br>Banks | Int'l<br>Securities | Regional<br>Investment<br>Banks | Discount<br>Brokers | Academics |   |    |   |   |   |   |   |
| <b>STOCK INDEX FUTURES MARKET EFFICIENCY IN EXECUTING AND CLEARING TRADES</b>                                 |                     |                     |                                |                     |                                 |                     |           |   |    |   |   |   |   |   |
| Excellent   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Good  | 1                   | 4                   | 0                              | 0                   | 0                               | 4                   | 0         | 0 | 1  | 0 | 0 | 0 | 1 | 0 |
| Poor  | 4                   | 4                   | 0                              | 3                   | 1                               | 1                   | 1         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Very poor   | 1                   | 0                   | 1                              | 0                   | 4                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Not observed  | 4                   | 0                   | 2                              | 3                   | 4                               | 1                   | 1         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| <b>OPTIONS MARKETS EFFICIENCY IN EXECUTING AND CLEARING TRADES</b>  |                     |                     |                                |                     |                                 |                     |           |   |    |   |   |   |   |   |
| Excellent   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Good  | 0                   | 4                   | 0                              | 0                   | 3                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Poor  | 4                   | 3                   | 0                              | 1                   | 1                               | 2                   | 1         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Very poor   | 0                   | 1                   | 1                              | 3                   | 4                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Not observed  | 6                   | 0                   | 2                              | 2                   | 5                               | 0                   | 1         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| <b>MOST BENEFICIAL RECOMMENDATION</b>   |                     |                     |                                |                     |                                 |                     |           |   |    |   |   |   |   |   |
| Keep status quo   | 1                   | 1                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Interfere with free market system   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Don't overreact   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 1 | 0 |
| Limit/ban financial instrument derivatives  | 1                   | 0                   | 0                              | 0                   | 2                               | 1                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Limit/ban portfolio insurance   | 1                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Limit/ban program trading   | 0                   | 1                   | 0                              | 1                   | 4                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Limit/ban index arbitrage   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Limit/ban foreign investment in U.S. markets  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Limit/ban U.S. investment in foreign markets  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Higher margins on futures   | 3                   | 1                   | 0                              | 2                   | 2                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Price limits on futures   | 1                   | 1                   | 0                              | 1                   | 1                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Price limits on cash markets  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Bolster specialist capital/access to credit   | 1                   | 1                   | 0                              | 0                   | 3                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Require portfolio insurers to hold underlying stock   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Downtick rule for futures   | 0                   | 0                   | 0                              | 0                   | 0                               | 1                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Reconfigure regulatory agencies such that Futures and underlying cash market fall under the same jurisdiction | 0                   | 1                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Change specialist system  | 1                   | 0                   | 1                              | 1                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Ban closing of markets  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Improve communication between exchanges   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Improve market making of DTC  | 1                   | 0                   | 0                              | 1                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Formalize market closing to allow information to be disseminated  | 1                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Improve dissemination of key information (i.e., prices)   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Close markets in disorderly situations  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Adjust systems to promote long-term investment and discourage speculation                                     | 0                   | 0                   | 0                              | 0                   | 1                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 1 | 0 |
| Fix U.S. economic fundamentals  | 1                   | 1                   | 1                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Other   | 1                   | 1                   | 1                              | 0                   | 0                               | 0                   | 0         | 0 | 0  | 0 | 0 | 0 | 2 | 0 |



| NUMBER OF SURVEYS   | 13                  | 8                   | 4                              | 6                   | 14                              | 2                   | 7         |
|---|---------------------|---------------------|--------------------------------|---------------------|---------------------------------|---------------------|-----------|
| Question/Response   | Commercial<br>Banks | Investment<br>Banks | Foreign<br>Commercial<br>Banks | Int'l<br>Securities | Regional<br>Investment<br>Banks | Discount<br>Brokers | Academics |
| <b>SECOND MOST BENEFICIAL RECOMMENDATION</b>  |                     |                     |                                |                     |                                 |                     |           |
| Keep status quo   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Interfere with free market system   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Don't overreact   | 0                   | 1                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Limit/ban financial instrument derivatives  | 0                   | 0                   | 0                              | 0                   | 1                               | 0                   | 1         |
| Limit/ban portfolio insurance   | 1                   | 1                   | 0                              | 0                   | 2                               | 0                   | 0         |
| Limit/ban program trading   | 1                   | 1                   | 0                              | 1                   | 2                               | 0                   | 0         |
| Limit/ban index arbitrage   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Limit/ban foreign investment in U.S. markets  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Limit/ban U.S. investment in foreign markets  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Higher margins on futures   | 2                   | 1                   | 0                              | 1                   | 1                               | 1                   | 1         |
| Price limits on futures   | 2                   | 2                   | 0                              | 0                   | 1                               | 0                   | 0         |
| Price limits on cash markets  | 0                   | 0                   | 1                              | 1                   | 0                               | 0                   | 0         |
| Bolster specialist capital/access to credit   | 3                   | 0                   | 0                              | 2                   | 3                               | 0                   | 0         |
| Require portfolio insurers to hold underlying stock   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Downtick rule for futures   | 0                   | 1                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Reconfigure regulatory agencies such that Futures and underlying cash market fall under the same jurisdiction | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Change specialist system  | 0                   | 0                   | 0                              | 0                   | 1                               | 0                   | 0         |
| Ban closing of markets  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Improve communication between exchanges   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Improve market making of OTC  | 0                   | 1                   | 1                              | 1                   | 1                               | 1                   | 0         |
| Formalize market closing to allow information to be disseminated  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Improve dissemination of key information (i.e., prices)   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Close markets in disorderly situations  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Adjust systems to promote long-term investment and discourage speculation                                     | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Fix U.S. economic fundamentals  | 0                   | 0                   | 1                              | 0                   | 0                               | 0                   | 2         |
| Other   | 3                   | 0                   | 0                              | 0                   | 1                               | 0                   | 1         |
| <b>THIRD MOST BENEFICIAL RECOMMENDATION</b>   |                     |                     |                                |                     |                                 |                     |           |
| Keep status quo   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 1         |
| Interfere with free market system   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Don't overreact   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Limit/ban financial instrument derivatives  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 1         |
| Limit/ban portfolio insurance   | 0                   | 1                   | 0                              | 0                   | 1                               | 0                   | 0         |
| Limit/ban program trading   | 0                   | 1                   | 0                              | 0                   | 1                               | 0                   | 0         |
| Limit/ban index arbitrage   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Limit/ban foreign investment in U.S. markets  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Limit/ban U.S. investment in foreign markets  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Higher margins on futures   | 1                   | 2                   | 1                              | 1                   | 1                               | 0                   | 0         |
| Price limits on futures   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Price limits on cash markets  | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Bolster specialist capital/access to credit   | 1                   | 1                   | 0                              | 1                   | 3                               | 2                   | 0         |
| Require portfolio insurers to hold underlying stock   | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |
| Downtick rule for futures   | 2                   | 0                   | 0                              | 1                   | 0                               | 0                   | 0         |
| Reconfigure regulatory agencies such that Futures and underlying cash market fall under the same jurisdiction | 0                   | 0                   | 0                              | 0                   | 0                               | 0                   | 0         |

| NUMBER OF SURVEYS   | 13         | 8          | 4          | 6          | 14         | 2        | 7         |
|---|------------|------------|------------|------------|------------|----------|-----------|
| Question/Response   | Commercial | Investment | Foreign    | Int'l      | Regional   | Discount |           |
|   | Banks      | Banks      | Commercial | Securities | Investment | Brokers  | Academics |
| THIRD MOST BENEFICIAL RECOMMENDATION  |            |            |            |            |            |          |           |
| Change specialist system  | 0          | 0          | 0          | 0          | 2          | 0        | 0         |
| Ban closing of markets  | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Improve communication between exchanges   | 1          | 0          | 0          | 0          | 0          | 0        | 0         |
| Improve market making of OTC  | 1          | 0          | 0          | 1          | 1          | 0        | 0         |
| Formalize market closing to allow information to be disseminated  | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Improve dissemination of key information (i.e., prices)   | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Close markets in disorderly situations  | 0          | 1          | 0          | 0          | 0          | 0        | 0         |
| Adjust systems to promote long-term investment and discourage speculation                                     | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Fix U.S. economic fundamentals  | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Other   | 4          | 1          | 0          | 2          | 0          | 0        | 2         |
| FOURTH MOST BENEFICIAL RECOMMENDATION   |            |            |            |            |            |          |           |
| Keep status quo   | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Interfere with free market system   | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Don't overreact   | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Limit/ban financial instrument derivatives  | 0          | 1          | 0          | 0          | 0          | 0        | 0         |
| Limit/ban portfolio insurance   | 0          | 1          | 0          | 0          | 0          | 0        | 0         |
| Limit/ban program trading   | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Limit/ban index arbitrage   | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Limit/ban foreign investment in U.S. markets  | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Limit/ban U.S. investment in foreign markets  | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Higher margins on futures   | 0          | 2          | 0          | 0          | 1          | 0        | 0         |
| Price limits on futures   | 0          | 0          | 0          | 1          | 1          | 0        | 0         |
| Price limits on cash markets  | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Bolster specialist capital/access to credit   | 0          | 1          | 0          | 0          | 0          | 0        | 0         |
| Require portfolio insurers to hold underlying stock   | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Downtick rule for futures   | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Reconfigure regulatory agencies such that Futures and underlying cash market fall under the same jurisdiction | 0          | 1          | 0          | 1          | 3          | 0        | 0         |
| Change specialist system  | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Ban closing of markets  | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Improve communication between exchanges   | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Improve market making of OTC  | 2          | 0          | 0          | 1          | 3          | 1        | 0         |
| Formalize market closing to allow information to be disseminated  | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Improve dissemination of key information (i.e., prices)   | 0          | 0          | 0          | 1          | 0          | 0        | 0         |
| Close markets in disorderly situations  | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Adjust systems to promote long-term investment and discourage speculation                                     | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Fix U.S. economic fundamentals  | 0          | 0          | 0          | 0          | 0          | 0        | 0         |
| Other   | 3          | 0          | 1          | 2          | 1          | 1        | 0         |

NUMBER OF SURVEYS 13 8 4 6 14 2 7

Question/Response Commercial Investment Foreign Int'l Regional Discount  
Banks Banks Banks Securities Banks Brokers Academics

MOST INAPPROPRIATE RECOMMENDATION

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| Keep status quo   | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| Interfere with free market system   | 3 | 0 | 0 | 0 | 3 | 0 | 0 |
| Don't overreact   | 2 | 3 | 1 | 1 | 0 | 0 | 0 |
| Limit/ban financial instrument derivatives  | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| Limit/ban portfolio insurance   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Limit/ban program trading   | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| Limit/ban index arbitrage   | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Limit/ban foreign investment in U.S. markets  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Limit/ban U.S. investment in foreign markets  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Higher margins on futures   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Price limits on futures   | 2 | 0 | 0 | 1 | 1 | 0 | 0 |
| Price limits on cash markets  | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Bolster specialist capital/access to credit   | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Require portfolio insurers to hold underlying stock   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downtick rule for futures   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reconfigure regulatory agencies such that futures and underlying cash market fall under the same jurisdiction | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Change specialist system  | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| Ban closing of markets  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Improve communication between exchanges   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Improve market making of OTC  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Formalize market closing to allow information to be disseminated  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Improve dissemination of key information (i.e., prices)   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Close markets in disorderly situations  | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| Adjust systems to promote long-term investment and discourage speculation                                     | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fix U.S. economic fundamentals  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other   | 1 | 1 | 1 | 0 | 3 | 0 | 2 |

SECOND MOST INAPPROPRIATE RECOMMENDATION

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| Keep status quo   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Interfere with free market system   | 2 | 1 | 0 | 0 | 2 | 0 | 0 |
| Don't overreact   | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| Limit/ban financial instrument derivatives  | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| Limit/ban portfolio insurance   | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Limit/ban program trading   | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| Limit/ban index arbitrage   | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| Limit/ban foreign investment in U.S. markets  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Limit/ban U.S. investment in foreign markets  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Higher margins on futures   | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Price limits on futures   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Price limits on cash markets  | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Bolster specialist capital/access to credit   | 0 | 0 | 0 | 2 | 1 | 0 | 0 |
| Require portfolio insurers to hold underlying stock   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downtick rule for futures   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reconfigure regulatory agencies such that futures and underlying cash market fall under the same jurisdiction | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| NUMBER OF SURVEYS   | 13         |            | 8          |            | 4          |          | 6         |   | 14 |   | 2 |   | 7 |   |
|---|------------|------------|------------|------------|------------|----------|-----------|---|----|---|---|---|---|---|
| Question/Response   | Commercial | Investment | Foreign    | Int'l      | Regional   | Discount |           |   |    |   |   |   |   |   |
|   | Banks      | Banks      | Commercial | Securities | Investment | Brokers  | Academics |   |    |   |   |   |   |   |
| <b>SECOND MOST INAPPROPRIATE RECOMMENDATION</b>   |            |            |            |            |            |          |           |   |    |   |   |   |   |   |
| Change specialist system  | 0          | 1          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Ban closing of markets  | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Improve communication between exchanges   | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Improve market making of OTC  | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Formalize market closing to allow information to be disseminated  | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Improve dissemination of key information (i.e., prices)   | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Close markets in disorderly situations  | 1          | 0          | 0          | 0          | 0          | 1        | 1         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Adjust systems to promote long-term investment and discourage speculation                                     | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Fix U.S. economic fundamentals  | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Other   | 1          | 0          | 0          | 1          | 1          | 0        | 0         | 3 |    |   |   |   |   |   |
| <b>THIRD MOST INAPPROPRIATE RECOMMENDATION</b>  |            |            |            |            |            |          |           |   |    |   |   |   |   |   |
| Keep status quo   | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Interfere with free market system   | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Don't overreact   | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Limit/ban financial instrument derivatives  | 0          | 0          | 0          | 1          | 1          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Limit/ban portfolio insurance   | 0          | 0          | 0          | 0          | 1          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Limit/ban program trading   | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Limit/ban index arbitrage   | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Limit/ban foreign investment in U.S. markets  | 0          | 0          | 0          | 0          | 0          | 1        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Limit/ban U.S. investment in foreign markets  | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Higher margins on futures   | 1          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Price limits on futures   | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Price limits on cash markets  | 0          | 0          | 0          | 1          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Bolster specialist capital/access to credit   | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Require portfolio insurers to hold underlying stock   | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Downtick rule for futures   | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Reconfigure regulatory agencies such that futures and underlying cash market fall under the same jurisdiction | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Change specialist system  | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Ban closing of markets  | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Improve communication between exchanges   | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Improve market making of OTC  | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Formalize market closing to allow information to be disseminated  | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Improve dissemination of key information (i.e., prices)   | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Close markets in disorderly situations  | 0          | 1          | 0          | 0          | 1          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Adjust systems to promote long-term investment and discourage speculation                                     | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Fix U.S. economic fundamentals  | 0          | 0          | 0          | 0          | 0          | 0        | 0         | 0 | 0  | 0 | 0 | 0 | 0 | 0 |
| Other   | 1          | 1          | 1          | 1          | 1          | 1        | 1         | 1 | 1  | 1 | 1 | 1 | 1 | 1 |

NUMBER OF SURVEYS

13

8

4

6

14

2

7

| Question/Response   | Foreign          |                  | Regional         |                  | Discount         |         | Academics |
|---|------------------|------------------|------------------|------------------|------------------|---------|-----------|
|   | Commercial Banks | Investment Banks | Commercial Banks | Int'l Securities | Investment Banks | Brokers |           |
| <b>FOURTH MOST INAPPROPRIATE RECOMMENDATION</b>   |                  |                  |                  |                  |                  |         |           |
| Keep status quo   | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Interfere with free market system   | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Don't overreact   | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Limit/ban financial instrument derivatives  | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Limit/ban portfolio insurance   | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Limit/ban program trading   | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Limit/ban index arbitrage   | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Limit/ban foreign investment in U.S. markets  | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Limit/ban U.S. investment in foreign markets  | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Higher margins on futures   | 0                | 0                | 0                | 0                | 1                | 0       | 0         |
| Price limits on futures   | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Price limits on cash markets  | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Bolster specialist capital/access to credit   | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Require portfolio insurers to hold underlying stock   | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Downtick rule for futures   | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Reconfigure regulatory agencies such that Futures and underlying cash market fall under the same jurisdiction | 0                | 0                | 0                | 0                | 1                | 0       | 0         |
| Change specialist system  | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Ban closing of markets  | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Improve communication between exchanges   | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Improve market making of OTC  | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Formalize market closing to allow information to be disseminated  | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Improve dissemination of key information (i.e., prices)   | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Close markets in disorderly situations  | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Adjust systems to promote long-term investment and discourage speculation                                     | 0                | 0                | 0                | 1                | 0                | 0       | 0         |
| Fix U.S. economic fundamentals  | 0                | 0                | 0                | 0                | 0                | 0       | 0         |
| Other   | 1                | 1                | 0                | 1                | 1                | 2       | 1         |



| NUMBER OF SURVEYS                                       | 80          |          |          |         |         |
|---|-------------|----------|----------|---------|---------|
| Question/Responses                                      | # Responses | 12/31/85 | 12/31/86 | 6/30/87 | 9/30/87 |
| TOTAL SIZE OF PENSION FUNDS                             |             |          |          |         |         |
| (\$ Million)  |             | 466,189  | 543,846  | 624,906 | 616,253 |
| TOTAL EQUITIES IN PENSION FUNDS                         |             |          |          |         |         |
| (\$ Million)  |             | 191,248  | 225,518  | 282,395 | 286,108 |
| AVERAGE BETA OF EQUITY PORTFOLIOS                       |             |          |          |         |         |
| < .80   |             | 0        | 1        | 2       | 0       |
| .80 - 1.00  |             | 17       | 28       | 25      | 0       |
| 1.00 - 1.20   |             | 41       | 37       | 39      | 0       |
| > 1.20  |             | 0        | 0        | 1       | 0       |
| EMPLOYEE PORTFOLIO INSURANCE IN 1985                    |             |          |          |         |         |
| Yes   | 3           |          |          |         |         |
| No  | 77          |          |          |         |         |
| EMPLOYEE PORTFOLIO INSURANCE IN 1986                    |             |          |          |         |         |
| Yes   | 14          |          |          |         |         |
| No  | 66          |          |          |         |         |
| EMPLOYEE PORTFOLIO INSURANCE IN 1987                    |             |          |          |         |         |
| Yes   | 14          |          |          |         |         |
| No  | 66          |          |          |         |         |
| DATE INTRODUCED PORTFOLIO INSURANCE                     |             |          |          |         |         |
| Prior to 1/1/85   | 1           |          |          |         |         |
| 1/1/85 - 12/31-85                                       | 2           |          |          |         |         |
| 1/1/86 - 12/31/86                                       | 11          |          |          |         |         |
| Since 1/1/87  | 2           |          |          |         |         |
| DID PORTFOLIO INSURER HAVE UNDERLYING EQUITIES AS WELL? |             |          |          |         |         |
| Yes   | 10          |          |          |         |         |
| No  | 6           |          |          |         |         |
| TOTAL AMOUNT OF EQUITIES COVERED BY PORTFOLIO INSURANCE |             |          |          |         |         |
| (\$ Million)  |             | 2,893    | 22,228   | 25,957  | 31,036  |
| WHAT WAS TIME HORIZON OF PORTFOLIO INSURANCE            |             |          |          |         |         |
| < 12 months   |             | 1        | 5        | 2       | 1       |
| 12-18 months  |             | 0        | 1        | 2       | 2       |
| 18-24   |             | 0        | 5        | 4       | 4       |
| > 24 months   |             | 0        | 0        | 0       | 1       |
| WHAT WAS PERFORMANCE MINIMUM OF PORTFOLIO INSURANCE     |             |          |          |         |         |
| > 0   |             | 1        | 0        | 0       | 0       |
| -10 - 0   |             | 2        | 3        | 4       | 4       |
| -25 - -10   |             | 0        | 5        | 2       | 2       |
| < -25   |             | 0        | 1        | 1       | 1       |

| NUMBER OF SURVEYS  | 80          |          |          |         |         |
|--|-------------|----------|----------|---------|---------|
| Question/Responses   | # Responses | 12/31/85 | 12/31/86 | 6/30/87 | 9/30/87 |
| <b>WERE TRIGGER POINTS RAISED AS MARKET APPRECIATED?</b>                                 |             |          |          |         |         |
| Yes  | 6           |          |          |         |         |
| No   | 7           |          |          |         |         |
| <b>WHAT PERCENT HAD TO BE SOLD FOR A 10% DECLINE</b>                                     |             |          |          |         |         |
| 0 - 10%  |             | 0        | 2        | 2       | 3       |
| 10% - 20%  |             | 2        | 1        | 1       | 0       |
| 20% - 30%  |             | 0        | 3        | 1       | 2       |
| > 30%  |             | 0        | 1        | 2       | 2       |
| <b>FIRST CITED PROTECTIVE ACTION TAKEN (WEEK PRECEEDING OCT. 19)</b>                     |             |          |          |         |         |
| Portfolio insurance: hedged position as planned  | 1           |          |          |         |         |
| Portfolio insurance: lagged hedge on expectation of recovery                             | 0           |          |          |         |         |
| On October 19, portfolio insurance: with futures   | 5           |          |          |         |         |
| On October 19, portfolio insurance: with options   | 0           |          |          |         |         |
| On October 19, portfolio insurance: with cash market                                     | 0           |          |          |         |         |
| On October 19, reduction of equity position (independent of portfolio insurance program) | 17          |          |          |         |         |
| Flight to quality (shifted equity to higher quality/lower risk stocks)                   | 1           |          |          |         |         |
| Increased equity position  | 1           |          |          |         |         |
| Other protective action taken  | 0           |          |          |         |         |
| No protective action taken   | 40          |          |          |         |         |
| <b>EFFECTIVENESS OF PROTECTIVE ACTION</b>  |             |          |          |         |         |
| Very effective   | 6           |          |          |         |         |
| Moderately effective   | 7           |          |          |         |         |
| Not effective  | 4           |          |          |         |         |
| <b>SECOND CITED PROTECTIVE ACTION TAKEN (WEEK PRECEEDING OCT. 19)</b>                    |             |          |          |         |         |
| Portfolio insurance: hedged position as planned  | 0           |          |          |         |         |
| Portfolio insurance: lagged hedge on expectation of recovery                             | 1           |          |          |         |         |
| On October 19, portfolio insurance: with futures   | 1           |          |          |         |         |
| On October 19, portfolio insurance: with options   | 1           |          |          |         |         |
| On October 19, portfolio insurance: with cash market                                     | 0           |          |          |         |         |
| On October 19, reduction of equity position (independent of portfolio insurance program) | 1           |          |          |         |         |
| Flight to quality (shifted equity to higher quality/lower risk stocks)                   | 1           |          |          |         |         |
| Increased equity position  | 0           |          |          |         |         |
| Other protective action taken  | 0           |          |          |         |         |
| No protective action taken   | 3           |          |          |         |         |
| <b>EFFECTIVENESS OF PROTECTIVE ACTION</b>  |             |          |          |         |         |
| Very effective   | 2           |          |          |         |         |
| Moderately effective   | 0           |          |          |         |         |
| Not effective  | 1           |          |          |         |         |

NUMBER OF SURVEYS

80

| Question/Responses   | # Responses | 12/31/85 | 12/31/86 | 6/30/87 | 9/30/87 |
|--|-------------|----------|----------|---------|---------|
| FIRST CITED PROTECTIVE ACTION TAKEN (OCT. 19)  |             |          |          |         |         |
| Portfolio insurance: hedged position as planned  | 2           |          |          |         |         |
| Portfolio insurance: lagged hedge on expectation of recovery                             | 0           |          |          |         |         |
| On October 19, portfolio insurance: with futures   | 4           |          |          |         |         |
| On October 19, portfolio insurance: with options   | 1           |          |          |         |         |
| On October 19, portfolio insurance: with cash market                                     | 0           |          |          |         |         |
| On October 19, reduction of equity position (independent of portfolio insurance program) | 5           |          |          |         |         |
| Flight to quality (shifted equity to higher quality/lower risk stocks)                   | 1           |          |          |         |         |
| Increased equity position  | 7           |          |          |         |         |
| Other protective action taken  | 2           |          |          |         |         |
| No protective action taken   | 43          |          |          |         |         |
| EFFECTIVENESS OF PROTECTIVE ACTION   |             |          |          |         |         |
| Very effective   | 3           |          |          |         |         |
| Moderately effective   | 5           |          |          |         |         |
| Not effective  | 2           |          |          |         |         |
| SECOND CITED PROTECTIVE ACTION TAKEN (OCT. 19)   |             |          |          |         |         |
| Portfolio insurance: hedged position as planned  | 0           |          |          |         |         |
| Portfolio insurance: lagged hedge on expectation of recovery                             | 3           |          |          |         |         |
| On October 19, portfolio insurance: with futures   | 2           |          |          |         |         |
| On October 19, portfolio insurance: with options   | 0           |          |          |         |         |
| On October 19, portfolio insurance: with cash market                                     | 0           |          |          |         |         |
| On October 19, reduction of equity position (independent of portfolio insurance program) | 0           |          |          |         |         |
| Flight to quality (shifted equity to higher quality/lower risk stocks)                   | 0           |          |          |         |         |
| Increased equity position  | 0           |          |          |         |         |
| Other protective action taken  | 1           |          |          |         |         |
| No protective action taken   | 2           |          |          |         |         |
| EFFECTIVENESS OF PROTECTIVE ACTION   |             |          |          |         |         |
| Very effective   | 0           |          |          |         |         |
| Moderately effective   | 1           |          |          |         |         |
| Not effective  | 2           |          |          |         |         |
| FIRST CITED PROTECTIVE ACTION TAKEN (OCT. 20)  |             |          |          |         |         |
| Portfolio insurance: hedged position as planned  | 0           |          |          |         |         |
| Portfolio insurance: lagged hedge on expectation of recovery                             | 0           |          |          |         |         |
| On October 19, portfolio insurance: with futures   | 4           |          |          |         |         |
| On October 19, portfolio insurance: with options   | 0           |          |          |         |         |
| On October 19, portfolio insurance: with cash market                                     | 0           |          |          |         |         |
| On October 19, reduction of equity position (independent of portfolio insurance program) | 5           |          |          |         |         |
| Flight to quality (shifted equity to higher quality/lower risk stocks)                   | 2           |          |          |         |         |
| Increased equity position  | 11          |          |          |         |         |
| Other protective action taken  | 0           |          |          |         |         |

| NUMBER OF SURVEYS  | 80          |          |          |         |         |
|--|-------------|----------|----------|---------|---------|
| Question/Responses   | # Responses | 12/31/85 | 12/31/86 | 6/30/87 | 9/30/87 |
| <b>FIRST CITED PROTECTIVE ACTION TAKEN (OCT. 20)</b>                                     |             |          |          |         |         |
| No protective action taken   | 43          |          |          |         |         |
| <b>EFFECTIVENESS OF PROTECTIVE ACTION</b>  |             |          |          |         |         |
| Very effective   | 4           |          |          |         |         |
| Moderately effective   | 4           |          |          |         |         |
| Not effective  | 2           |          |          |         |         |
| <b>SECOND CITED PROTECTIVE ACTION TAKEN (OCT. 20)</b>                                    |             |          |          |         |         |
| Portfolio insurance: hedged position as planned  | 0           |          |          |         |         |
| Portfolio insurance: lagged hedge on expectation of recovery                             | 2           |          |          |         |         |
| On October 19, portfolio insurance: with futures   | 0           |          |          |         |         |
| On October 19, portfolio insurance: with options   | 0           |          |          |         |         |
| On October 19, portfolio insurance: with cash market                                     | 0           |          |          |         |         |
| On October 19, reduction of equity position (independent of portfolio insurance program) | 0           |          |          |         |         |
| Flight to quality (shifted equity to higher quality/lower risk stocks)                   | 0           |          |          |         |         |
| Increased equity position  | 2           |          |          |         |         |
| Other protective action taken  | 0           |          |          |         |         |
| No protective action taken   | 2           |          |          |         |         |
| <b>EFFECTIVENESS OF PROTECTIVE ACTION</b>  |             |          |          |         |         |
| Very effective   | 0           |          |          |         |         |
| Moderately effective   | 0           |          |          |         |         |
| Not effective  | 1           |          |          |         |         |
| <b>FIRST CITED PROTECTIVE ACTION TAKEN (OCT. 21-28)</b>                                  |             |          |          |         |         |
| Portfolio insurance: hedged position as planned  | 1           |          |          |         |         |
| Portfolio insurance: lagged hedge on expectation of recovery                             | 0           |          |          |         |         |
| On October 19, portfolio insurance: with futures   | 5           |          |          |         |         |
| On October 19, portfolio insurance: with options   | 0           |          |          |         |         |
| On October 19, portfolio insurance: with cash market                                     | 0           |          |          |         |         |
| On October 19, reduction of equity position (independent of portfolio insurance program) | 6           |          |          |         |         |
| Flight to quality (shifted equity to higher quality/lower risk stocks)                   | 5           |          |          |         |         |
| Increased equity position  | 7           |          |          |         |         |
| Other protective action taken  | 0           |          |          |         |         |
| No protective action taken   | 39          |          |          |         |         |
| <b>EFFECTIVENESS OF PROTECTIVE ACTION</b>  |             |          |          |         |         |
| Very effective   | 7           |          |          |         |         |
| Moderately effective   | 2           |          |          |         |         |
| Not effective  | 2           |          |          |         |         |
| <b>SECOND CITED PROTECTIVE ACTION TAKEN (OCT. 21-28)</b>                                 |             |          |          |         |         |
| Portfolio insurance: hedged position as planned  | 1           |          |          |         |         |
| Portfolio insurance: lagged hedge on expectation of recovery                             | 0           |          |          |         |         |

| Question/Responses   | # Responses | 12/31/85 | 12/31/86 | 6/30/87 | 9/30/87 |
|--|-------------|----------|----------|---------|---------|
| NUMBER OF SURVEYS  |             |          |          |         |         |
|  | 80          |          |          |         |         |
| SECOND CITED PROTECTIVE ACTION TAKEN (OCT. 21-28)  |             |          |          |         |         |
| On October 19, portfolio insurance: with futures   | 2           |          |          |         |         |
| On October 19, portfolio insurance: with options   | 1           |          |          |         |         |
| On October 19, portfolio insurance: with cash market                                     | 0           |          |          |         |         |
| On October 19, reduction of equity position (independent of portfolio insurance program) | 0           |          |          |         |         |
| Flight to quality (shifted equity to higher quality/lower risk stocks)                   | 0           |          |          |         |         |
| Increased equity position  | 0           |          |          |         |         |
| Other protective action taken  | 0           |          |          |         |         |
| No protective action taken   | 3           |          |          |         |         |
| EFFECTIVENESS OF PROTECTIVE ACTION   |             |          |          |         |         |
| Very effective   | 1           |          |          |         |         |
| Moderately effective   | 1           |          |          |         |         |
| Not effective  | 1           |          |          |         |         |
| PROGRAM STILL IN EFFECT  |             |          |          |         |         |
| Yes  | 4           |          |          |         |         |
| No   | 11          |          |          |         |         |
| COVER SAME PERCENTAGE OF EQUITY PORTFOLIO  |             |          |          |         |         |
| Yes  | 3           |          |          |         |         |
| No   | 4           |          |          |         |         |
| HAVE TRIGGER POINTS BEEN ALTERED   |             |          |          |         |         |
| Yes  | 3           |          |          |         |         |
| No   | 3           |          |          |         |         |
| FIRST CHANGE TO PORTFOLIO INSURANCE STRATEGY CITED                                       |             |          |          |         |         |
| Eliminated strategy  | 5           |          |          |         |         |
| Use option markets for protection  | 0           |          |          |         |         |
| Use cash markets for protection  | 0           |          |          |         |         |
| Change portfolio insurance purveyor  | 0           |          |          |         |         |
| Raised minimal threshold   | 1           |          |          |         |         |
| Lowered minimal threshold  | 0           |          |          |         |         |
| Extended time horizon  | 0           |          |          |         |         |
| Shortened time horizon   | 0           |          |          |         |         |
| Decreased equity position  | 0           |          |          |         |         |
| Other change in strategy   | 1           |          |          |         |         |
| No change to strategy  | 0           |          |          |         |         |
| SECOND CHANGE TO PORTFOLIO INSURANCE STRATEGY CITED                                      |             |          |          |         |         |
| Eliminated strategy  | 0           |          |          |         |         |
| Use option markets for protection  | 0           |          |          |         |         |
| Use cash markets for protection  | 0           |          |          |         |         |
| Change portfolio insurance purveyor  | 0           |          |          |         |         |
| Raised minimal threshold   | 0           |          |          |         |         |
| Lowered minimal threshold  | 0           |          |          |         |         |
| Extended time horizon  | 0           |          |          |         |         |
| Shortened time horizon   | 0           |          |          |         |         |
| Decreased equity position  | 0           |          |          |         |         |
| Other change in strategy   | 0           |          |          |         |         |
| No change to strategy  | 0           |          |          |         |         |

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**Study VI**  
**Performance of the Equity Market During**  
**the October Market Break and Regulatory**  
**Overview**

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# Study VI

## Performance of the Equity Market During the October Market Break and Regulatory Overview

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    - 1. Stock Index Futures
    - 2. Stock Index Options
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    - 1. Stock Index Futures
    - 2. Stock Index Options
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## I. Introduction

As the Report indicates, the Task Force has concluded that the stock market and the derivative instrument market (options and futures) are, in reality, segments of a single equity market, rather than separate markets. This Study examines how the equity market performed during the October market break.

We have included a description of each segment of the market, as well as the regulatory environment in which the market operates, in order to give the reader an overview of the market and to put the subject of market performance during the October market break into its proper context. In light of time constraints, we determined to limit our examination of the various equity and derivative instruments and market segments to the following: for stocks, we limited our discussion to the New York Stock Exchange ("NYSE") and the over-the-counter market; for options, we have generally limited our discussion to the Standard and Poor's ("S&P") 100 index option ("OEX") traded on Chicago Board Options Exchange, Inc. ("CBOE"); and for futures, we limited our discussion to the S&P 500 futures

contract traded on the Chicago Mercantile Exchange ("CME") and the Major Market Index futures contract ("MMI"), traded on the Chicago Board of Trade ("CBT").

Part II A of this Study describes the New York Stock Exchange market for listed stocks; Part II B describes the over-the-counter market for stocks; and Parts II C, D, and E describe the net capital rules applicable to broker-dealers, margin requirements and clearing and settlement procedures, respectively, for both listed and over-the-counter stocks. Part III of this Study describes the market for the derivative instruments, including a description of the instruments, how markets are made, applicable net capital requirements for market participants, margin requirements and settlement procedures, including the interface of these requirements and procedures with the banking system. The performance of the market during the break is discussed in Part IV. Part V discusses the regulatory environment in which these market segments operate.

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## II. Stock Market

### A. Listed Stocks—The New York Stock Exchange

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#### 1. Introduction

At December 31, 1986, there were 2,257 issues of stock listed on the NYSE, with a total of 59.6 billion shares having a value of \$2.2 trillion.<sup>1</sup> Certain NYSE-listed stocks are also traded on five other domestic stock exchanges and in the over-the-counter market. In 1986, the consolidated volume in all NYSE listed stocks was 42.7 billion shares and there were 26.1 million reported trades in NYSE-listed stocks. The NYSE accounted for 84 percent of the consolidated volume and 72.7 percent of the consolidated reported trades in NYSE-listed stocks.

Part 2 of this section describes how the market is made for NYSE-listed stocks, focusing on the market making roles of specialists and “upstairs” block traders and the capital and other regulatory requirements applicable to these market makers. Part 2 also describes the NYSE automated systems, the Designated Order Turnaround System (“DOT”) and the Intermarket Trading System (“ITS”).

#### 2. How the Market is Made

##### (a) Introduction

Trading on the NYSE is conducted by NYSE members at posts manned by specialists assigned to particular stocks. The NYSE combines features of an auction market and a dealer market. Members, either for their own account or as agents, trade directly with each other in an auction framework if they are present at the post at the same time or if they are bringing to the floor a trade negotiated away from the floor of the exchange. Members also trade with the specialist, who is obligated, to the extent reasonably practicable, to trade for his own account to maintain price continuity and reasonable depth. In addition, members can place limit orders with the specialist at prices away from the current

market price, for execution against subsequent orders at the limit prices.

The percentage of share volume in NYSE-listed stocks executed as “block” trades (trades of 10,000 shares or more) has increased dramatically from 3.1 percent in 1965 to about 50 percent in 1986. Although these transactions are typically executed on the floor of the NYSE, much of the work in putting them together is done “upstairs” in institutional trading departments of member firms of the NYSE. Once the firm has put together as many of the buyers and sellers as it can find, it may choose to commit its own capital to complete the transaction or it may leave that function to the specialist and others on the floor of the NYSE.

Orders reach the specialist post by brokers walking orders to the post or through the NYSE’s DOT System. Brokers who walk orders to the post are either brokers employed by member firms to execute customer and certain types of proprietary orders, or independent floor brokers (so-called \$2 brokers), individual entrepreneurs who handle orders for other members. The DOT System enables opening orders, market orders and limit orders up to specified amounts to be transmitted electronically to the specialist’s post.

Once a trade has been executed at the specialist’s post, it is recorded by a NYSE employee. Thereafter, each trade is reported via third party vendors to their subscribers and also appears on the tape, which reports the size and price of each trade in sequence. Each trade is also reported by the members on both sides of the trade to the National Securities Clearing Corporation (“NSCC”) for clearance and settlement through the NSCC. Trades can only be cleared through a participant in NSCC and those NYSE members who are not participants in NSCC must clear their trades through a participant. After a trade is successfully compared (i.e. the buyer and seller are matched at the same quantity and price), the NSCC guarantees its participants’ obligations, thus becoming the buyer to every seller and the seller to every buyer.

Settlement is generally made on a net basis in next day funds on the fifth business day after the

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<sup>1</sup> Unless otherwise indicated, statistics are from the NYSE Fact Book 1987, the NYSE review of specialist financial performance 1981 to 1986 or were provided by the NYSE to the Task Force.



trade date. Actual transfer of shares resulting from a trade is generally effected by book entry through the Depository Trust Company.

## (b) NYSE Specialists

### (i) General

The specialist plays three roles: broker, dealer and auctioneer. The specialist acts as a broker when other members leave limit orders that the specialist records in his book and executes when the market price reaches the limit price. In 1986 specialists participated as commission earning brokers in 12.7 percent of NYSE twice total volume (the sum of all purchases and all sales), earning revenues of \$159 million.<sup>2</sup> Specialist commissions accounted for 2.5 percent of public equity commissions earned by "upstairs firms" in 1986.

The specialist acts as dealer when he buys and sells specialty stocks for his own account. Specialist dealer volume in 1986 was 11.6 percent of NYSE twice total volume, and specialist dealer profits accounted for 64 percent of specialist gross revenues. A specialist is required by Securities and Exchange Commission ("SEC") and NYSE rules to restrict his dealer activities so far as practicable to those reasonably necessary to permit him to maintain a fair and orderly market.<sup>3</sup> In return for the opportunity to earn brokerage commissions and the advantage of being able to trade, albeit with the above restriction, for his own account when in possession of exclusive knowledge of the state of the book, the specialist has the affirmative obligation to engage in a course of dealings to assist in the maintenance of a fair and orderly market so far as reasonably practicable.<sup>4</sup>

The specialist acts as an auctioneer in that he is responsible for setting a "fair" opening price which clears all accumulated market orders. The same responsibility applies at the resumption of trading after a halt. In the event of an order imbalance the specialist can solicit additional orders and may announce trial clearing prices to brokers in the crowd. In addition, the specialist can act as a dealer to reduce or eliminate an imbalance. The specialist also quotes current bid and offer prices that are disseminated on a real-time basis through various quotation services.

At April 24, 1987, there were 422 individual specialists, with an average of 3.7 common stocks assigned to each individual specialist. The individual specialists belonged to 55 specialist units, the larg-

est of which included 24 individual specialists assigned to 126 stocks and the smallest of which consisted of 2 individuals assigned to 5 stocks. No stock is assigned to more than one specialist.

### (ii) Statutory and Regulatory Framework

#### (x) General

Section 11(b) of the Securities Exchange Act of 1934 provides for a national securities exchange to register a member as a specialist if such registration does not contravene rules prescribed by the SEC as necessary or appropriate in the public interest and for the protection of investors, to maintain fair and orderly markets, or to remove impediments to and perfect the mechanisms of a national market system. The SEC rules that are most relevant to the affirmative obligation of the specialist as dealer require a national securities exchange's rules to include (i) adequate minimum capital requirements in view of the markets for securities on such exchange and (ii) requirements that a specialist engage in a course of dealings for his own account to assist in the maintenance, so far as practicable, of a fair and orderly market and that a finding by the exchange of any substantial or continued failure by a specialist to engage in such a course of dealings will result in the suspension or cancellation of such specialist's registration.

The structure of SEC rules requiring an exchange's rules to deal with the specialist's affirmative obligation within general guidelines results in the exchange, and not the SEC, being the entity directly regulating compliance. This can be contrasted with the restriction on specialist dealer activities (that dealer activities be restricted to those reasonably necessary to permit the maintenance of a fair and orderly market). The SEC's rules expressly provide that if the SEC finds that a specialist effected transactions in a manner inconsistent with the exchange's rules so restricting dealer activities, the SEC may order the exchange to cancel or suspend such specialist's registration.<sup>5</sup> While the SEC does not directly enforce compliance with the NYSE's specialist affirmative obligation rules, it does conduct periodic inspections of NYSE specialist surveillance procedures and NYSE enforcement of its rules, including those relating to market maintenance by specialists. The SEC issues a confidential inspection report to the NYSE setting forth its findings and recommendations. If the NYSE disagreed with the SEC's recommendations, however, the SEC could exercise its broad powers of enforcement against both the NYSE and an individual specialist.<sup>6</sup>

<sup>2</sup> Specialists do not earn a commission for certain orders transmitted through DOT.

<sup>3</sup> SEC Rule 11b-1(a)(2)(iii) under the Securities Exchange Act of 1934 and NYSE Rule 104.

<sup>4</sup> SEC Rule 11b-1(a)(2)(ii) under the Securities Exchange Act of 1934 and NYSE Rule 104.10.

<sup>5</sup> See SEC Rules 11b-2(a)(2)(i) and (ii) and Regulations under the Securities Exchange Act of 1934.

<sup>6</sup> See, for example, Sections 19 and 21 of the Securities Exchange Act of 1934.



However, these general powers have not been used to impose the SEC view on the NYSE.

The NYSE rules on capital requirements and the affirmative dealer obligation of a specialist are discussed below.

(y) *Capital Requirements*

The SEC's requirement that an exchange set minimum specialist capital requirements recognizes that the ability to make a market is related to capital position. However, the link is not direct. At a minimum it can be said that an absence of capital will prevent a specialist from carrying out his affirmative dealer obligations, but it cannot be said that an abundance of capital will ensure sufficient dealer participation to maintain a fair and orderly market. Allocation of capital among different lines of business and among different specialty stocks, risk aversion and perception of the direction and duration of a market move will influence the level of participation of the best capitalized specialist unit.

Capital requirements for a specialist unit depend on whether the unit carries or services customer accounts. Twenty eight of the 55 NYSE specialists units, registered in 800 stocks, do not carry or service customer accounts and are thus exempt from all SEC and certain NYSE net capital requirements including net capital requirements discussed in Section C of this Part II. There are minimum NYSE capital requirements, however, for qualification as a specialist. A specialist must be able to assume a position of 5,000 shares in each common stock in which it is registered (with a lower position requirement for preferred stocks).<sup>7</sup> At December 31, 1986, the average NYSE share price was \$36.89. Although this number is weighted by shares outstanding it provides an approximate measure of the specialist's position requirement. Thus at the end of 1986 the position requirement was approximately \$184,450 per common stock. This requirement is not a net capital requirement as it can be satisfied with resources other than net capital. In addition, each specialist unit must meet with its own net liquid assets a minimum capital requirement which is the greater of \$100,000 or 25 percent of its position requirement, except as determined by the NYSE in unusual circumstances.<sup>8</sup>

The 27 NYSE specialist units that do carry or service customer accounts are registered with respect to about 1,500 stocks and are subject to the

above capital requirements, as well as additional SEC and NYSE capital requirements designed to protect customer funds (see Section C of this Part II).

At December 31, 1986, total NYSE specialist unit capital was \$836 million, comprised of \$180 million represented by NYSE memberships (at market), \$100 million in subordinated capital and \$556 million in equity, and total net liquid assets was approximately \$553 million. Average net liquid assets per specialist was 9.2 times the required minimum.

As noted above, the NYSE is required by SEC rules to set adequate minimum capital requirements for specialists "in view of the markets for securities on such exchange." The requirement that a specialist be able to assume a position of 5,000 shares of specialty stock has been in effect since 1971. The minimum liquid assets requirement of the greater of \$100,000 or 25 percent of the position requirement has been in effect since 1977, when the former part of the test was reduced to \$100,000 from \$500,000, apparently to encourage competition among specialists. The following table shows NYSE specialist net liquid assets and ratios of specialist net liquid assets to market value and trading volume since 1977 (specialist net liquid asset data from 1971, when the position assumption requirement was established, to 1976 was not available).

|           | Specialist net liquid assets <sup>1</sup> (in millions) | Net liquid assets to market value <sup>2</sup> (percent) | Net liquid assets to trading volume <sup>3</sup> (percent) |
|-----------|---|--|--|
| 1977..... | \$185   | 0.023  | 0.123  |
| 1978..... | 199   | 0.024  | 0.100  |
| 1979..... | 238   | 0.025  | 0.100  |
| 1980..... | 273   | 0.022  | 0.073  |
| 1981..... | 284   | 0.025  | 0.073  |
| 1982..... | 390   | 0.030  | 0.080  |
| 1983..... | 387   | 0.024  | 0.051  |
| 1984..... | 456   | 0.029  | 0.060  |
| 1985..... | 441   | 0.023  | 0.045  |
| 1986..... | 553   | 0.025  | 0.040  |

<sup>1</sup> Net liquid assets at year-end, computed in accordance with NYSE rules.

<sup>2</sup> Defined as net liquid assets divided by market value of shares on NYSE at year-end.

<sup>3</sup> Defined as net liquid assets divided by dollar value of trading volume.

The NYSE monitors specialist financial condition by reviewing periodic financial statements (filed with the NYSE once every six months by specialist units that do not carry or service customer accounts, and monthly by other specialist units); unannounced inspections by an NYSE examination team; telephone calls to officials at specialist firms if the Dow Jones Industrial Average moves more than 1 percent in a day or if there are certain price movements in specialty stocks; and communication with the NSCC if the unit is an NSCC participant or, with the clearing firm, if the unit clears through another firm. The

<sup>7</sup> NYSE Rule 104.20.

<sup>8</sup> For purpose of NYSE Rule 104.20, "net liquid assets" is defined, for specialists who do not carry or service customer accounts, as the excess of cash or readily marketable securities over liabilities. For other specialists, "net liquid assets" means excess net capital computed in accordance with NYSE rules with certain adjustments, including the restoration of "haircuts" on specialty stocks.

NYSE does not have the ability directly to capture on a day-to-day basis data that would enable it to assess the effect of a specialist's trading activities on its financial condition. In addition to gauging net liquid assets against the minimum requirements, the NYSE uses early warning standards based on the ratios of net liquid assets to specialty stock position market value and bank borrowings to collateral value.

A specialist's buying power is more directly relevant to its ability to act as a dealer than its net liquid assets or capital. Under regulations of the Board of Governors of the Federal Reserve System and NYSE rules, a NYSE member may have transactions as a specialist financed on a basis that is mutually satisfactory to the specialist and the creditor. Regulations imposing margin requirements are not applicable to specialist transactions.

The NYSE determines specialist buying power by multiplying a specialist's excess net liquid assets by four, thus assuming that a specialist could obtain financing requiring posting of a margin of 25 percent of the purchase price of specialty stock (this 25 percent is analogous to the minimum maintenance margin the NYSE rules permit in governing credit extended by its members to their customers). Excess net liquid assets is determined by subtracting 25 percent of total specialty stock position at market value from total net liquid assets, again assuming that financing has been obtained with a 25 percent margin. A very limited sampling of commercial banks by the Task Force indicated that some banks do finance specialist transactions on the basis of 25 percent margin, while other banks require a higher or lower margin. Bank lines of credit, as well as lines of credit made available to specialist units by other NYSE members, are generally uncommitted. NYSE rules require that a specialist inform the NYSE of the establishment of, and any changes in, financing arrangements.<sup>9</sup> The NYSE was not able to provide the Task Force with data regarding the amount covered by specialist financing arrangements or the terms of these arrangements.

In part because of a desire to have specialists affiliated with financially stronger entities, the NYSE in January 1987 enacted new Rule 98 to facilitate diversified member firms entering the specialist business without having their non-specialist related activities unnecessarily limited. In support of the proposed rule, the NYSE noted that Rule 98 was intended to help strengthen the capital base of the auction market system. The NYSE pointed out that large diversified organizations have the capital to expand their business, and that if such organizations were to enter the specialist business they could reasonably be expected to provide additional capital

for market making on the NYSE. The NYSE also noted that the increasing "institutionalization" of the market and the increasing volatility of trading would require specialists to commit greater capital, and be willing to assume some additional market risk in accommodating large-size orders and minimizing short term price fluctuations. The NYSE observed that the specialist system would benefit significantly from the additional capital contributions of large diversified organizations which have the financial resources to devote to specializing and, because of their diversified nature, may have a greater ability to assume risk than an organization whose business consists exclusively of specializing.

There are a number of NYSE rules restricting specialist activity that also apply to affiliates of a specialist. For example, an affiliate of a specialist may not engage in business transactions with the issuer of a specialty stock. NYSE Rule 98 establishes an exemptive program whereby an affiliate of a specialist that has satisfied the NYSE that it has appropriate safeguards in place is exempt from certain of the restrictions applicable to its affiliated specialist. Thus, for example, a Rule 98 approved person may act as an underwriter of specialty stock if the affiliated specialist "gives up the book" during the period of the underwriting. From January to October 1987, no diversified firm entered the NYSE specialist business, but on October 20, 1987, Merrill Lynch acquired A.B. Tompane, a specialist unit that was experiencing financial difficulties.<sup>10</sup>

#### (2) Fair and Orderly Markets

NYSE Rule 104 states this requirement as the maintenance, in so far as reasonably practicable, of a fair and orderly market and more specifically sets forth the following:

- The maintenance of a fair and orderly market implies the maintenance of price continuity with reasonable depth, and the minimizing of the effects of temporary disparity between supply and demand.
- In connection with the maintenance of a fair and orderly market, it is commonly desirable that a member acting as a specialist engage to a reasonable degree under existing circumstances in dealings for his own account when lack of price continuity, lack of depth, or disparity between supply and demand exists or is reasonably to be anticipated.

<sup>10</sup> In part to induce that acquisition, the NYSE agreed to propose, and the SEC subsequently approved, an amendment to Rule 98 temporarily to permit a Rule 98 approved person to act as a *managing* underwriter of specialty stock. The NYSE has stated that it intends to seek permanent SEC approval of this amendment.

<sup>9</sup> See NYSE Rule 104.30.



The NYSE rules do not state the maximum or minimum amounts of liquidity, depth and continuity required to be provided by a specialist in the execution of his function of maintaining, as far as reasonably practicable, a fair and orderly market. This lack of precision is understandable given the vague nature of the concept of a "fair and orderly market." Insofar as the maximum obligation of a specialist in a down market is concerned, a specialist is not expected to exhaust his capital by purchasing stock in the face of a flood of sell orders. On the other hand, a specialist is required either to supply some buying power to assist in the maintenance of an orderly down market, or, if the imbalance of orders is too great, to request a floor official to halt trading for a temporary period to enable the imbalance to be resolved at an appropriate price.

The above description of the specialist's obligations does not accord with the public perception or press reports of the specialist's role as a "buyer of last resort." The NYSE may have contributed to this misperception in that it does not always describe the very real limitations on a specialist's ability or obligation to stem a down market. For example, a 1987 NYSE brochure entitled "The Capital Market" describes the dealer obligation of the specialist in full as follows:

Exchange rules also require specialists to act as dealers, risking their own or their firms' capital by buying and selling for their accounts whenever a temporary imbalance between buy and sell orders exists in any of their assigned stocks. At such times, the specialist must step in and offer to buy at a higher price than anyone else is willing to pay—or to sell at a lower price than anyone else is willing to accept—thereby narrowing the spread between bids and offers.

NYSE computers monitor trading activity on a daily basis and aberrant behavior such as unusual volatility or delayed openings could lead to inquiries of floor officials and an examination of the specialist's proprietary trading activities. The NYSE has a minimum market depth standard for each stock, based on the historic trading patterns of that stock, and it measures specialist performance in each stock against that standard. The NYSE requires specialists to keep a sequential record of purchases and sales of specialty stock. This record, which includes the time and price of a transaction (and the relation of the price to the price of the immediately preceding transaction), is required to be reported to the NYSE on Form 81 on periodic call from the NYSE. If the NYSE determines that a specialist's performance did not meet the required standard, a caution is issued or enforcement proceedings are instituted. To date, the NYSE Hearing Panel imposed a fine on one specialist unit for failing to maintain a fair and or-

derly market on a trade date in 1985. In addition, in 1987 four market maintenance violation cases were forwarded from the NYSE surveillance department to the enforcement division (one of which related to a 1986 trade date and two of which occurred during the October market break). To date, the surveillance department also sent seven letters of caution to specialists relating to market maintenance issues. The NYSE also takes into account a specialist unit's performance record (as well as its capital) in allocating newly listed stocks.

The NYSE also monitors specialist performance by quarterly Specialist Performance Evaluation Questionnaires. These questionnaires, which give some indication of NYSE expectations of specialist performance, are completed by brokers who subjectively grade each specialist unit in the following areas relating to its dealer function:

- Providing reasonably representative continuous quotations as appropriate given the market characteristics of its stocks.
- Acting as principal as necessary in the regular course of making a market to maintain price continuity with reasonable depth on both sides of the market.
- Acting as principal, in appropriate volume at appropriate prices, to minimize temporary disparities between supply and demand.
- Avoiding dealing for its own account when public orders are capable of execution against one another.
- Offering single-price executions to small orders if permitted by the NYSE rules.
- Willingness to use its own capital to enable CAP orders (a type of order based on volume, used by institutions) to participate at the print price.
- Committing capital when a broker does not have the other side of a block.
- Avoiding interference with crosses, provided such crosses are priced reasonably near the market.
- Maintaining a stable aftermarket when a block trade occurs.

The other parts of the questionnaire relate to the agency and other functions of a specialist. The NYSE ranks specialist units from highest rated to lowest rated based upon the responses to the questionnaires. Failure to receive certain scores in the responses to the questionnaire could lead to disciplinary action, including reallocation of stock (which

has never happened). The ratings are taken into account in allocating newly listed stocks.

### (c) "Upstairs" Block Traders

As is shown in the table below, the number of blocks and the percentage of the share volume in NYSE-listed stocks executed as block trades of 10,000 shares or more has increased dramatically since 1965.

NYSE LARGE BLOCK TRANSACTIONS  
10,000 SHARES OR MORE—1965 TO 1986

|           | Transactions |                  | Shares<br>(thousands) | Percent-<br>age of<br>reported<br>volume |
|-----------|--------------|------------------|-----------------------|--|
|           | Total        | Daily<br>average |                       |  |
| 1965..... | 2,171        | 9                | 48,262                | 3.1                                      |
| 1970..... | 17,217       | 68               | 450,908               | 15.4                                     |
| 1975..... | 34,420       | 136              | 778,540               | 16.6                                     |
| 1980..... | 133,597      | 528              | 3,311,132             | 29.2                                     |
| 1981..... | 145,564      | 575              | 3,771,442             | 31.8                                     |
| 1982..... | 254,707      | 1,007            | 6,742,481             | 41.0                                     |
| 1983..... | 363,415      | 1,436            | 9,842,080             | 45.6                                     |
| 1984..... | 433,427      | 1,713            | 11,492,091            | 49.8                                     |
| 1985..... | 539,039      | 2,139            | 14,222,272            | 51.7                                     |
| 1986..... | 665,587      | 2,631            | 17,811,335            | 49.9                                     |

In 1986, the daily average of 2,631 block transactions was greater than the total number of block transactions in all of 1965. Of greater relevance is the fact that half of all of the shares traded on the NYSE during the past three years were traded in blocks. The average size of these block transactions is more than 26,000 shares.

Although these transactions are typically executed on the floor of the Exchange, most of the work in putting them together is done "upstairs" in the institutional trading departments of the member firms. Some of the firms which execute trades for institutions are known for their expertise in effecting transactions of stocks of certain types of companies such as utilities, banks, etc. Other firms maintain continuing research coverage of companies and often effect transactions in the stocks of those companies. Still other firms act as block positioners, and where all or part of a block cannot be placed with institutional customers on the other side, these firms will use their own capital to buy or sell all or part of a block. Although such firms must have at least \$1 million in net capital and be registered as block positioners with the Exchange, they have no affirmative obligation to buy or sell stocks or to make a fair and orderly market but do so for competitive reasons. There are presently 66 firms registered with the Exchange as block positioners. Rule 97 of the NYSE defines a block positioner as:

A member organization which engages, either regularly or on an intermittent basis, in a

course of business of acquiring positions to facilitate the handling of customers' orders on the Floor of the Exchange. For the purposes of this Rule, a block shall mean a quantity of stock having a market value of \$200,000 or more which is acquired by a member organization on its own behalf and/or for others from one or more buyers or sellers in a single transaction.

The institutional salesmen and traders at these member firms maintain constant communication with hundreds and, in some instances, thousands of institutions. Typically the institutional trading departments of these firms maintain direct phone lines to the trading desks of hundreds of these institutions. An institution looking to buy or sell a large block of stock generally seeks to give that order to the firm which under the circumstances appears able to handle the particular transaction. Once the firm has been given an order to buy or sell a large block of stock by an institution, it will contact other institutions to see whether they want to participate on the other side of the trade. For instance, if the firm receives an order to sell a large block of stock it will alert those other institutions which it believes may be potential buyers. These would include those institutions which already have a position in the stock and might be seeking to increase that position. Institutions which do not own that particular stock but own other stocks in that industry and might be willing to acquire stock in a related company might also be contacted. On occasion the company itself may be contacted, especially if it has announced a buy-back program. Hedge funds and other active institutional type trading accounts might also be contacted.

In order to determine which institutions to contact, the firm may utilize a proprietary information system in which such data as institutional transactions, inquiries about particular securities and positions in individual stocks are recorded. In addition, non-proprietary systems such as AutEx, which connects over 900 trading desks in North America and London, may be used by the firm to help find the other side of the trade by communicating the interest simultaneously to many institutions. The specialist may be contacted, not only to see what is available at the bid or offer on the book, but also as a source of information as to what interest there may be from other member firms. Indeed, NYSE Rule 127 requires that:

A member organization that receives an order or orders for the purchase or sale of a block of stock, which may not readily be absorbed by the market, should explore in depth the market on the Floor. Unless professional judgment dictates otherwise, this should include checking the specialist to ascertain the extent, if any, of



the interest the specialist has in participating at an indicated price or prices.

The rule protects the firm that checks with the specialist by requiring that the specialist should maintain the same depth and normal variations between sales as he would had he not learned of the block. These inquiries by a firm to find a buyer or seller for the block often will develop additional interest on the same side, and an institution learning of the firm's efforts to find a buyer or seller will often allow the firm making the inquiries to also handle its block. This is done in lieu of creating a potentially harmful competitive situation in the market for the stock by going to a second firm with the order. Once the firm has put together as many of the buyers and sellers as it can find, it may choose to commit its own capital to complete the transaction or it may leave that function to the specialist and others on the floor when the block is taken there for execution. When a firm chooses to commit its capital it may seek to hedge its risk by buying or selling listed options on that stock. It may also seek to hedge against changes in the overall market by buying or selling index futures or options.

Once the firm has done as much as it can "upstairs" in its offices, the transaction is ready to be executed. If the firm putting the block together is a member of the NYSE and it is acting as principal, or as agent for both the buyers and the sellers, it is generally obligated to execute the trade on the floor of the NYSE or another exchange where it is a member and where that stock is also traded. In either case, the number of shares and the price of the trade is transmitted to the firm's floor broker or an independent broker to be brought to the specialist's post for execution.

If the stock was listed on the Exchange after April 26, 1979, however, under Rule 19c-3 of the Securities Exchange Act of 1934 ("SEA") the firm has the option of crossing the transaction "upstairs" in its office, rather than at the specialist's post. When the firm is acting as agent for either the buyer or seller, but not both, it also is not obligated to bring the order to the Exchange floor for execution. Where an order is executed "upstairs", the National Association of Securities Dealers, Inc. ("NASD") requires that the transaction be reported to it for distribution to quotation vendors and printing on the consolidated tape. Despite the ability of these firms not to take these orders down to the floor, the great majority of orders are brought there to be executed since most institutions feel more comfortable about having their transactions executed on an exchange floor where they are subjected to the auction market.

If the order which is sent down to the floor of the NYSE is to be executed at a price that is either

above the current offer or below the current bid, then other provisions of Rule 127 become applicable. The rule requires that unless (i) the trade is to be executed at a price no more than one eighth below the bid or one eighth above the offer, and (ii) both sides of the cross consist solely of public customers, then the member with the block cannot execute part of it by selling to or buying from the specialist's book at limit prices away from the cross price. For instance, if the stock is currently bid at 20 and the firm intends to cross a block of stock at 19½ and limit orders to buy are on the specialist's book at 19⅞, 19¾ and 19⅝, the firm intending to cross the block cannot execute part of the order by selling stock to the specialist's book at prices from 20 down to 19⅝. Thus, the person with a limit order on the book at or near the market cannot suffer an immediate paper loss, as he would if his order was executed as part of a series of transactions immediately preceding a cross occurring at a price away from the market. The person with the order on the book will benefit by generally receiving an execution at the cross price.

If the execution of orders represented at the post by other firms, on the specialist's book or for the account of the specialist himself, would, in the opinion of the firm crossing the block, disadvantage its customers, the firm crossing the stock has two alternatives available to it. First, it can choose not to execute the block on the NYSE and execute it on one of the regional exchanges. Second, if both sides of the trade are for public customers and the firm is not participating as a block positioner, it can announce to the crowd at the post that it will not allow these other firms or the specialist to participate in the block. If it chooses the latter alternative, it can also limit the book's participation to the greater of 5 percent of the block or 1,000 shares. To do this the executing firm must announce a new bid and offer to the crowd prior to crossing the block and allow those other firms in the crowd and the specialist to trade against that bid and offer. For instance, if the cross is to be executed at 19½ the firm can announce a quote of 19⅞ bid and 19⅝ offered. Thus, any stock sold to the crowd or the specialist will benefit the firm's selling institutional customer since they will get one eighth of a point more for their stock. Likewise, any stock purchased from the crowd or the specialist for the firm's institutional customer at 19⅞ benefits that customer since it will pay one eighth of a point less for its stock. After the supply and demand of the crowd and the specialist at 19⅞ and 19⅝ respectively is taken care of, the remainder of the block would then be crossed at 19½.

Where the firm crossing the block is participating in the trade as principal, however, it cannot preempt the orders in the crowd or the specialist. It must

step aside and let public orders represented at the post by these other firms participate in the block at the cross price. Only then can it participate. If a block positioner acquires a long position in a stock as part of a block transaction with its customer, it is bound by other provisions of NYSE Rule 97 designed to limit members trading for the remainder of the day on which it acquired the position. The rule prohibits, other than as part of block positioning or certain other exempted activities, further purchases under certain enumerated conditions which the Exchange believes to be of a possibly manipulative nature. For instance, further purchases at a price higher than the price of the preceding transaction during the last half hour of trading are prohibited. Likewise, purchases at a price higher than the price of the preceding transaction are prohibited if such purchases would result in setting a new high for the day. There are no prohibitions on the liquidation of these positions. Since these positions are not acquired on their investment merits but rather to facilitate the needs of customers, every effort is made to liquidate them expeditiously so that the capital is available for future block positioning needs.

#### **(d) NYSE Automated Systems**

##### *(i) Designated Order Turnaround System (DOT)*

The NYSE's Designated Order Turnaround System is an automated order processing and trade report system that links member firms directly to the trading floor of the exchange. Member firms transmit orders through their own links to the NYSE's common message switch and the DOT System then routes the order to the appropriate trading post. Post-opening market orders up to 30,099 shares and limit orders up to 99,999 shares may be transmitted through DOT. At the trading post a market or limit order either prints out on an execution card or, if the specialist has an electronic display book, is displayed on a terminal. Market orders are generally executed without a floor brokerage charge and then are reported to the originating firms and submitted to the comparison system (electronically, in the case of the 630 stocks for which the specialist has a display book, and by means of a "mark sense" card, which is marked by hand and then read by machine, in the case of all other stocks). Once executed, limit orders are similarly reported and submitted to the comparison system. The NYSE's common message switch, which is the point through which DOT orders, execution reports and administrative and SRU messages enter and exit the NYSE automated system, has a capacity

of 95 messages per second. The DOT market and limit order systems have capacities of 55 and 40 messages per second, respectively. The Universal Floor Device Controller, which controls access to the electronic display books, the printers that print orders and the readers that read report cards where there are no electronic displays, has a capacity of 68 messages per second. The floor printers have a capacity of printing 10 to 12 messages per minute and the readers have a capacity of reading approximately 40 cards per minute.

A market order transmitted through DOT receives a reference price when it reaches the DOT System (after passing through the common message switch). If a specialist has not reported execution of a DOT market order of up to 2,099 shares within three minutes of its reaching the DOT System, the NYSE gives confirmation of execution at the reference price and, if the trade has not been made with a third party, the trade is for the specialist's own account.

The Opening Automated Report Service ("OARS") of DOT accepts pre-opening market orders of up to 5,099 shares for execution at the opening price. OARS continually pairs buy and sell orders, informs the specialist of the number of shares subject to paired orders and presents the imbalance to the specialist.

ITS is an electronic communications network which links eight markets—the New York, American, Boston, Cincinnati, Midwest, Pacific and Philadelphia Stock Exchanges and the NASD. The system enables brokers, as well as specialists and other market makers, to interact with their counterparts in other markets whenever the nationwide composite quotation system shows a better price. When an NYSE specialist posts a quotation that is the best price in the composite system, commitments at the quoted price or the market are directed to the NYSE from other exchanges. ITS commitments directed to the NYSE have a two minute expiration period, beginning when the order is accepted by ITS. If the commitment does not reach the specialist post within two minutes or is not executed within two minutes, it automatically expires.

The 1,278 issues eligible for trading on ITS at the end of 1986 represented most of the stocks traded on more than one exchange. Of these stocks 1,083 were listed on the New York Stock Exchange and 195 were listed on the American Stock Exchange ("Amex").

In 1986, daily average ITS share volume was 7.2 million shares, with a daily average of 7,712 trades executed through ITS.



## B. The Over-The-Counter Market

### 1. Introduction

Other than the new markets for derivative products, the most dramatic growth in the U.S. securities markets has occurred in the over-the-counter market, the market for those securities not primarily traded on an exchange. Average daily share volume of those securities quoted in the National Association of Securities Dealers Automated Quotations ("NASDAQ"), the automated quotation system for the over-the-counter market, grew from a low of less than 5 million shares in 1974 to 114 million shares in 1986. In the first three quarters of 1987 daily volume increased further to an average of 150 million shares. This share volume, which was the equivalent of 30 percent of NYSE volume in 1975, grew to 80 percent of NYSE volume in 1986. This absolute and relative growth has been a source of great pride to the NASD and its membership. In a 1987 book published by the NASD entitled *The NASDAQ Handbook: The Stock Market of Tomorrow—Today*, this growth was attributed primarily to the greater liquidity and continuity that a system of multiple competing market makers provides compared to the exchange specialist system.

### 2. How the Market is Made

#### (a) Market Makers

The over-the-counter market has no limits on the number of market makers nor are there limits on the number of stocks a market maker may trade. It is the interaction of the multiple market makers in a stock, each with different order flows and a different perception of the risks and rewards of effecting a transaction at a particular price, that is supposed to determine the appropriate price for a security at a given moment of time.

Any member of the NASD, the over-the counter market's self-regulatory organization, seeking to become a market maker in a security must merely register his interest in making a market in that security with the NASD. The firm becomes eligible to place quotations in NASDAQ two business days later.

The firms making over-the-counter markets include the large national full-service firms, which make markets primarily to serve the needs of their own retail and institutional customers, and wholesalers primarily serving the needs of the smaller retail firms and discount houses which do not themselves make markets. It is not unusual for these large national full-service firms and wholesalers to make markets in more than 1,000 different securities. In addition there are local and regional firms concentrating in making markets in the securities of com-

panies in their geographical area. Other firms specialize in making markets in banking, insurance, high technology or stocks of other companies in particular industries. Last but not least are the major investment banking and institutional firms which make markets in stocks which they have underwritten as well as other stocks which are widely held by institutional investors.

The NASD has no capital requirements for market makers and the only capital requirements are those spelled out for all broker-dealers in Rule 15c3-1 promulgated under the Securities Exchange Act of 1934. That rule is designed primarily to protect customers' funds and is discussed in Part II C. In addition, that rule requires a firm which makes markets to have \$2,500 in capital for each stock selling at \$10 and over in which it makes a market and \$500 in capital for each stock selling for under \$10. Generally, the maximum capital a firm needs to be a market maker under the rule is \$100,000. The number and size of the firms involved as market makers, however, makes it clear that despite these miniscule requirements tens of billions of dollars in capital are available to those firms making over-the-counter markets. Obviously, only a small portion of that total capital is utilized for that purpose. Based on responses to an SEC questionnaire, the NASD estimates that the top 50 market makers normally commit a total of approximately \$850 million to market making in NASDAQ securities.

At the end of 1986 there were 526 firms making markets in NASDAQ securities. Many firms have a large number of individual traders performing the market making function. The 50 largest market makers in total have more than 700 traders. On average, each of the firms traded 79 securities. The average number of market makers for each NASDAQ security was eight. As is shown in Table B-1 it is not at all unusual for there to be more than 25 market makers in a single security, and at the end of 1986 more than 430 NASDAQ securities had at least 15 market makers.

TABLE B-1.—NUMBER OF MARKET MAKERS PER NASDAQ SECURITY END OF 1986

| Market makers     | Number of issues | Average market value per NASDAQ security (in thousands) |
|-------------------|------------------|---|
| Less than 3 ..... | 313              | \$27,198  |
| 3 to 5 .....      | 1,764            | 34,560  |
| 6 to 10 .....     | 1,878            | 50,851  |
| 11 to 15 .....    | 801              | 91,720  |
| 16 to 20 .....    | 283              | 200,423   |
| 21 to 25 .....    | 81               | 314,426   |
| 26 or more .....  | 69               | 605,164   |

Source: NASD.

### (b) Reporting of Quotations; NASD's Automatic Quotations System

Prior to 1971, the over-the-counter market was a loose amalgam of market makers willing to buy and sell those securities not traded on an organized exchange at prices directly negotiated over the telephone between the seller and the buyer. Their willingness to trade these securities was shown by listing their name and possibly a bid and offer in a daily publication known as the "Pink Sheets". There were no standards for which securities were traded nor was there any affirmative obligation to the market imposed upon those dealers trading in the market. Since then the market has evolved into a highly automated market with a defined set of procedures and obligations. There is NASDAQ, which as of the end of 1986 provided bids and offers on a real-time basis for 5,189 securities issued by 4,417 different companies.

The NASDAQ System operates on three levels. Level I service is designed for the registered representative and his customer and is available from those vendors supplying quotation services to the industry. Subscribers to Level I obtain the inside quote; i.e., the highest bid and lowest offer currently quoted by the registered market makers in each

NASDAQ stock. Level II terminals link the market makers with those retail firms buying and selling over-the-counter securities for their customers. In addition, Level II service is also available to the trading desks of those institutions which buy and sell over-the-counter securities. Subscribers to Level II can see the quotes of each of the market makers in each NASDAQ stock. Level III is for the market makers themselves and in addition to providing the information on Level II, it allows them to enter and change their quotes in the system.

### (c) Reporting of Executions; National Market System

Prices of transactions are available for about half of the NASDAQ securities on a real-time basis and are distributed by NASDAQ to the vendors which in turn provide the data to the securities industry. Those securities for which real-time prices are available are known as the National Market System ("NMS") securities. At the end of 1986, prices were available for 2,695 NASDAQ securities, meeting certain higher criteria; e.g., the number of shares and the market value of the public float. Table B-2 compares the criteria for common stocks for inclusion in NMS with those for other NASDAQ securities.

TABLE B-2.—QUALIFICATION STANDARDS FOR NASDAQ AND NASDAQ NATIONAL MARKET SYSTEM

| Standard   | For initial NASDAQ inclusion (domestic common stocks) | For continued NASDAQ inclusion (domestic common stocks) | Criteria for NASDAQ/NMS inclusion <sup>1</sup> |               |
|--|---|---|--|---------------|
|  |   |   | Alternative 1                                  | Alternative 2 |
| Registration under section 12(g) of the Securities Exchange Act of 1934 or Equivalent..... | Yes   | Yes   | Yes  | Yes           |
| Total assets.....  | \$2,000,000   | \$750,000   | \$2,000,000                                    | \$8,000,000   |
| Tangible assets.....   | —   | —   | —  | —             |
| Capital and surplus.....   | \$1,000,000   | \$375,000   | \$1,000,000                                    | \$8,000,000   |
| Net income.....  | —   | —   | <sup>2</sup> \$300,000                         | —             |
| Operating history.....   | —   | —   | —  | 4 years       |
| Public float (shares).....   | 100,000   | 100,000   | 350,000  | 800,000       |
| Market value of float.....   | —   | —   | \$2,000,000                                    | \$8,000,000   |
| Minimum bid.....   | —   | —   | \$3  | —             |
| Trading volume.....  | —   | —   | —  | —             |
| Shareholders of record.....  | 300   | 300   | 300  | 300           |
| Number of market makers.....   | 2   | 1   | 2  | 2             |

<sup>1</sup> In addition to the quantitative standards for NASDAQ/NMS inclusion, companies must also meet certain corporate governance requirements.

<sup>2</sup> In latest or 2 of 3 last fiscal years.

The reporting of executions of NMS securities is the obligation of the firms involved in the transaction. If a trade is between a market maker and a non-market maker then the market maker is obligated to report the transaction. Where the transaction is between two market makers in a security or two non-market makers then the seller reports the trade. Where the trade is between a member of the NASD and a customer, the member must report it. Regardless of who has to report the trade it is required that it be reported within 90 seconds after the exe-

cutio. Any transaction reported later than that must be designated as late. Reports of transactions are generally made by the market makers through Level III of NASDAQ. Where an NASD member lacks such capability, he can report the trade via Telex, TWX or telephone directly to the NASD.

### (d) Automated Execution Systems

Many orders to buy or sell NASDAQ securities are executed without the need for the buyer or seller to contact a market maker on the telephone.



For customer orders of 1,000 shares or less an automated execution system, the NASD's Small Order Execution System ("SOES"), is available. In addition, most major national full-service firms are market makers in those over-the-counter securities traded by their customers. They buy and sell such over-the-counter securities directly with their customers at the inside quote plus or minus a retail markup or markdown through the use of proprietary automatic execution systems. These systems execute their firms own retail customers' orders of stocks in which they make a market. Such executions are often good for as much as 2,000 shares. Automatic execution systems are also used by the wholesalers to execute small orders for the retail firms trading with them. It is only after a firm utilizing one of these systems has acquired a larger long or short position than it wants to carry in its inventory that it will need to call another market maker on the phone to reduce its position. These automated systems typically do not execute larger orders nor do they execute orders when a broker-dealer's proprietary account is on the other side of the transaction. Such orders must still be negotiated over the phone directly with a market maker.

### C. Net Capital Requirements for Broker-Dealers

The net capital rule promulgated by the SEC<sup>11</sup> requires broker-dealers to maintain a certain minimum amount of net capital to protect customer funds in case the broker-dealer suffers financial losses.

Net capital is essentially defined as net worth (assets minus liabilities), plus qualifying subordinated borrowings and less certain mandatory deductions that result from excluding assets that are not readily convertible into cash and from valuing conservatively certain other assets, such as a firm's positions in securities. Among these deductions are adjustments (called "haircuts") in the market value of securities to reflect the possibility of illiquidity or a market decline prior to disposition.

Most broker-dealers have elected to compute net capital under an alternative method of calculation permitted by the net capital rule. Under this alternative method, a broker-dealer is required to maintain a minimum "net capital," as defined in the net capital rule, equal to the greater of \$100,000 or 2 percent of the amount of its "aggregate debit items" computed in accordance with the formula for Determination of Reserve Requirements for Brokers and Dealers (SEA Rule 15c3-3). The "aggregate debit items" are assets that have as their source transactions with customers, for example, margin

loans. Thus, broker-dealers must, at a minimum, have net capital sufficient to absorb the non-realization of 2 percent of such debit items.

In keeping with the purpose of the net capital rule to protect customer funds (and thus being a function of transactions with customers), a broker-dealer who does not carry customer accounts is exempt from the SEC's net capital rule (SEA Rule 15c3-1(k)). If it is a member of the NYSE, however, it must present evidence of its financial responsibility in the amount of \$50,000 by means of a letter of credit or a guarantee of another clearing member with net capital in excess of such amount (NYSE Rule 625). Because the focus of the net capital rule is customer accounts, the rule effectively does not restrict the degree of liquidity or leverage in a firm's proprietary accounts.

Failure to maintain the required net capital may subject a broker-dealer to suspension or expulsion by the NYSE, the SEC and other regulatory bodies and ultimately may require its liquidation. The net capital rule also prohibits payments of dividends, redemptions of stock and the prepayment of subordinated indebtedness if net capital thereafter would be less than 5 percent of aggregate debit items (or 7 percent of the funds required to be segregated pursuant to the Commodity Exchange Act and the regulations thereunder, if greater). The net capital rule also provides that the total outstanding principal amounts of a broker-dealer's indebtedness under certain subordination agreements, the proceeds of which are includable in its net capital, may not exceed 70 percent of the sum of the outstanding principal amounts of all subordinated indebtedness included in net capital, par or stated value of capital stock, paid-in capital in excess of par, retained earnings and other capital accounts for a period in excess of 90 days.

Under NYSE Rule 326, member firms that carry customer accounts are required to reduce their business if their net capital is less than 4 percent of aggregate debit items (or 6 percent of the funds required to be segregated pursuant to the Commodity Exchange Act and the regulations thereunder, if greater) for 15 consecutive days. NYSE Rule 326 also prohibits the expansion of business if net capital is less than 5 percent of aggregate debit items (or 7 percent of the funds required to be segregated pursuant to the Commodity Exchange Act and the regulations thereunder, if greater) for 15 consecutive days. The provisions of Rule 326 also become operative if capital withdrawals (including scheduled maturities of subordinated indebtedness during the following six months) would result in a reduction of a firm's net capital to the levels indicated.

<sup>11</sup> Rule 15c3-1 under the Securities Exchange Act of 1934.

## D. Margin

In the stock market, "margin" refers to buying stock on credit. The authority to regulate the amount of credit which may be initially extended and subsequently maintained on any security is vested in the Board of Governors of the Federal Reserve System by Section 7 of the Securities Exchange Act of 1934. The Federal Reserve Board's margin requirements are set forth in Regulations T (Credit by brokers and dealers), U (Credit by banks for the purpose of purchasing or carrying margin stocks) and G (Securities credit by persons other than banks, brokers or dealers). These regulations generally impose an initial minimum margin requirement of 50 percent for long positions and 150 percent for short positions, which must be collected by the lender within seven business days.

Although the Federal Reserve Board has not exercised its authority to regulate maintenance margin levels, each stock exchange has established and requires its members to collect both initial and maintenance margin on extensions of credit to customers. Broker-dealers that are not members of a stock exchange are covered by the NASD. The margin requirements of the various stock exchanges and the NASD are essentially uniform. The NYSE requires an initial margin level equal to the greater of the Federal Reserve Board initial margin level or the NYSE maintenance margin level (NYSE Rule 431(a)).

The NYSE maintenance margin levels are 25 percent for long stocks, 30 percent for short stocks and 10 percent for long stocks which are offset by shorts in the same security (see NYSE Rule 431(b)). Because the initial margin requirement for long stocks is 50 percent and the maintenance level is only 25 percent, the value of the stock purchased on margin can decrease by 33⅓ percent before a margin call need be made. Thus, to purchase on margin a share of IBM trading at, say, \$110, the customer must deposit \$55 of margin. Unless IBM falls below \$74 ( $\$110 \times 0.33$ ) no additional margin need be deposited, because the remaining customer interest of \$19 ( $\$74$  minus  $\$55$ ) is equal to 25 percent of the \$74 stock value.

The foregoing maintenance margin requirements apply only to extensions of credit by broker-dealers. There is no regulatory minimum maintenance requirement for extensions of credit by other lenders.

Broker-dealers can achieve greater leverage because certain of their borrowings are limited only by a "good faith" margin requirement. The most notable category of such transactions relates to market making activities. Extensions of credit to specialists, OTC market makers, "third" market makers and block positioners for such activities require only good faith margin (see regulation U, 12 C.F.R. Sec-

tion 221.5(c)(10)-(13); NYSE Rule 431(c)(6)). By utilizing the third market maker and block positioner exceptions, broker-dealers can finance positions in such stocks on good faith margin.

Other types of credit that may be extended to broker-dealers on good faith margin include: (i) credit secured by hypothecated customer securities (financing broker-dealers' margin loans to customers), (ii) intraday loans and (iii) financing of bona fide arbitrage transactions (narrowly defined as purchase and sale of the same security or one convertible into or exchangeable therefor—Regulation U, 12 C.F.R. Section 221.5(c)). All other extensions of credit to broker-dealers are subject to the same margin requirements as applicable to any other customer (Federal Reserve Board Staff Op. of November 16, 1979).

The Federal Reserve Board and self-regulatory organization margin requirements are only minimums. Lenders are specifically authorized to impose additional requirements (see, e.g., Regulation T, 12 C.F.R. Section 220.1(b)(2)). Most broker-dealers impose maintenance requirements on their customers that are five to ten percentage points higher than the regulatory minimums (Federal Reserve Board Staff Op. of October 15, 1985). In addition, while bank extensions of credit to broker-dealers are subject only to a good faith margin requirement, they generally lend only up to 50 percent on stocks and 80-90 percent on municipals and treasuries.

## E. Clearing and Settlement; Clearinghouse Protections; Customer Protection

### 1. The Clearing and Settlement Process

Clearing is the comparison or reconciliation of the trading process—the post-trade agreement between involved parties that the trade was, in fact, executed in accordance with the stipulations of buyer and seller. Settlement is the actual exchange of securities and payment, usually in a depository book entry environment. The seller must have established sufficient book entry position in the security for such a delivery to occur, and once book entry and payment are completed, a legal transfer of ownership is effected. Payment consists of the manual exchange of checks between the clearing corporation and its participants on a netted basis once a day. The netting effect across all stocks into one cash position reduces the settlement of all trades to relatively few payments.

The National Securities Clearing Corporation ("NSCC") clears and settles trades in NYSE, American Stock Exchange, certain regional exchange and over-the-counter stocks, as well as corporate bonds.



The NSCC interfaces with the Depository Trust Company ("DTC"), a depository where book entry ownership of securities is maintained and which settles transactions between NSCC participants, usually banks and broker-dealers, and their customers.

In 1986, the NSCC processed an average of 376,400 transactions per day valued at over \$12 billion of which approximately two thirds were stock transactions. Due to net settling, fewer than 77,000 deliveries were made each day.

At the end of the trading day (or automatically after a trade in the case of a trade resulting from an automated order such as a DOT or SOES order) the exchanges (or NASDAQ, in the case of over-the-counter trades) provide execution reports to their members. Also, during the evening of the trade date the buying and selling brokers begin the clearance process between themselves and their customers, either by mailing trade confirmations or through DTC's Institutional Delivery System, in the case of certain large institutions.

Also on the evening of the trade date, NSCC participants begin providing information regarding their trades to the NSCC, which begins matching buy and sell orders of submitted trades. The NSCC prepares contract sheets for matched trades and advises participants of those trades for which the other side cannot be found or which do not match in some degree. If the buyer and seller can reconcile a questioned trade, advisories are resubmitted to the NSCC, or if the trade cannot be reconciled, the traders return to the trading floor (or utilize NASDAQ's trade acceptance and reconciliation service in the case of over-the-counter stocks) for final resolution.

Once the NSCC has a final picture of the day's trading activity, multiple activities in the same issue are generally netted and applied to the NSCC's Continuous Net Settlement ("CNS") system, adding such netted activities to the previous day's data which had not been settled. At midnight on the day after the trade has been compared (midnight on the day after the trade date for a "locked in" trade through an automated system such as DOT or SOES, or midnight on the second day after the trade date in the case of the vast majority of trades that are successfully compared on the day after the trade), the connection between the buying and selling broker for an individual trade has been broken. The individual broker's obligation for a specific security for a specific trade date has been netted with other unfulfilled obligations from previous trade dates, making any association with another trading broker meaningless, although the totalled obligations to and from the NSCC for each issue offset each other. Therefore, the NSCC and not the broker "on the other side" is the entity to which, and from which, securities must be delivered.

By the end of the fourth day after trading the netted positions are passed from the NSCC to DTC for settlement. The DTC system determines what depository bookkeeping positions can be used to satisfy broker obligations to NSCC. Positions taken from selling participants are reallocated to buying participants.

By mutual agreement, participants can designate certain trades to maintain their original trade identities in order to settle individually. These special trades are confirmed through normal comparison processing but do not enter the Continuous Net Settlement system. Instead, they generate individual receive and deliver tickets and are settled at their original contract value.

## 2. The NSCC Clearing Fund

The NSCC has approximately 400 participants. Banks and broker-dealers belong directly, not through subsidiaries. Each participant in the NSCC is required to make a deposit into the Clearing Fund, which is segregated into two funds, one for transactions utilizing the Continuous Net Settlement system (including corporate bond transactions) and one for transactions that clear and settle other than through the Continuous Net Settlement system. The amount of the deposit requirement is determined by the participant's settlement activity over the previous 20 days. Twice a month the NSCC requests additional deposits from those participants whose deposits are insufficient. Participants may at any time withdraw any deposits to the Clearing Fund in excess of their required minimum. At December 31, 1986, the Clearing Fund contained approximately \$60 million in cash, approximately \$50 million in U.S. government securities and approved municipal securities and approximately \$240 million in letters of credit issued by approved banks. During May 1987, the formula for deposit requirements was revised, decreasing deposit requirements by approximately \$25 million. The aggregate of the funds was \$369 million by the beginning of October 1987; due to decreased settlement activity, the aggregate of the funds had declined to \$229 million by December 17, 1987. The breakdown between the two funds was \$170 million in the CNS fund and \$59 million in the non-CNS fund. In the event of a participant failing to meet its obligations to the NSCC, the NSCC would:

- (i) liquidate the participant's position by purchasing securities to cover a failed delivery obligation or by selling securities received in the event of a payment failure, in each case with a resulting claim against the participant or its estate;

(ii) have access to the delinquent participant's deposit in the Clearing Fund;

(iii) then utilize the NSCC's retained earnings of approximately \$10 million (it must use at least 25 percent and may use more); and,

(iv) thereafter, assess its participant's pro rata (based on Clearing Fund deposits) for the full amount of any remaining deficiency, even if such deficiency exceeds the amount in the Clearing Fund. If a participant's assessment is greater than the amount of its Clearing Fund deposit, it must pay the additional amount in full if it wishes to remain an NSCC participant.

In the 10 years of its existence the NSCC has suffered losses from a participant's failure on three occasions, although about a dozen participants have gone out of business (including four in October 1987). Prior to October 1987, the two losses were approximately \$850,000 and approximately \$53,000. As a result of the failure of Metropolitan Securities in October, the NSCC expects a loss of approximately \$400,000.

### **3. Customer Protection**

While the NSCC guarantees each transaction which it clears, NSCC's guarantee runs only to the broker-dealer, not to the broker-dealer's customer. Customer accounts held by a broker-dealer are insured by the Securities Investor Protection Corpora-

tion ("SIPC"), a non-profit quasi-governmental agency established by the Securities Investor Protection Act of 1970 ("SIPA"). SIPC insures customer accounts up to \$500,000 per customer, subject to a limitation of \$100,000 on claims for cash balances. Only customer securities, which include stocks and options, and cash deposited for the purchases of securities are protected by SIPC. Commodities contracts, including stock index futures, are explicitly excluded from SIPC's coverage. Whether SIPC coverage extends to cash deposits held by broker-dealers which are also FCMs, depends on whether the cash was deposited for the purchase of securities or for some other purpose such as the purchase of futures. Since 1981, SIPC has used a rebuttable presumption that cash balances held in brokerage accounts are for the purpose of purchasing securities. This presumption would undoubtedly be overcome, however, for cash balances of customers whose futures activity significantly outweighs their securities activity.

SIPC currently has \$390 million in its reserve fund, \$500 million in lines of credit from reserve banks and the statutory authority to borrow \$1 billion from the Treasury. SIPC is funded through assessments on registered broker-dealers. Most of the major firms that carry customer accounts have purchased additional coverage from private insurers often protecting customer securities positions up to \$5 million per customer. These policies like SIPC do not cover commodities contracts.



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## III. Derivative Instruments

### A. Description

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#### 1. Stock Index Futures

A futures contract is a standardized contract made on a commodity exchange that provides for the future delivery of a specified quantity of a particular commodity on a specified delivery date, leaving the price as the only term to be established by the buyer and seller. A trader who initiates a futures contract position by agreeing to purchase the underlying commodity at a future date is said to be "long" in the futures market (i.e. has purchased a futures contract), while a trader who initiates a position by agreeing to sell the underlying commodity at a future date is "short" (i.e. has sold a futures contract). The obligation represented by a futures contract is traditionally satisfied by taking or making delivery of the underlying commodity, or more commonly, by making an offsetting sale or purchase of an equivalent but opposite futures position.

Stock index futures contracts differ from traditional futures contracts in that settlement of contracts remaining open at maturity can be made only in cash—no such contract provides for physical delivery of any securities.

The basic reason for requiring physical delivery on any futures contract is that it causes futures and cash prices to converge as contract maturity approaches. So long as the seller of a futures contract can substitute physical delivery for the executory contract, the contract's price will converge to the cash market value of the specified product. Thus, one's economic position is maintained so long as he has the right to make or take physical delivery.

When the Chicago Mercantile Exchange ("CME") filed for approval of the S&P 500 futures contract, it proposed cash settlement, rather than physical delivery of such contract on the grounds that under certain circumstances cash settlement can guarantee the maintenance of economic positions to the same extent as physical delivery. Thus, if there are "objective" cash prices (i.e. uniform and representing an industry standard; well known due to wide availability and quotation; immune to manipulation; accurate indicators of the value of the commodity; and

independent of spatial location), cash settlement can assure price convergence as well as physical delivery. Cash settlement was said to be further warranted because the delivery of actual shares of stock underlying such a contract would be complicated and costly, and might impede the proper functioning of the market. Since the S&P index meets the criteria of "objective" cash prices, and delivery of a small number of shares of stock in a large number of corporations (including fractional shares which do not exist) would be complicated and result in large transaction costs, the CME petitioned for cash settlement. The cash settlement feature was ultimately approved by the Commodity Futures Trading Commission ("CFTC").

Unlike the purchaser of stock, the purchaser of a stock index futures contract does not acquire an equity interest in a company or even in a group of companies. Rather, a stock index futures contract is a derivative instrument because an investor's profit or loss is determined through indirect participation in the aggregate price of designated shares rather than through direct ownership of those shares.

Although stock index futures contracts on various indices trade on four different exchanges, the most significant contract is the Standard and Poor's 500 Stock Price Index, which has traded on the CME since 1982. This contract is based on the Standard & Poor's 500 Composite Index, which is a widely recognized barometer of the stock market as a whole and the benchmark against which the performance of most portfolio managers is measured. It is also used by the United States Commerce Department as one of the components of the Index of Leading Indicators.

The S&P 500 Index is based on the stock prices of 500 different companies—400 industrials, 40 utilities, 20 transportation companies, and 40 financial institutions. Approximately 475 of the S&P firms are presently listed on the New York Stock Exchange ("NYSE"). The market value of those 500 firms is equal to approximately 80 percent of the value of all stocks listed on the NYSE.

The S&P 500 Index is a capitalization-weighted index. Market capitalization is the value of a stock's

price multiplied by the number of its shares outstanding. Changes in the price of a particular stock will influence the index in proportion to the total outstanding shares of common stock of that particular company. The S&P 500 Index is calculated using the base years 1941 to 1943 at a value of 10.

The S&P 500 stock index futures contract has a dollar value of \$500 times its currently quoted price. This arbitrary \$500 figure is known as the "index multiplier." The \$500 index multiplier results in a contract large enough to facilitate institutional hedging of portfolios, but not so large as to discourage participation by speculators. An S&P contract quoted at \$200 has a value of \$100,000. The minimum price fluctuation or tick for each S&P futures contract is \$25, represented by a minimum fluctuation or tick in the contract price of \$0.05. If an S&P contract were to advance a full point from 200 to 201, a person holding a long position would have a \$500 gain while a person holding a short position would incur a corresponding \$500 loss. If an S&P contract were to drop one tick from 200.00 to 199.95, each long would have a \$25 loss, and each short would have a corresponding \$25 gain.

The S&P futures are traded on a quarterly delivery-month cycle of March, June, September and December. The expiration date of each contract is the third Friday of the delivery month. The price of the contract at expiration converges with the value of the S&P 500 Index on expiration day.

## 2. Stock Index Options

Options exist on individual stocks and on stock indices. A stock index option is essentially an option on a portfolio of stocks. The primary difference between a stock option and a stock index option is the nature of the underlying asset—a single stock on one hand and an index of stocks on the other.

The most widely traded stock index option is the S&P 100 option, which is listed on the Chicago Board Options Exchange, Inc. ("CBOE") and is commonly known by its ticker symbol, "OEX." Similar to the S&P futures contract, the S&P 100 option is based upon an index of 100 stocks that are included in the S&P 100 Index. The two indices tend to exhibit similar price movements.<sup>12</sup>

As with a stock index future, a stock index option is a leveraged, derivative trading vehicle that allows an investor to realize cash profits from favorable price movements of a specified portfolio or index of securities. However, two critical factors distinguish

an option from a futures contract. First, any loss incurred by an option purchaser is limited to the amount of his initial premium payment. Second, an option gives its holder the *right* to take (or make, in the case of a put) delivery of the underlying asset, but does not entail the obligation to do so.

There are two types of options, calls and puts. A call option on a stock index gives the buyer (or holder) the right, for a limited time, to receive cash in an amount equal to \$100 times the amount by which the closing level of the index on the exercise date exceeds the exercise price (or strike price) of the option. The buyer of a call option expects the price of the index to rise. He can realize a profit if, at any time during the life of the option, the price of the index rises enough to offset the decay in the premium due to the passage of time or if, upon exercise, the cash he receives exceeds the premium he paid for the option.

A put option gives the buyer the right, for a limited time, to receive cash equal to \$100 times the amount by which the exercise price of the option exceeds the closing level of the index on the exercise date. The buyer of a put option expects the price of the index to decline. He can realize a profit if, at any time during the life of the option, the index declines by an amount sufficient to offset the decay in the premium he paid for the option or if, upon exercise, the cash he receives exceeds the premium he paid.

In contrast to futures, where both a long and a short position in a futures contract entail essentially equal (and potentially unlimited) risk, long and short positions in options contracts involve radically different risks. One who has a long position in any stock index option cannot lose more than what he initially paid in premium because, even if the underlying index moves drastically against him, the option price can only go to zero.

On the other hand, as the collapse so vividly demonstrated, one with a short position in an index option faces the risk of virtually unlimited losses if the underlying index moves drastically against him. In fact, some index put options increased in value 800-fold between October 13 and October 20. Needless to say, such a movement was unprecedented. But as compensation for the enormous risk, a short position in an option carries a high probability of producing a profit, since options are wasting assets whose value will decrease over time if the price of the underlying index does not change. Option buyers tend to be members of the general public, while option sellers are most often exchange members or other professional traders.

The value of an option is a function of intrinsic value and time value. Intrinsic value is simply the difference between the price at which the option can be exercised ("strike price") and the current price

<sup>12</sup> Although various indices do not necessarily track each other perfectly, there is a reasonably high correlation among them. Thus, generally speaking, a one point move on the MMI futures index translates into a move of about 4.8 points on the DJIA; a move of one point on the S&P futures contract or on the S&P 100 or S&P 500 indices is equal to a move of about eight points on the DJIA.



of the underlying index. The intrinsic value of an index call option equals the amount by which the price of the underlying index exceeds the strike price. A put option's intrinsic value equals the amount by which the underlying index price is below the strike price. An option which is "at-the-money" or "out-of-the-money" has no intrinsic value.

Time value represents the amount of premium that a buyer is willing to pay over and above the intrinsic value in order to profit from any favorable price movement in the underlying index. That amount is determined by a buyer's assessment of the probability of favorable price movements of various magnitudes before the option's expiration. That probability can be assessed by two quantifiable factors: the time remaining until expiration of the option and the volatility of the underlying index. Since the buyer can substitute the purchase of the underlying stocks for the purchase of the option, the alternative cost of carrying the stocks is another factor taken into account.

Traders calculate the fair value of an option by plugging the index price, strike price, time to expiration, volatility and carrying cost into an equation and solving for the option price. Conversely, traders will sometimes enter the option price and solve the equation for implied volatility. Implied volatility of an index option reflects the marketplace's aggregate estimate of the likely volatility of the stock market in the near future.

## B. Market Making

### 1. Stock Index Futures

The system of market making in the futures markets is significantly different from the market making system in either stocks or stock options. The rules of the CFTC require that all purchases and sales of futures contracts on contract markets be executed openly and competitively by open outcry. Thus, the futures trading arena has no single centralized auctioneer who functions in the manner of a specialist. Rather, the futures arena is composed of several hundred competing market makers commonly referred to as "locals" who stand in an oval-shaped trading pit. Because of the open and competitive rule, a market maker in the futures market is not required to make a "fair and orderly market," unlike specialists on the NYSE. As a practical matter, this means that a local is not obliged to attempt market stabilization or even to remain in a trading crowd. Further, there is no "uptick rule" in the futures market, so one can enter a short position at any time and a local is free to bid or offer even when it would add to an imbalance of buy or sell orders.

Also, in contrast to the stock markets, prearranged trading is prohibited under the CFTC's current interpretation of its rules and therefore block trading, as practiced by "upstairs" block traders for NYSE stocks, is not permitted in the futures market. Similarly, unlike the NYSE and options exchanges, there are no computerized trade execution systems on the futures exchanges. Further, there is no procedure for a single price opening in the futures market.

At the CME's S&P 500 pit, liquidity is maintained by approximately 300 locals who frequently trade into and out of positions in as little as one or two minutes. Some of the larger locals will typically buy or sell 100 or more contracts at a time for their own account, hoping to make a profit of only one or two ticks on such a transaction. (A two-tick profit on 100 contracts is \$5,000.)

Unlike the securities world, a bid or offer in the commodities world is considered binding only as it is being announced. Hence, much of the noise in a futures pit is constant repetition of a bid or offer. With that much noise in such a large trading crowd, it can become difficult to trade with a counterparty who is in a distant part of the pit. Thus, the open outcry system may have the ironic effect of not necessarily exposing a customer bid or offer to all who might wish to hear it (or see it through the hand signals used in the pit). Prices change so rapidly in the futures pit that the only reliable bid-ask quotation is that given over the telephone directly from the trading floor. It is the seller's responsibility to report all trades. These shouted reports are picked up and disseminated by exchange-employed reporters stationed at the edge of the ring.

A futures floor broker is permitted to trade for his own account as well as to execute customer orders, subject to the requirement that the broker put the customer's order first.

The CME imposes a speculative position limit of 5,000 contracts, and allows a bona fide hedger to apply for an expanded limit. Generally, hedgers' limits will be no higher than 10,000 contracts, except in the case of major index funds which may run as high as 35,000 contracts. In the wake of the crash, the CME imposed a daily price limit of 30 points on the S&P futures, which equates roughly to a 250 point move on the Dow.

### 2. Stock Index Options

Options on individual stocks and on stock indices are traded on five different exchanges in the U.S. Market making practices vary among these exchanges and differ from the market making practices on the NYSE floor and in the futures pit. Even on exchanges such as the American Stock Exchange ("Amex") where there is a specialist, competing market makers supplement the specialist. The spe-

cialist and market makers are responsible for maintaining a reasonable bid-ask spread. The specialist also handles limit orders, which must be executed before specialists and market makers can establish new positions at that price.

The leading options exchange, the CBOE, has no specialists. The OEX pit at the CBOE is populated by over 300 market makers who trade only for their own account and who are registered with the SEC as broker-dealers. These market makers are guaranteed by a clearing member. Under exchange rules, each market maker has an obligation to make a market reasonably calculated to be fair and orderly. In lieu of specialists, CBOE exchange employees known as board brokers execute limit orders.

Small customer market orders for OEX options priced under \$10 can be executed automatically through the CBOE's Retail Automatic Execution System ("RAES"), which will execute a buy order at the current offer price or execute a sell order at the current bid. Market makers in the OEX pit voluntarily participate in the RAES system and are informed of their RAES trades within minutes of their execution. RAES generally handles about 30 percent of OEX volume. Customer orders not handled through RAES are brought by a broker into the trading pit and executed. Market makers do not execute customer orders and brokers do not act as market makers.

Each option series is opened separately in a "rotation" to arrive at a single opening price for all customer buy and sell orders. A board broker will match up all buy and sell orders in each series, and market makers will typically resolve any imbalance in such orders. This rotation procedure begins at the NYSE opening. In distinct contrast to October 19 and 20, opening rotation ordinarily takes about 20 minutes. Once a rotation is completed, the options commence free trading. After rotation, index options are supposed to trade only when stocks representing at least 80 percent of the index capitalization are open.

During free trading under normal market conditions, a market order for an option trading under \$10 can generally be filled within a bid-ask spread of  $\frac{1}{16}$  or  $\frac{1}{8}$ . The seller is responsible for reporting an option trade to one of the reporters stationed throughout the trading pit. In addition to entering last sales into a console for dissemination, these reporters are responsible for updating the bid-ask for each option series. A limit order is left with a board broker who is responsible for displaying and filling it before exchange members can establish new positions at that price. Screens on the exchange floor show the best bid-offer in the limit order book separately from the best bid-offer in the trading pit itself.

There are position limits in all options. The OEX position limit is 25,000 contracts on the same side

of the market, with no more than 15,000 contracts in the near month. Hedgers may not receive permission to exceed their position limit in options. Although position limits in options are nominally larger than in futures, they are smaller in dollar terms because an at-the-money OEX put hedges only about 10 percent of what an S&P 500 futures contract protects.

In addition to stock index options, there is an entirely separate instrument called an option on a stock index futures contract. These options are not important to the events of October because trading volume in the futures options is not substantial. Unlike stock index options, these futures options are listed on commodity exchanges and are regulated under the auspices of the CFTC rather than the SEC.

## C. Net Capital Requirements

### 1. Stock Index Futures

The futures commission merchant ("FCM") is the commodities equivalent of a securities broker. An introducing broker ("IB") is essentially an FCM that does not carry customer funds or extend credit. Minimum capital requirements for FCMs and IBs are established by the CFTC.

The CFTC's financial requirements require that each FCM maintain at all times a certain minimum amount of capital to protect customers in case the FCM suffers financial losses. In order to become registered initially an FCM applicant must submit a certified financial statement that it has net capital of at least \$50,000. Net capital is essentially defined as net worth (assets minus liabilities), plus qualifying subordinated borrowings, less certain mandatory deductions for certain assets that are not readily convertible into cash and from valuing certain other assets, such as a firm's positions in securities, conservatively. Among these deductions are adjustments (called "haircuts") in the market value of securities to reflect the possibility of a market decline prior to their liquidation.

Once a firm is registered as an FCM it must continue to meet regulatory financial requirements. Furthermore, the rules recognize that a larger capital base is necessary as the firm's business grows. Therefore, FCMs are required to maintain net capital at a level of the greater of \$50,000 or 4 percent of the amount of funds held for customers. Such customer funds include money, securities and property deposited by a customer to margin trades or accruing to such customer as the result of such trades. For example, if an FCM held customer funds total \$2,000,000 its capital requirement would be \$80,000.



Because the minimum capital requirement is a function of customer funds, it does not affect the leverage or liquidity in a firm's proprietary account. Thus, an FCM could have unlimited exposure in its house account but as long as it holds less than \$1,250,000 of customer funds (4 percent of which equals the \$50,000 minimum), the rule requires only \$50,000 of net capital.

The CFTC and the SEC have coordinated their respective capital rules because many FCMs are also registered as securities broker-dealers. As a result, the two rules are virtually identical in their application, and an FCM that is also a broker-dealer must therefore maintain net capital of the greatest of \$50,000, 4 percent of customer funds, or the amount required by SEC rules.

Firms that do not maintain the required net capital must cease doing business immediately. In addition to the minimum net capital requirement, CFTC rules set forth certain early warning levels for FCMs. If an FCM's net capital falls below either \$75,000, 6 percent of customer funds, or for broker-dealers, the early warning level set forth in SEC rules, the FCM must notify the CFTC and the FCM's Designated Self Regulatory Organization ("DSRO") in writing of that fact (See 12 CFR 1.12). The FCM must then file monthly (instead of the usual quarterly) financial statements until its capital is above the early warning level for three consecutive months. The minimum financial requirements rule also prohibits the payment of dividends, redemptions of stock or prepayment of subordinated debt by the FCM if net capital thereafter would be less than \$60,000 or 7 percent of customer funds (See 17 CFR 1.17).

If an FCM desires to clear trades on a particular exchange, it must become a clearing member of such exchange and meet its capital requirements. The Chicago Mercantile Exchange imposes net capital requirements on its FCM clearing members which exceed those set by the CFTC. CME clearing members must maintain net capital of at least \$1,000,000, and its rules authorize it to impose higher net capital requirements on individual firms. Locals trading for their own account are not required by CME rules to maintain any minimum net capital. However, the clearing member that clears and guarantees the local's trades generally requires the local to maintain a minimum cash deposit of approximately \$25,000.

The CFTC, NYSE and commodity exchanges coordinate their financial audit activities, so that each FCM's financial condition is periodically reviewed by its DSRO. During the market break, the CME conducted daily reviews of the firms for which it is the DSRO.

## 2. Stock Index Options

The minimum capital requirements for registered broker-dealers and member firms of the NYSE, set forth in the net capital rule promulgated by the SEC (SEA 15c3-1) and incorporated by reference in NYSE Rule 325, apply to broker-dealer activities in the options market as well as in the stock market.

Net capital calculations are based on a firm's overall positions and activities, including both the options and stock markets. As discussed in Part II C of this Study, most broker-dealers have elected to compute net capital under the (more liberal) alternative method which requires that they maintain a minimum "net capital," as defined in the net capital rule, equal to the greater of \$100,000 or 2 percent of the amount of its "aggregate debit items," computed in accordance with the Formula for Determination of Reserve Requirements for Brokers and Dealers (SEA Rule 15c3-3). The "aggregate debit items" are essentially extensions of credit by broker-dealers to their customers during the course of effecting transactions for them to the extent such assets are included in the broker-dealer's net capital. Included among these items is the margin required and on deposit with the Option Clearing Corporation ("OCC"), the central clearinghouse for all exchange traded options, for options written by or purchased for customers.

The OCC imposes additional net capital requirements on broker-dealers that are clearing members. While neither the CBOE nor the OCC imposes any minimum financial requirements on non-clearing members, they cannot execute trades unless they are guaranteed by a clearing member (See CBOE Rule 6.21 and 13.1).

The OCC's net capital requirements impose a sliding scale of restrictions, as net capital declines, similar to those imposed by the NYSE. Clearing members must have initial net capital at least equal to the greater of \$150,000 or 5 percent of aggregate debit items (12½ percent of aggregate indebtedness for members which have not elected to operate pursuant to the alternative net capital requirements). Such initial net capital must be maintained for the lesser of three months after its admission as a clearing member or twelve months after it commenced doing business as a broker-dealer (See OCC Rule 301).

Thereafter, if net capital falls below the greater of \$150,000 or 5 percent of aggregate debit items (10 percent of aggregate indebtedness for members who have not elected to operate pursuant to the alternative net capital requirements), the clearing member must notify the OCC by the following business day. Furthermore, payments of dividends and redemptions of stock are prohibited if net capital thereafter



would be less than such level (See OCC Rule 303 and 304).

If net capital falls below the greater of \$150,000 or 4 percent of aggregate debit items (8½ percent of aggregate indebtedness for members that do not operate under the alternative net capital requirements), then the OCC may, if it deems it advisable, impose restrictions on such clearing members' activities or positions (See OCC Rule 305).

The most severe sanction, compelling the clearing member to cease clearing opening transactions, is imposed if its net capital falls below \$100,000 or 2 percent of its aggregate debit items (6⅔ percent of aggregate indebtedness for members who do not operate under the alternative net capital requirements).

Thus, a broker-dealer with \$10,000,000 of aggregate debit items, must have at least \$500,000 (\$10,000,000 times 0.05) net capital to meet the initial minimum capital requirement to be an OCC clearing member. If its net capital falls below \$500,000 it must notify the OCC promptly and certain capital withdrawals are prohibited. If net capital falls below \$400,000 (\$10,000,000 times 0.04), certain activities may be restricted, and when it falls below \$200,000 (\$10,000,000 times 0.02) it must cease doing business.

## D. Margin and Settlement

### 1. Stock Index Futures

#### (a) Margin

In the futures market, "margin" refers to the cash or securities required to be deposited as a form of performance bond by both sellers and buyers to insure that they will meet their financial obligations under the contract. There are margin requirements both at the customer level (the customer must deposit margin with its FCM) and at the FCM level (the FCM must deposit margin with the clearing corporation).

Because futures are not defined as securities for purposes of federal securities law, authority to set initial and maintenance margin requirements is not included in the authority granted to the Federal Reserve Board by Section 7 of the Securities Exchange Act of 1934. Legislation introduced since October 19, however, if adopted, would both authorize and require the Federal Reserve Board to set margin levels for futures (See H.R. 3597 and S. 1847).

The Commodity Exchange Act ("CEA") does not grant the CFTC the general authority to set margin levels. Furthermore, it specifically excludes from the CFTC's customary rule review jurisdiction any authority to review exchange margin rules (See CEA Section 5(a)(12)). Only in the case of a market

"emergency" does the CFTC have authority over margin levels (See CEA Section 8a(9)).

Thus, the various futures exchanges set initial and maintenance margins and require their clearing firms to collect them from their customers. If customer margin is reduced below the maintenance margin level through the daily settlement process, the account must be restored to the initial margin levels.

The most notable exception to the general margin requirement is that for "day trades," i.e. positions established and liquidated the same day. Clearing members are not required to collect or call for margin from a customer "with an established account in respect to new positions that are liquidated by the close of trading" (See CME Rule 627(c)). This exception effectively exempts most locals from the margin requirements, since they generally end each day flat.

Exchanges set margin levels for each contract, which are specified in absolute dollar amounts as opposed to percentages. These levels attempt to reflect the risk associated with certain types of trading by providing lower margin levels for hedging and spreading transactions. The CME states that margin for members is also lower because their membership serves as collateral. Because open positions are marked-to-market and settled daily (see "Settlement" below), margin levels are designed to cover the probable risk of daily loss under market conditions existing at that time and are frequently adjusted to reflect market conditions.

Initial and maintenance margin on the S&P 500 future for hedgers and members was increased by the CME from \$5,000 to \$12,500 per contract between October 16 and October 28. The margin requirements for speculators were increased similarly (pre-crash initial \$10,000, maintenance \$5,000; post-crash initial \$20,000, maintenance \$12,500). Margin requirements were lowered back down on December 21, 1987 for speculators to \$15,000 initial and \$10,000 maintenance and for hedgers and members to \$10,000 initial and \$10,000 maintenance. Although futures margins are set in absolute dollar amounts, the current requirements for hedgers and members would translate to approximately 8 percent at December 1987 price levels.

When a hedger buys an S&P 500 future with the index at 230, he effectively assumes the economic risk of owning a basket of stocks with a value of \$115,000 (230 times \$500), and would be required to deposit \$12,500 (approximately 9 percent of the contract value) of margin with the clearing member. If the futures fell by 10 percent to 207 the position would be marked-to-market (see "Settlement" below) and a margin call would be made to cover the market loss of \$11,500 (230 times \$500 minus 207 times \$500) and to restore the account to initial

margin requirements. While the foregoing minimum margin requirements are set by the exchanges, member firms are specifically authorized by the exchanges to impose higher margin requirements and they often do so in the case of speculative accounts.

### (b) Settlement; Variation Margin

The CME's settlement mechanism, like those on other futures exchanges, is designed to remove debt from its system on at least a daily basis. This is accomplished, in the case of futures contracts, by the clearinghouse marking all open positions on all of its futures to the current day's settlement price, collecting cash from the "losing" clearing firms, and paying cash to the "winning" clearing firms the following business day. The cash flow related to this mark-to-the-market process is called "variation margin," or "settlement variation" and is in addition to the initial and maintenance margin discussed under "Margin" above.

The clearinghouse calculates variation margin after the final trade reconciliation. The CME performs preliminary trade reconciliations (trade matches) at 11:30 a.m., 3:45 p.m. and 4:45 p.m. CST and starts the final reconciliation at approximately 9:00 p.m. CST. Incoming futures positions (i.e. those established on prior days) are marked from the previous business day's settlement price to the current day's settlement price. Futures trades clearing for the first time on the current day are marked from trade price to the current day's settlement price. At the time each trade is finally reconciled, the clearinghouse is substituted for the other party to each trade and each clearing member thereafter looks only to the clearinghouse to perform.

The clearinghouse makes this calculation for each transaction or position in a clearing member's house and customer accounts to arrive at a single net variation margin figure for the firm's customer account, and a single net variation margin figure for the firm's house account. In addition, the clearinghouse instructs the clearing firms to collect initial margin for all new positions established that day. Unlike most futures exchanges, the CME collects initial margins on a gross basis (i.e. each position is margined separately, not offset against one another). Each clearing member is provided a "Trade Register" (often in machine readable form), which provides the necessary information to transfer gross variation margin among its various customer and house accounts. Also, each night, the clearing members run their own data through their computer systems, resulting in debits and credits to their customers' accounts.

In times of extreme price volatility, the CME's clearinghouse may call for intraday payment of variation margin. A program in the clearing system marks each position from the previous day's settle-

ment price to the then current price in the CME's computerized market quotation system throughout the trading day. Reports to the clearinghouse compare the resultant cash requirements to the excess margin on deposit and the capital of the firm. Based on an assessment of the net exposure of a given firm, the clearinghouse will initiate an intraday call that is payable in one hour.<sup>13</sup>

Intraday variation margin calls are initiated by the CME telephoning each clearing firm, and notifying it of the amount of the call and the deadline for meeting it (usually one banking hour). A written variation margin call is telecopied to the settlement bank, with instructions that the bank notify the clearinghouse when the funds are in place. The rules of the CME allow it to accept cash, Treasury securities, or letters of credit ("L/C"), from a firm in fulfillment of an intraday call. If Treasuries or an L/C are put up, then cash must flow the next day with the regular settlements. If cash is put up for the intraday call, then this amount is deducted from the total settlement variation calculated at the close of business. The CME only collects variation on an intraday basis; it does not pay it out. These intraday calls may be made more than once a day.

### (c) Cash Flows

#### (i) CME Settlement Banks

To process the cash flows relating to original and variation margin, the CME has arrangements with four Chicago banks known as settlement banks—Continental Illinois National Bank and Trust Company; The First National Bank of Chicago; The Harris Trust and Savings Bank; and The Northern Trust Company. The CME clearinghouse maintains a variation account with each bank and this account contains sub-accounts for each CME clearing member. In addition, each CME clearing member firm is required to establish two accounts with at least one of these banks, one account for the segregated funds of its customers, and one account for its house, non-segregated, funds. Each clearing member is required to sign documents giving its bank permission to debit these accounts acting solely on the instructions of the clearinghouse.

As previously mentioned, the CME collects original margin on a gross basis from both sides of each contract. Unlike variation margin, these deposits do not zero out each day but, instead, remain on deposit until the futures contract is liquidated or settled. The following discussion of CME cash flows emphasizes variation margin payments because, as

<sup>13</sup> Because the intraday margining system relies upon day old data, clearing members may be required to post variation margin on positions already closed. Conversely, new positions may be unmargined until the evening settlement calculations are performed.



will be discussed, these payments placed the greatest stress on the financial system during the week of October 19.

*(ii) Banking Instructions and the Settlement Banks' "Commitment"*

After the clearinghouse determines each clearing firm's net variation margin for all futures contracts, including currencies and the S&P 500, it produces banking instructions. These instructions are telecopied to the settlement banks at approximately 5:00 a.m. CST. The instructions are in two parts. The first indicates amounts receivable from clearing member accounts ("pays") and instructs the banks to debit the clearing member's customer or house account and credit the variation account of the clearinghouse. The second part indicates amounts payable to clearing member accounts ("collects") and instructs the banks to credit the clearing member's customer or house accounts and, correspondingly, debit the variation account of the clearinghouse.

Written agreements between the CME and each of the four settlement banks require that each bank notify the clearinghouse by 7:00 a.m. CST to confirm "fund transfers made or notice of fund transfers not made because the account to be charged does not contain sufficient funds." Often, the clearing member will not have funds at the settlement bank by 7:00 a.m. CST sufficient to pay the clearinghouse the amount owed by the clearing member to it and the bank will extend intraday unsecured credit to the clearing member for such purpose. In effect, each of the four banks makes a credit determination whether it will agree to fund the clearinghouse's instructions to debit its clearing member customer accounts.

The CME views the settlement banks' 7:00 a.m. CST confirmation that "fund transfers" are made as "irrevocable," and the four Chicago settlement banks do not undertake their 7:00 a.m. CST commitments lightly. The banks appear to believe that their commitment is tantamount to an irrevocable substitution of their credit for their customers'; although there is apparently no formal, written agreement to this effect between the settlement banks and the clearinghouse or between such banks and their customers. These mutual understandings have built up over time, and the bankers and exchange officials participating in the process have confidence in "the system."

*(iii) Timing of Cash Flows*

While the clearinghouse receives payment information from the settlement banks at 7:00 a.m. CST, the actual timing of cash flows varies from bank to bank and within a bank and from customer to customer. For example, at one bank debit and credit

memos are posted to the settlement accounts prior to 7:00 a.m. CST. At two other banks, they are keypunched into the bank's internal bookkeeping systems sometime between 8:30 a.m. and 10:00 a.m. CST. At the fourth bank, debits and credits are not processed until the end of the banking day. All interbank and intrabank transfers are made in "same day" funds that have immediate value. While these payments are the only ones in which the clearinghouse has an interest, they are only the beginning (or end) of the process from the clearing members' perspective. Clearing members generally post debits and credits to their customers' accounts overnight. Especially in the case of institutional customers, such as mutual and pension funds, clearing members may have standing agreements to wire transfer out variation margin on a daily basis. Generally, cash does not move from clearing member to customer until after the clearinghouse settlement system results in payments to the clearing members.

A number of the Wall Street broker-dealers that are CME clearing members do most of their banking in New York, and thus need to wire transfer funds into and out of New York banks. As a general rule, the clearing member must provide separate wire instructions to the settlement bank for each transfer to a New York bank. The settlement bank then initiates these transfers via the Federal Reserve Bank's Fed Wire system. These transfers are subject to the rules of the Federal Reserve Bank, which include daylight overdraft limits on banks belonging to the Federal Reserve System, including the four settlement banks. Wire transfers to and from New York must pass through two Federal Reserve Districts. The operating procedures and rules of the Fed Wire system may at times delay the actual flow of settlement variation funds which are a small portion of the total traffic on the Fed Wire network.

*(iv) The Concentration Bank*

Because futures trading is a "zero sum game," the clearinghouse pays out exactly the same amount of cash as it takes in for variation margin each business day. At the end of the day, the balance in the clearinghouse's variation margin accounts must equal zero (except for intraday variation margin calls which are paid out the next day). Since there are four different settlement banks involved in the cash transfers, the clearinghouse must move funds from bank to bank in order to zero out its variation accounts. To facilitate this process, the clearinghouse uses the Harris Trust and Savings Bank as its "concentration bank." The banking instructions sent by the clearinghouse to each settlement bank also set forth the net debit or credit to the clearinghouse variation account for that particular bank. If the clearinghouse variation account has a credit balance, the report instructs the settlement bank to wire

transfer that balance to Harris (via the Federal Reserve Bank's Fed Wire system). If the clearinghouse variation account has a debit balance, the bank is told to expect receipt of a wire transfer from Harris for that balance. The bank report for Harris shows both incoming and outgoing wire transfers for each of the other settlement banks. In this manner, funds transfer is "concentrated" at Harris. These wire transfers are generally initiated by the Harris at about 9:30 a.m. each day.

## 2. Stock Index Options

### (a) Margin and Settlement; Variation Margin

In contrast to stock, options may not be bought on credit. The purchaser of an option must pay the option premium in full. The writer (or seller) of the option, however, is required to deposit cash or securities as collateral for the obligation incurred by granting the option. This deposit of collateral for short positions, referred to as margin, and all premium payments for long positions, must be made within seven business days unless the broker requires deposit sooner (See Reg. T, 12 CFR 220.4(c)(3) and 220.18(e)). There are margin requirements both at the customer level—the option writer must deposit margin with the clearing member—and at the clearing member level—the clearing member must deposit margin with the clearing corporation. These regulatory requirements are only minimums, and clearing members are specifically authorized to impose higher margin requirements on their customers.

Because options are legally defined as securities, the Federal Reserve Board possesses statutory authority to set initial and maintenance margin requirements pursuant to Section 7 of the Securities Exchange Act of 1934. However, the Federal Reserve has deferred in the case of exchange traded options to the exchange where the options are traded. Legislation introduced since October 19, if adopted, would require the Federal Reserve Board to set margin levels for options (See H.R. 3597 and S. 1847).

Member firms are required by their exchanges to impose minimum initial and maintenance margin requirements on their options customers. The primary options exchange, the CBOE, has its own margin requirements, but permits its members to follow the margin requirements of the NYSE (See CBOE Rule 12.11 and 24.11).

The NYSE requires initial and maintenance margin on options equal to the current market value of the option (which at the time of writing the option is equal to the premium paid by the buyer and thereafter means the preceding day's closing price for the option) plus an additional amount based on the value of the underlying asset. For

individual stock or narrow-based index options, that additional amount is 15 percent of the value of the underlying security, reduced by any out-of-the-money amount to a minimum of 5 percent. For broad based index options, the additional sum is 10 percent (prior to November 2, 1987, it was only 5 percent) of the value of the underlying index reduced by any out-of-the-money amount to a minimum of 5 percent (prior to November 2, 1987, it was only 2 percent).

These margin requirements are designed to cover the forecasted liquidation cost of positions in the event of an adverse price change. Such forecasting is based on the historical volatility of the underlying security and the volatility implied by option prices. Because of the inherent reduced price risk, the margin requirement for offsetting positions is equal to the excess, if any, of the current market value of the short contracts over the long contracts as measured by their current premium quotations. Similarly, there is no margin requirement on any covered option.

Using the margin requirements in effect prior to November 2, to write a put or call at the market on the S&P 100 (OEX) when it is at 225 (underlying market value \$22,500), the writer must deposit the premium he receives from the buyer (for example, \$812.50 for a call or \$900 for a put) and deposit \$1,125 (22,500 times 0.05) of his own money. If, instead, a put option were written out-of-the-money with a strike price of 215, the writer would still deposit the premium he receives from the buyer (for example, \$500) plus \$450 (\$1,125 minus \$1,000 out-of-the-money is below the 2 percent minimum of \$450) of his own money as margin. Since November 2, the required margin level has been essentially doubled.

Although firms are specifically authorized to impose higher margin requirements, prior to October 19 they generally did not. Since then most firms have required customers to maintain 15 percent margin on broad based index options, instead of the regulatory 10 percent minimum. Similarly, the seven business days provided for payment of margin is a minimum. Since October 19 some firms have even required that the required margin be on deposit before they will execute the trade.

The required margin level in a customer's account is marked to market daily. To continue the previous example using margin requirements prior to November 2, the writer of an out-of-the-money put on the S&P 100 at a strike price of 215 would have deposited the \$500 premium he received and put up \$450 of his own money as margin. If the index fell to 205 (9 percent decline), the writer would need to deposit \$500 to reflect the increase in value of the option as measured by current premium quotations (from \$500 to \$1,000) plus \$575



(205 times 100 times 0.05 minus 450) to reflect the increase in the margin requirement from 2 percent to 5 percent because the option is no longer out of the money. Thus, the option writer's margin requirement would have increased by 139 percent due to a 9 percent market decline.

The rules of the OCC permit only clearing members to present option contracts to the clearing corporation (OCC Rule 6.50). Upon acceptance of the transaction by the clearing corporation, the clearing corporation is substituted for the original writer and buyer, thereby becoming the writer to every buyer and the buyer to every writer. For the protection of the clearing corporation, clearing members are responsible for the clearing of all transactions compared on their behalf. This responsibility is supported by the clearing member's contribution (minimum \$10,000) to the stock clearing fund. In addition, clearing members must maintain margin with and pay premiums to the clearing corporation even when they have not yet collected it from their customers.

As discussed above, options may not be bought on margin. The clearing corporation calculates daily on a net basis the premiums and exercise amounts due to or from each clearing member for the firm and customer accounts maintained by it with the clearing corporation (OCC Rule 501). Although a broker may allow his customer up to 7 days to pay the premium, option premiums settle on the next business day. The exercise settlement date for index options is the business day following exercise, while the exercise settlement date for options on individual stocks is the fifth business day following exercise (See OCC rules 902 and 1805). The net daily premium and net exercise settlement amount are set forth in the Daily Position Report and are automatically credited to or debited from the clearing members designated account with one of the four settlement banks (OCC Rule 502 and 1806).

Similarly, the clearing corporation calculates daily the net margin due to or from each clearing member on the short option positions in each account maintained by it with the clearing corporation. Clearing members must maintain margin with the clearing corporation equal to the current market value (i.e. the sum of the latest premium quotations) for the short option positions maintained in the firm's proprietary account or customer accounts. Margin may be in the form of cash, check, government securities, irrevocable letter of credit or common stocks.

Because margin is based on the latest premium quotations and the amount, if any, by which the option is out of the money, writers of options to a limited extent can withdraw their gains. A writer's option position becomes more profitable as it moves out of the money. As an option moves out of the money, the margin requirement with respect to such

option declines because the premium decreases and the percentage of the underlying security or index which the writer must deposit is reduced by the out-of-the-money amount down to the minimum percentage. The decreased margin requirement leaves excess margin which may be withdrawn or used for other transactions. Unlike futures, the option writer is not permitted to withdraw completely his gain while the position remains open because there are minimum margin requirements.

The critical contrast is for option purchasers. They must pay the premium in full and have no access to any gain while the position remains open. Consider someone who is long a stock index futures contract and long 10 index puts in a declining market. Even if the gain on the puts more than offsets the loss on the futures, the gain cannot be used to meet a variation margin call on the futures position. In extreme cases, such as the week of October 19, severe liquidity problems can result from such margin requirements.

Just as at the customer level, margin is reduced for offsetting positions due to the inherent reduced price risk. Long positions may only be used to offset the margin requirement on short positions to the extent the clearinghouse is granted a lien thereon, such as unencumbered positions in the firm's proprietary account or in a customer account where the customer consents in order to reduce his margin requirement on offsetting long and short positions. In the case of paired contracts, the margin requirement is equal to the excess, if any, of the current market value of the short contracts over the long contracts as measured by their current premium quotations. Similarly, no margin is required on calls where the underlying security is deposited with the clearing corporation. Limited offset is permitted for spreads and straddles.

Thus, the customer maintains with the clearing member margin equal to the current value of the option plus 5 to 15 percent of the market value of the underlying security or index. The clearing member passes on to the clearing corporation only the current value of the option and may retain the 5 to 15 percent. Using again the example of a writer of a \$9 at-the-money put on the S&P 100, the writer must deposit with the clearing member the \$900 premium paid by the buyer and deposit an additional \$1,125 of his own money. The clearing member in turn must deposit the \$900 premium with the clearing corporation but may retain the \$1,125 of additional margin.

In addition to required margin, clearing firms have to post variation margin with the clearing corporation upon demand. Variation margin is an intraday margin call made to reflect changes in: (i) the market price of the options or underlying security, (ii) the size of the member's position, (iii) the value



of securities deposited as margin and (iv) the financial position of the member. It is also meant to protect the clearing corporation, its members and the public (See OCC Rule 609). Thus, when market movements cause the forecasted liquidation value of positions to exceed the current required margin, the OCC will generally make intraday margin calls. The amount of such intraday margin will be credited the following morning against the net margin due between the clearing member and the clearing corporation.

#### (b) Cash Flows

In order to process the cash flows resulting from initial maintenance and variation margin payments, the OCC has designated fifteen of the largest U.S. money center banks as "settlement banks." The OCC maintains an account containing sub-accounts for each OCC clearing firm with each of the settlement banks. In addition, each OCC clearing firm is required to establish two accounts with at least one of these banks, one account for the segregated funds of its customers, and one account for its house, non-segregated funds.<sup>14</sup> The daily position report and the daily margin report delivered to each clearing firm by 9:00 a.m. CST contains a bank draft that the firm signs. The draft is then presented to the settlement bank. Even if the clearing firm does not sign the draft, each clearing firm has previously instructed its settlement bank to debit its accounts acting solely on the instructions of the OCC.

Copies of the daily position report and daily margin report for each clearing firm are delivered with payment instructions to the corresponding settlement banks each morning. Each of these fifteen settlement banks have contractually committed to notify the OCC by 10:00 a.m. CST whether it will honor the OCC's payment instructions. The settlement banks are bound to honor the payment instructions if they do not notify the OCC otherwise by 10:00 a.m. CST.

Like the futures market, each settlement bank makes a credit determination whether it will agree to honor the OCC's instructions to debit a clearing firm's account. If a settlement bank informs the OCC that it will not make a payment on behalf of a particular clearing firm, that clearing firm will be in default.

Because the premiums that the OCC collects from purchasers of options are paid out directly to the writers of options, the net premium settlement must be paid with immediately available funds. While the aggregate of OCC's accounts are not changed by the premium settlement, the OCC's account at any one settlement bank will change if the bank's cus-

tomers are net writers or purchasers of options. Thus, the OCC must move funds between the settlement banks.

## E. Default on Obligations to Clearinghouse; Customer Protection

### 1. Stock Index Futures

#### (a) Default on Obligations to Clearinghouse

Under the rules of the CME a number of procedures would be triggered in the event a clearing member failed to meet a margin call. While no CME clearing member has ever defaulted (though clearing members have been ordered by the CME to transfer customer accounts to other clearing members) such an event could occur if a clearing member's customer and/or proprietary losses exceeded both the customer's and the clearing firm's liquid resources. These procedures, which are designed to make the clearinghouse whole, are as follows:

##### (i) *Transfer of Customer Positions and Funds*

Assuming that the obligation defaulted on arises from the clearing member's house account, the CME will transfer all customer positions and funds to another non-defaulting clearing member. The CME will then apply to the defaulting clearing member's debt the member's security deposit (currently \$50,000), its house margins on deposit and its CME memberships. Customer margins may not be used to satisfy defaults arising in a house account. Instead, the CME will apply its own surplus funds, and its members' security deposits, and make assessment calls (see below) to meet a default in a house account.

In the event of a default arising in a clearing member's customer account, the CME will attempt to transfer positions and funds of the customers not in default; however, in order to meet the default, the CME would apply any of the defaulting clearing member's customer margin on deposit. The CME will also apply the member's security deposit and any assets, including its memberships to the defaulting clearing member's debt. In addition, the CME would apply the clearing member's house margin on deposit.

Assuming the firm's own assets are insufficient, and customer margin has to be used to satisfy the debt, non-defaulting customers of the clearing member may then bear the risk caused by a defaulting customer. To alleviate this risk the CME currently maintains a \$29 million Trust Fund that can be used on a discretionary basis to assist customers of a CME clearing member that becomes insol-

<sup>14</sup> The clearing firm must maintain a third account if it is a market maker for such activity. Firms need not maintain all of these accounts at the same bank.

vent.<sup>15</sup> However, in substance, the clearing house guarantee generally operates to protect market integrity and is designed in the first instance to protect customers of non-defaulting members rather than the customers of defaulting members.

(ii) *Application of CME Surplus Funds and Security Deposits*

If a default exceeds the clearing firm's margin deposits, security deposits, memberships and other liquid assets, the CME will fund the deficiency out of its own surplus, which was approximately \$25 million as of October 31, 1987. If this proves insufficient, the exchange will next apply the security deposits of all clearing members, which totaled approximately \$4.6 million in October, 1987.

(iii) *Member Assessments*

As a final source of funds, the CME will assess its clearing members to meet margin calls and make itself whole. Under this "common bond" or "good-to-the-last-drop" rule, the balance of the loss would be allocated among the remaining clearing members (up to \$500,000 per member in proportion to their adjusted net capital and the balance in proportion to the member's share of the clearing volume and open commitment). Many large firms insulate themselves from these procedures by the use of separate futures subsidiaries. Nevertheless, as of October 31, 1987, CME clearing members had approximately \$11 billion in shareholders' equity, plus \$5.2 billion of subordinated debt. According to the CME, in the event of a default so massive that assessments become necessary, it would seek immediate liquidity from the banking community by borrowing against the collateral provided by its "good-to-the-last-drop" rule. While banks have indicated to the CME that they would fund such a shortfall in a crisis, there is no written commitment that they do so. The assessment system has never been tested.

If a settlement bank informs the clearinghouse that it will not make a payment on behalf of a particular clearing member firm, that clearing member is in default, and the CME's emergency financial procedures are triggered.

<sup>15</sup> In March, 1985, Volume Investors Corporation, a clearing member of the Comex, defaulted when customer margin deficits exceeded the firm's capital. In this case, non-defaulting customer margin and clearinghouse funds were applied to the deficit and made up the shortfall. As a result, the opposite side of the market was made whole immediately, and no variation margin payments were omitted. However, the non-defaulting customers lost the use of their funds until they were finally made whole in the course of the subsequent receivership proceedings in 1986. Unlike the CME, the Comex had no Trust Fund at the time of the default.

(b) **Customer Protection**

In contrast to the securities industry, the futures industry does not provide customer account insurance, relying instead on rules and procedures that require strict segregation of customer funds at the clearing member level, and guarantees such as those described above at the clearinghouse level. In addition, the mark-to-market daily settlement system appears to reduce customer jeopardy because it makes the system debt free. Historically, FCM insolvencies have not occurred frequently and few customer funds have been lost in events that a Security Investors Protection Corporation ("SIPC") like insurer might have funded. Nonetheless, the absence of any account insurance continues to draw attention and study.

The CFTC first considered the issue of whether to compel account insurance in 1976 and again in 1985 in the wake of the Volume Investors default (See Note 15, supra). In its 1985 report, the CFTC's Division of Trading and Markets observed that the rapid institutionalization and increased volatility of the futures markets increased the potential for a default with far-reaching consequences. But in November 1986, the NFA's Customer Account Protection Study concluded that there were "currently substantial and wide ranging customer account protections in place," and, consequently, the NFA recommended maintenance of the *status quo*.

**2. Stock Index Options**

(a) **Default on Obligations to Clearinghouse**

The OCC's obligation to the opposite side of each trade runs only to the clearing member and not to public customers. The OCC's obligation is subject to the clearing member having deposited all required margin and premiums for all its option positions with OCC.

The OCC's obligation is backed by: (i) clearing member margin accounts with the OCC, (ii) the clearing member's clearing fund with the OCC, (iii) the balance of OCC's clearing funds, and (iv) OCC's net worth.

(i) *Clearing Member Accounts*

Each clearing member maintains up to three accounts with the OCC—customer, firm and market maker. The OCC has a lien on and may apply all the assets in: (i) the firm account of a clearing member to cover defaults in any of the three accounts, (ii) the customer account (except for segregated long option positions which comprise the bulk of long option positions in customer accounts) to cover defaults in that account by another customer, and (iii) the market maker account to cover defaults in that market maker account.

*(ii) OCC Clearing Funds*

The OCC maintains two clearing funds, one for stock options which currently totals \$111 million, and one for options on stock indices, debt securities and foreign currency, which currently totals \$114 million. Upon the default of a clearing member in any of its accounts, the OCC may apply the combined contributions of such clearing member to both funds. To cover any further deficiency not paid by such clearing member within 24 hours, the OCC may apply pro rata the deposits of other clearing members to the applicable clearing fund. Once one clearing fund is depleted, the OCC may apply the assets of the other fund. In the event of a pro rata charge to either clearing fund, each clearing member is obligated to make good the deficiency in its own contribution to that fund up to 100 percent

of its contribution. Thereafter, the OCC's rules permit a clearing member to withdraw from the OCC to prevent further assessments.

If the above sources were insufficient, OCC would then apply its own net worth which is currently only \$5 million.

**(b) Customer Protection**

The OCC's clearinghouse obligation does not protect a customer against a default or wrongdoing by his own clearing member or by another customer of his clearing member. The customer may only rely on the financial strength of his clearing firm, which is regulated to some extent by the net capital requirements. In addition, and in contrast to futures, option customers are also protected by SIPC insurance, which is described at Part II E 3, above.



## IV. Market Activity and Performance During the October Market Break

### A. Introduction

There are a number of ways to measure the performance of the marketplaces and market makers for stocks, futures and options. One important measure is how the performance of those markets was perceived by various market participants and other interested parties. The table below from the *Survey Evidence on the Market Collapse*<sup>16</sup> shows how the markets were perceived by a group which included institutional investors, investment and commercial bankers, corporate executives and others.

#### RESPONDENTS' RATING OF MARKET PERFORMANCE OCTOBER 19 TO 20 AGAINST NORMAL QUALITY PERFORMANCE

[Percent of respondents]

|   | Excellent<br>(90% of<br>normal<br>quality) | Good<br>(75% to<br>90%) | Poor<br>(50% to<br>75%) | Very<br>poor<br>(less<br>than<br>50% of<br>normal<br>quality) |
|---|--|-------------------------|-------------------------|---|
| <b>Dissemination of price<br/>and market information:</b> |  |                         |                         |   |
| NYSE .....  | 4.5  | 31.8                    | 30.7                    | 33.0  |
| OTC .....   | 0.0  | 9.8                     | 14.4                    | 75.8  |
| Index futures .....                                       | 5.6  | 34.6                    | 29.0                    | 30.8  |
| Option markets .....                                      | 1.2  | 21.2                    | 35.3                    | 42.3  |
| <b>Executing and clearing<br/>trades:</b>                 |  |                         |                         |   |
| NYSE .....  | 4.7  | 29.2                    | 39.2                    | 26.9  |
| OTC .....   | 3.8  | 10.5                    | 21.0                    | 64.7  |
| Index futures .....                                       | 7.6  | 27.2                    | 31.5                    | 33.7  |
| Option markets .....                                      | 1.6  | 23.4                    | 37.5                    | 37.5  |

Given the unprecedented price movement and volume during the October break, it is easier to make observations than to draw conclusions about whether that performance was adequate under the extraordinary circumstances. Further, it is not always possible to assess fully relative performance

during the break because certain indicia of market performance are not directly comparable.

Market performance issues examined by the Task Force include:

- *Availability and Overall Volume of Market.* Was the market as a whole open or closed? Were individual trading vehicles open or closed? Were any markets that were formally open *de facto* closed? Was information from the floor adequate? How did peak volume compare to average daily volume?

- *Liquidity and Depth of Market.* How did the market makers perform? How did bid-ask spreads compare to the norm in each market? How did market depth compare to the norm in term of relative volume, relative dollar volume and relative large trade volume? What percentage of dollar volume was purchased by each floor? How much of each floor's capital was committed/lost?

- *Orderliness of Market.* Did executions occur at reasonable logical price sequences? Were there instances of notorious gaps or sudden jumps in prices? Was trading conducted in an equitable manner, i.e. were orders entered under equal conditions executed on similar terms? Was volume reasonably consistent throughout the day? Did all orders get executed? Did all orders get reported within a reasonable time?

- *Settlement and Clearing.* How did the settlement and clearing process handle the heavy volume? Did the futures and options clearing-houses and their banks pay and collect variation margin in a timely and orderly manner?

### B. New York Stock Exchange

Any examination of NYSE performance during the October market break must be undertaken bearing in mind the extraordinary activity during that period. For example, over the last 25 years the high day volume has generally been 80 percent more active than the annual average. The then record volume of 339 million shares on October 16 was

<sup>16</sup> See Study V.

approximately 88 percent higher than the 1987 average daily volume of 180 million shares. The volume on both October 19 and 20 was 235 percent greater than the average daily volume. The last time that high day volume exceeded the average by a similar extent was in May, 1962 following a sell-off that dropped the DJIA by 5.7 percent. From a processing standpoint the number of DOT and ITS orders received at peak times is also relevant. On October 19 and 20, 470,100 and 585,000 system orders were received, compared to a daily average

for January to September, 1987 of 143,700 system orders per day. Prior to October 19, the record number of system orders received in a day was 270,000.

## 1. NYSE Activity

Table B-1 sets forth certain data relating to activity on the NYSE for 1986 (average), for the high day prior to October 15, 1987, and for each trading day from October 15 to 21, 1987.

TABLE B-1.—NYSE ACTIVITY

|  | 1986               | Previous high | October 15 | October 16 | October 19 | October 20 | October 21 |
|--|--------------------|---------------|------------|------------|------------|------------|------------|
| <b>Dow Jones Industrial Average:</b>                   |                    |               |            |            |            |            |            |
| High.....  | <sup>1</sup> 1,956 | 2,747         | 2,440      | 2,396      | 2,164      | 2,067      | 2,081      |
| Low.....   | 1,502              | 2,695         | 2,346      | 2,208      | 1,678      | 1,616      | 1,952      |
| Close.....   | 1,896              | 2,722         | 2,355      | 2,247      | 1,739      | 1,841      | 2,028      |
| <b>NYSE index:</b>                                     |                    |               |            |            |            |            |            |
| High.....  | <sup>1</sup> 139   | 188           | 171        | 167        | 154        | 138        | 145        |
| Low.....   | 118                | 186           | 167        | 159        | 129        | 122        | 140        |
| Close.....   | 146                | 188           | 167        | 159        | 129        | 133        | 145        |
| <b>Volume:</b>   |                    |               |            |            |            |            |            |
| Shares (millions).....                                 | 141.0              | 303.0         | 263.2      | 338.6      | 604.3      | 608.1      | 449.4      |
| Dollars (billions).....                                | N/A                | 14.0          | 11.4       | 14.5       | 21.0       | 18.5       | 15.0       |
| NYSE percent of consolidated volume <sup>2</sup> ..... | 84                 | N/A           | 88.8       | 88.9       | 92.3       | 92.2       | 90.3       |
| <b>Opening volume (1st ½ hr):</b>                      |                    |               |            |            |            |            |            |
| Shares (in millions).....                              | N/A                | 39.2          | N/A        | 16.4       | 58.7       | 65.6       | 47.0       |
| Percent total volume.....                              | N/A                | 17.7          | N/A        | 4.8        | 9.7        | 10.8       | 10.5       |
| <b>Trades:</b>   |                    |               |            |            |            |            |            |
| Reported trades <sup>3</sup> (thousands).....          | 75.0               | 151.0         | 109.6      | 144.1      | 201.3      | 204.9      | 189.6      |
| Average size.....                                      | 1,880              | 2,007         | 2,401      | 2,350      | 3,002      | 2,968      | 2,370      |
| <b>Block trades: <sup>4</sup></b>                      |                    |               |            |            |            |            |            |
| Trades.....  | 2,631              | 5,628         | 5,079      | 6,782      | 11,700     | 12,653     | 9,111      |
| Volume (millions of shares).....                       | N/A                | 143.1         | 134.2      | 162.1      | 306.3      | 343.1      | 236.4      |
| Percent total volume.....                              | 49.9               | 64.8          | 51.0       | 47.9       | 50.7       | 56.4       | 52.6       |
| <b>Member trading (millions of shares):</b>            |                    |               |            |            |            |            |            |
| <b>Specialists:</b>                                    |                    |               |            |            |            |            |            |
| Purchases.....   | N/A                | N/A           | 34.3       | 46.9       | 114.4      | 106.5      | 66.3       |
| Sales.....   | N/A                | N/A           | 31.5       | 43.0       | 93.2       | 115.6      | 84.5       |
| Short sales <sup>5</sup> .....                         | N/A                | N/A           | 5.5        | 6.2        | 9.3        | 22.3       | 27.5       |
| <b>Other members:</b>                                  |                    |               |            |            |            |            |            |
| Purchases.....   | N/A                | N/A           | 42.7       | 49.5       | 73.6       | 56.2       | 35.8       |
| Sales.....   | N/A                | N/A           | 37.6       | 44.8       | 78.1       | 65.8       | 53.5       |
| Short sales.....                                       | N/A                | N/A           | 6.2        | 7.0        | 9.9        | 5.2        | 7.2        |

<sup>1</sup> High day close, low day close and end of year.

<sup>2</sup> NYSE percentage of transactions in NYSE-listed stocks printed on the consolidated tape.

<sup>3</sup> Trades reported to the consolidated tape by the NYSE, which may involve the execution of two or more separate orders or transactions, particularly at the opening of the market and in the "bunching" together of small orders through DOT.

<sup>4</sup> Trades of 10,000 shares or more.

<sup>5</sup> Short sales are included in sales.

## 2. NYSE Performance

### (a) Opening Delays and Trading Halts

One test of an exchange's performance is its ability to open trading in each stock and keep each stock open for trading. Prior to the opening, the specialist in each stock displays an indication of the opening price, which is intended to clear accumulated buy and sell market orders. Opening delays arise when there is an imbalance of buy and sell orders that

have accumulated prior to the opening. The specialist is required by NYSE rules to obtain approval of a floor official (usually another specialist or a broker) before delaying an opening. Similarly, when there is an imbalance of orders during the trading day the specialist can either intervene for his own account to resolve the imbalance or if he believes resolution of the imbalance is beyond his obligation, he can request permission from a floor official (again, usually another specialist or a broker) to halt trading.



During a trading halt the specialist displays price indications from time to time to try to attract new buy or sell orders. Once the imbalance is either resolved or reduced to a level at which the specialist is able and willing to commit funds on the other side, the stock opens at a reopening price set by the specialist at which all accumulated market orders are executed. NYSE rules require a delayed opening or trading halt to be reported on the tape.

On October 19, there were 187 opening delays, seven trading halts and three stocks that did not resume trading after halts. On October 20, there were 92 opening delays, 175 trading halts and 10 stocks that did not resume trading. Table B-2 shows the number of stocks that had not opened by the beginning of the period indicated on October 19 and 20, and the number of stocks subject to trading halts at any time during these periods.

TABLE B-2.—NYSE DELAYED OPENINGS AND TRADING HALTS

|                     | Delayed openings |         | Trading halts |         |
|---------------------|------------------|---------|---------------|---------|
|                     | Oct. 19          | Oct. 20 | Oct. 19       | Oct. 20 |
| 9:30 to 10:00.....  | 187              | 90      | 0             | 4       |
| 10:00 to 11:00..... | 175              | 79      | 2             | 8       |
| 11:00 to 12:00..... | 84               | 20      | 3             | 83      |
| 12:00 to 13:00..... | 25               | 14      | 3             | 161     |
| 13:00 to 14:00..... | 10               | 10      | 1             | 137     |
| 14:00 to 15:00..... | 5                | 6       | 1             | 64      |
| 15:00 to 16:00..... | 0                | 4       | 3             | 38      |

The average opening delay on October 19 and October 20 was one hour and 35 minutes and one hour and 25 minutes, respectively. The average duration of trading halts on October 19 and October 20 was one hour and 19 minutes and one hour and 43 minutes, respectively.

In light of the extraordinary volume in the 2,257 NYSE-listed stocks on October 19 and 20, the number and duration of opening delays and trading halts were surprisingly limited.

#### (b) NYSE Tests of Market Performance

The NYSE measures market performance by three tests: price continuity, market depth and quotation spread.

Price continuity is the size of the price variation, if any, from one trade to the next in the same stock. In 1986, 90.2 percent of all NYSE transactions occurred with no change or the minimum variation of  $\frac{1}{8}$  point.

Market depth refers to the amount of buying or selling pressure a stock will withstand before its price changes significantly. The NYSE measures

depth as the price change in a stock per 1,000 shares traded. After each transaction of up to 2,000 shares in a stock, the NYSE computer counts back 1,000 shares, checks the price of the preceding transaction and then calculates the net change in price over the 1,000 share sequence. The average stock showed no price change or  $\frac{1}{8}$  point change in 1,000 shares of volume for transactions of up to 2,000 shares 89.2 percent of the time in 1986.

The quotation spread is the difference between the price at which a stock is bid and the price at which it is offered. Each quotation indicates the best price bid and offered at a particular moment in the trading crowd and by the specialist either for orders left with him or for his own account. A trade may take place within the spread if the parties so agree. The quotation spread was  $\frac{1}{4}$  point or less in 69.8 percent of NYSE quotations in 1986.

Table B-3 sets forth price continuity, market depth and quotation spread for all NYSE common stocks for September 1987, October 19 and 20 and November 1987, by percentage of trades or quotations and cumulative percentage.

TABLE B-3.—NYSE PRICE CONTINUITY, MARKET DEPTH AND QUOTATION SPREAD

| Variation         | September |                    | October 19 |                    | October 20 |                    | November |                    |
|-------------------|-----------|--------------------|------------|--------------------|------------|--------------------|----------|--------------------|
|                   | Percent   | Cumulative percent | Percent    | Cumulative percent | Percent    | Cumulative percent | Percent  | Cumulative percent |
| Price continuity  |           |                    |            |                    |            |                    |          |                    |
| 0 .....           | 57.9      | 57.9               | 50.6       | 50.6               | 46.4       | 46.4               | 54.6     | 54.6               |
| 1/8 .....         | 32.8      | 90.8               | 22.6       | 73.2               | 20.5       | 66.9               | 31.8     | 86.4               |
| 1/4 .....         | 8.6       | 99.3               | 22.0       | 95.2               | 26.3       | 93.2               | 11.9     | 98.3               |
| 3/8 .....         | 0.2       | 99.6               | 1.3        | 96.5               | 1.5        | 94.7               | 0.6      | 98.9               |
| 1/2 .....         | 0.2       | 99.8               | 2.2        | 98.7               | 3.7        | 98.4               | 0.6      | 99.5               |
| 5/8 .....         | 0.0       | 99.8               | 0.1        | 98.8               | 0.1        | 98.6               | 0.1      | 99.5               |
| 3/4 .....         | 0.0       | 99.9               | 0.3        | 99.1               | 0.4        | 99.0               | 0.1      | 99.5               |
| 7/8 .....         | 0.0       | 99.9               | 0.1        | 99.1               | 0.1        | 99.0               | 0.0      | 99.5               |
| 1 .....           | 0.0       | 99.9               | 0.4        | 99.5               | 0.6        | 99.6               | 0.2      | 99.7               |
| More than 1 ..... | 0.1       | 100.0              | 0.5        | 100.0              | 0.4        | 100.0              | 0.2      | 100.0              |
| Market depth      |           |                    |            |                    |            |                    |          |                    |
| 0 .....           | 52.9      | 52.9               | 47.2       | 47.2               | 42.4       | 42.4               | 49.2     | 49.2               |
| 1/8 .....         | 35.2      | 88.2               | 23.5       | 70.6               | 21.3       | 63.7               | 34.0     | 83.2               |
| 1/4 .....         | 9.6       | 98.9               | 22.2       | 92.6               | 26.5       | 90.2               | 12.9     | 96.1               |
| 3/8 .....         | 1.1       | 98.9               | 2.2        | 95.0               | 2.5        | 92.7               | 1.6      | 97.7               |
| 1/2 .....         | 0.7       | 99.6               | 3.2        | 98.2               | 5.0        | 97.8               | 1.3      | 99.0               |
| 5/8 .....         | 0.1       | 99.6               | 0.2        | 98.5               | 0.3        | 98.1               | 0.1      | 99.1               |
| 3/4 .....         | 0.1       | 99.8               | 0.5        | 98.9               | 0.7        | 98.8               | 0.2      | 99.3               |
| 7/8 .....         | 0.0       | 99.8               | 0.1        | 99.0               | 0.1        | 98.9               | 0.0      | 99.3               |
| 1 .....           | 0.1       | 99.9               | 0.5        | 99.6               | 0.6        | 99.5               | 0.2      | 99.5               |
| More than 1 ..... | 0.1       | 100.0              | 0.4        | 100.0              | 0.5        | 100.0              | 0.4      | 100.0              |
| Quotation spread  |           |                    |            |                    |            |                    |          |                    |
| 1/8 .....         | 28.1      | 28.1               | 8.0        | 8.0                | 5.2        | 5.2                | 22.1     | 22.1               |
| 1/4 .....         | 43.6      | 71.7               | 28.3       | 36.3               | 23.6       | 28.8               | 39.3     | 61.4               |
| 3/8 .....         | 20.5      | 92.2               | 24.8       | 61.2               | 21.8       | 50.6               | 22.5     | 83.9               |
| 1/2 .....         | 6.6       | 98.8               | 28.4       | 89.6               | 34.5       | 85.2               | 11.5     | 95.4               |
| 5/8 .....         | 0.3       | 99.1               | 2.4        | 92.0               | 2.0        | 87.2               | 0.6      | 96.0               |
| 3/4 .....         | 0.5       | 99.6               | 3.4        | 95.4               | 4.9        | 92.1               | 1.0      | 97.0               |
| 7/8 .....         | 0.0       | 99.6               | 0.4        | 95.8               | 0.4        | 92.4               | 0.1      | 97.1               |
| 1 .....           | 0.3       | 99.8               | 2.5        | 98.2               | 5.0        | 97.4               | 1.0      | 98.1               |
| More than 1 ..... | 0.2       | 100.0              | 1.8        | 100.0              | 2.6        | 100.0              | 1.8      | 100.0              |

Tables B-4, 5 and 6 set forth the price continuity, market depth and quotation spread by percentage of trades or quotations for the 50 large capitalization NYSE stocks listed on Table B-10 by time period for October 19 and 20 (equivalent data for

all NYSE stocks was not available to the Task Force). Volume for all NYSE stocks in millions of shares during each time period and the change in the DJIA during the period are also included.

TABLE B-4.—PRICE CONTINUITY BY TIME PERIOD FOR 50 LARGE CAPITALIZATION STOCKS

[In percent; except volume]

|   | 9:30 to<br>10:00 | 10:00 to<br>11:00 | 11:00 to<br>12:00 | 12:00 to<br>13:00 | 13:00 to<br>14:00 | 14:00 to<br>15:00 | 15:00 to<br>16:00 | Day total |
|---|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------|
| October 19, 1987                                      |                  |                   |                   |                   |                   |                   |                   |           |
| Volume (in millions).....                             | 51               | 103               | 108               | 81                | 78                | 78                | 101               | 604       |
| Dow Jones Industrial Average<br>(percent change)..... | (3)              | (6)               | 3                 | (2)               | (5)               | (1)               | (11)              | (23)      |
| 0.....  | 59.1             | 58.0              | 54.9              | 57.6              | 55.2              | 55.7              | 58.7              | 56.7      |
| 1/8.....  | 24.3             | 18.0              | 13.9              | 18.7              | 18.1              | 17.2              | 16.7              | 17.2      |
| 1/4.....  | 11.6             | 20.0              | 26.0              | 19.2              | 21.5              | 21.4              | 17.1              | 20.7      |
| 3/8.....  | 0.8              | 1.1               | 1.4               | 2.3               | 1.8               | 1.6               | 1.3               | 1.6       |
| 1/2.....  | 0.3              | 1.9               | 2.9               | 1.6               | 2.8               | 3.3               | 4.5               | 2.9       |
| 5/8.....  | 0.1              | 0.1               | 0.1               | 0.0               | 0.0               | 0.1               | 0.1               | 0.1       |
| 3/4.....  | 0.3              | 0.3               | 0.2               | 0.1               | 0.2               | 0.2               | 0.6               | 0.3       |
| 7/8.....  | 0.0              | 0.0               | 0.0               | 0.0               | 0.0               | 0.0               | 0.1               | 0.0       |
| 1.....  | 0.0              | 0.2               | 0.3               | 0.2               | 0.2               | 0.2               | 0.7               | 0.3       |
| More than 1.....                                      | 3.4              | 0.5               | 0.1               | 0.1               | 0.0               | 0.2               | 0.4               | 0.3       |
| Total.....  | 100              | 100               | 100               | 100               | 100               | 100               | 100               | 100       |
| October 20, 1987                                      |                  |                   |                   |                   |                   |                   |                   |           |
| Volume (in millions).....                             | 62               | 137               | 114               | 85                | 70                | 64                | 77                | 608       |
| Dow Jones Industrial Average<br>(percent change)..... | 7                | 1                 | (6)               | 4                 | (4)               | 7                 | (2)               | 6         |
| 0.....  | 52.7             | 58.1              | 58.0              | 54.2              | 53.6              | 56.2              | 53.5              | 55.4      |
| 1/8.....  | 13.4             | 14.2              | 16.6              | 12.0              | 13.0              | 12.2              | 14.8              | 13.8      |
| 1/4.....  | 22.3             | 20.4              | 17.5              | 23.1              | 23.4              | 22.0              | 21.6              | 21.4      |
| 3/8.....  | 1.1              | 1.4               | 1.5               | 1.2               | 1.6               | 1.4               | 2.2               | 1.6       |
| 1/2.....  | 6.1              | 4.6               | 5.0               | 7.9               | 6.9               | 7.1               | 6.8               | 6.4       |
| 5/8.....  | 0.1              | 0.1               | 0.2               | 0.1               | 0.1               | 0.1               | 0.1               | 0.1       |
| 3/4.....  | 0.6              | 0.4               | 0.3               | 0.5               | 0.5               | 0.5               | 0.4               | 0.5       |
| 7/8.....  | 0.1              | 0.0               | 0.1               | 0.0               | 0.0               | 0.0               | 0.1               | 0.0       |
| 1.....  | 1.4              | 0.5               | 0.6               | 0.6               | 0.5               | 0.5               | 0.4               | 0.5       |
| More than 1.....                                      | 2.3              | 0.5               | 0.2               | 0.3               | 0.3               | 0.1               | 0.1               | 0.3       |
| Total.....  | 100              | 100               | 100               | 100               | 100               | 100               | 100               | 100       |

TABLE B-5.—MARKET DEPTH BY TIME PERIOD FOR 50 LARGE CAPITALIZATION STOCKS

[In percent; except volume]

|   | 9:30 to<br>10:00 | 10:00 to<br>11:00 | 11:00 to<br>12:00 | 12:00 to<br>13:00 | 13:00 to<br>14:00 | 14:00 to<br>15:00 | 15:00 to<br>16:00 | Day total |
|---|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------|
| October 19, 1987                                      |                  |                   |                   |                   |                   |                   |                   |           |
| Volume (in millions).....                             | 51               | 103               | 108               | 81                | 78                | 78                | 101               | 604       |
| Dow Jones Industrial Average<br>(percent change)..... | (3)              | (6)               | 3                 | (2)               | (5)               | (1)               | (11)              | (23)      |
| 0.....  | 62.9             | 61.0              | 55.6              | 58.3              | 55.0              | 53.9              | 57.8              | 56.9      |
| 1/8.....  | 27.6             | 19.5              | 13.9              | 19.6              | 18.9              | 18.4              | 18.3              | 18.2      |
| 1/4.....  | 9.5              | 16.9              | 25.8              | 18.4              | 21.2              | 22.4              | 17.0              | 20.1      |
| 3/8.....  | 0.0              | 1.5               | 1.9               | 2.0               | 1.7               | 1.6               | 1.5               | 1.7       |
| 1/2.....  | 0.0              | 0.9               | 2.0               | 1.3               | 2.5               | 3.1               | 4.0               | 2.4       |
| 5/8.....  | 0.0              | 0.0               | 0.2               | 0.0               | 0.0               | 0.0               | 0.1               | 0.1       |
| 3/4.....  | 0.0              | 0.1               | 0.4               | 0.1               | 0.4               | 0.3               | 0.5               | 0.3       |
| 7/8.....  | 0.0              | 0.0               | 0.0               | 0.0               | 0.0               | 0.1               | 0.1               | 0.0       |
| 1.....  | 0.0              | 0.0               | 0.3               | 0.2               | 0.2               | 0.2               | 0.6               | 0.3       |
| More than 1.....                                      | 0.0              | 0.1               | 0.0               | 0.1               | 0.0               | 0.1               | 0.2               | 0.1       |
| Total.....  | 100              | 100               | 100               | 100               | 100               | 100               | 100               | 100       |
| October 20, 1987                                      |                  |                   |                   |                   |                   |                   |                   |           |
| Volume (in millions).....                             | 62               | 137               | 114               | 85                | 70                | 64                | 77                | 608       |
| Dow Jones Industrial Average<br>(percent change)..... | 7                | 1                 | (6)               | 4                 | (4)               | 7                 | (2)               | 6         |
| 0.....  | 53.2             | 60.4              | 57.0              | 53.1              | 51.6              | 53.3              | 51.9              | 54.1      |
| 1/8.....  | 16.3             | 14.9              | 17.6              | 11.9              | 14.0              | 12.2              | 16.0              | 14.5      |
| 1/4.....  | 22.3             | 19.4              | 18.7              | 23.8              | 23.5              | 23.4              | 21.0              | 21.8      |
| 3/8.....  | 1.0              | 1.5               | 2.1               | 1.7               | 2.5               | 2.1               | 2.4               | 2.1       |
| 1/2.....  | 5.3              | 3.5               | 3.8               | 8.2               | 6.9               | 7.9               | 7.4               | 6.5       |
| 5/8.....  | 0.0              | 0.0               | 0.1               | 0.2               | 0.1               | 0.1               | 0.1               | 0.1       |
| 3/4.....  | 0.7              | 0.1               | 0.1               | 0.7               | 0.5               | 0.7               | 0.5               | 0.5       |
| 7/8.....  | 0.0              | 0.0               | 0.1               | 0.0               | 0.1               | 0.0               | 0.0               | 0.0       |
| 1.....  | 0.7              | 0.1               | 0.3               | 0.2               | 0.7               | 0.2               | 0.5               | 0.4       |
| More than 1.....                                      | 0.5              | 0.0               | 0.2               | 0.1               | 0.1               | 0.1               | 0.1               | 0.1       |
| Total.....  | 100              | 100               | 100               | 100               | 100               | 100               | 100               | 100       |

TABLE B-6.—QUOTATION SPREADS BY TIME PERIOD FOR 50 LARGE CAPITALIZATION STOCKS

[In percent; except volume]

|   | 9:30 to<br>10:00 | 10:00 to<br>11:00 | 11:00 to<br>12:00 | 12:00 to<br>13:00 | 13:00 to<br>14:00 | 14:00 to<br>15:00 | 15:00 to<br>16:00 | Day total |
|---|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------|
| October 19, 1987                                      |                  |                   |                   |                   |                   |                   |                   |           |
| Volume (in millions).....                             | 51               | 103               | 108               | 81                | 78                | 78                | 101               | 604       |
| Dow Jones Industrial Average<br>(percent change)..... | (3)              | (6)               | 3                 | (2)               | (5)               | (1)               | (11)              | (23)      |
| 1/8.....  | 9.8              | 7.8               | 3.4               | 6.1               | 7.9               | 5.7               | 7.0               | 6.4       |
| 1/4.....  | 41.5             | 27.6              | 25.3              | 26.9              | 27.2              | 22.6              | 21.5              | 25.6      |
| 3/8.....  | 25.0             | 21.3              | 13.6              | 20.6              | 18.6              | 20.1              | 17.0              | 18.6      |
| 1/2.....  | 15.0             | 34.2              | 46.2              | 36.3              | 32.9              | 36.8              | 31.8              | 35.7      |
| 5/8.....  | 1.4              | 1.9               | 1.8               | 1.9               | 2.2               | 1.8               | 2.7               | 2.1       |
| 3/4.....  | 1.4              | 2.8               | 5.6               | 5.1               | 6.9               | 5.1               | 5.1               | 5.1       |
| 7/8.....  | 0.4              | 0.3               | 0.3               | 0.4               | 0.2               | 0.4               | 0.6               | 0.4       |
| 1.....  | 1.2              | 1.9               | 2.9               | 1.7               | 2.7               | 6.0               | 7.8               | 3.8       |
| More than 1.....                                      | 4.3              | 2.2               | 1.1               | 1.0               | 1.3               | 1.5               | 6.4               | 2.4       |
| Total.....  | 100              | 100               | 100               | 100               | 100               | 100               | 100               | 100       |
| October 20, 1987                                      |                  |                   |                   |                   |                   |                   |                   |           |
| Volume (in millions).....                             | 62               | 137               | 114               | 85                | 70                | 64                | 77                | 608       |
| Dow Jones Industrial Average<br>(percent change)..... | 7                | 1                 | (6)               | 4                 | (4)               | 7                 | (2)               | 6         |
| 1/8.....  | 3.9              | 3.7               | 7.5               | 3.2               | 2.8               | 2.9               | 3.8               | 3.9       |
| 1/4.....  | 26.3             | 25.2              | 22.2              | 18.0              | 17.5              | 19.5              | 18.1              | 20.3      |
| 3/8.....  | 9.2              | 15.2              | 16.0              | 13.9              | 11.8              | 10.9              | 13.8              | 13.4      |
| 1/2.....  | 36.6             | 36.6              | 30.6              | 37.5              | 41.9              | 40.0              | 38.1              | 37.6      |
| 5/8.....  | 0.5              | 2.0               | 2.8               | 1.5               | 1.2               | 0.7               | 1.2               | 1.5       |
| 3/4.....  | 6.4              | 6.1               | 5.3               | 6.8               | 6.3               | 8.6               | 7.8               | 6.9       |
| 7/8.....  | 0.5              | 0.2               | 0.6               | 0.3               | 0.3               | 0.2               | 0.2               | 0.3       |
| 1.....  | 9.8              | 8.1               | 10.6              | 14.7              | 14.1              | 13.9              | 13.5              | 12.4      |
| More than 1.....                                      | 6.7              | 2.8               | 4.5               | 4.0               | 4.1               | 3.4               | 3.4               | 3.8       |
| Total.....  | 100              | 100               | 100               | 100               | 100               | 100               | 100               | 100       |

Table B-3 shows a reduction for October 19 and, more markedly, for October 20 in the percentage of trades that took place with a price variation of 0 or 1/8. However, on a cumulative basis, much of the reduction is made up when trades taking place at a price variation of 1/4 are included. Table B-4 shows, for October 19, some deterioration from the active down period at the beginning of the day to the similar period at the end of the day. This pattern continued on October 20, when the opening period had significantly less price continuity than the previous closing period and was the low period for price continuity on that day. Both Tables B-3 and B-4 show less price continuity on October 20 than the previous day, which is consistent with the cumulative pressure the market had absorbed.

The price continuity test does not take volume into account. Accordingly, a trade of 100 shares is given the same weight as a large block. In addition, opening trades and trades upon reopening after a trading halt are "bunched" together and counted as one trade. So, while Table B-4 shows for October 20, 1987 only 0.3 percent of trades in which the price change was greater than \$1, 86 percent of the 50 openings were at a difference of more than \$1 from the previous close (average difference of \$4.47) and opening volume was 19.9 million shares (13.8 percent of the day's total in those stocks). After the 15 trading halts in the 50 stocks, 10 reopened at a price more than \$1 different than the previous price (average \$3.29) and reopenings accounted for 4 million shares or 10.2 percent of the day's volume in those stocks.



Whatever the merits of the price continuity test may be in normal times, its usefulness in measuring performance during periods like October 19 and 20 is surely negligible. Some deterioration from normal standards is to be expected under the conditions of those days. Whether there was an unreasonable deterioration in price continuity is open to debate, but

an examination of price fluctuation over the period is more important to an evaluation of market performance under the circumstances. Table B-7 presents, for a sample of large capitalization NYSE stocks, examples of extreme fluctuations in prices of the kinds that characterized the market break in October.

TABLE B-7.—A SAMPLE OF NYSE PRICE CHANGES  
OCTOBER 19 AND 20

[Percentage price change]

| Stock no. | Close October 16<br>to open October 19 | Open October 19,<br>to 11:30 am | 3 pm to 4 pm,<br>October 19 | Close October 19<br>to open October<br>20 | Open October 20<br>to 11:30 am |
|-----------|--|---------------------------------|-----------------------------|---|--------------------------------|
| 1         | (7.63)                                 | 1.30                            | (15.69)                     | 6.67                                      | (11.98)                        |
| 2         | (4.04)                                 | 1.05                            | (4.87)                      | 0.61                                      | (7.23)                         |
| 3         | (10.49)                                | 8.63                            | (13.57)                     | 31.15                                     | (15.00)                        |
| 4         | (7.07)                                 | (0.29)                          | (8.77)                      | 12.68                                     | (16.09)                        |
| 5         | (9.09)                                 | 4.17                            | (8.70)                      | (6.83)                                    | N/A                            |
| 6         | (16.71)                                | 12.50                           | (20.81)                     | (17.30)                                   | N/A                            |
| 7         | (8.05)                                 | 0.63                            | N/A                         | 19.40                                     | (6.56)                         |
| 8         | (19.04)                                | 16.07                           | (6.49)                      | 11.05                                     | (9.41)                         |
| 9         | (3.86)                                 | 3.24                            | (14.23)                     | 8.33                                      | (16.34)                        |
| 10        | (8.15)                                 | 4.13                            | (11.64)                     | 16.22                                     | N/A                            |
| 11        | (10.38)                                | 4.27                            | (9.06)                      | 10.70                                     | (23.67)                        |
| 12        | (5.06)                                 | 0.67                            | (6.69)                      | 15.50                                     | (13.42)                        |
| 13        | (10.99)                                | 7.10                            | (6.79)                      | 1.88                                      | N/A                            |
| 14        | (9.54)                                 | 1.17                            | (11.86)                     | 19.23                                     | (27.42)                        |
| 15        | (12.30)                                | 9.17                            | (4.19)                      | 7.80                                      | (18.42)                        |
| 16        | (4.39)                                 | 1.83                            | (14.00)                     | 13.18                                     | (7.19)                         |
| 17        | (3.53)                                 | (0.46)                          | 16.72                       | 27.09                                     | (15.38)                        |
| 18        | (10.36)                                | 4.08                            | (8.15)                      | 22.58                                     | N/A                            |
| 19        | (5.81)                                 | 0.44                            | (7.25)                      | 20.64                                     | (8.77)                         |
| 20        | (5.15)                                 | 0.00                            | (19.81)                     | 24.42                                     | (13.55)                        |
| 21        | (9.27)                                 | (3.52)                          | (13.18)                     | 19.44                                     | (1.52)                         |
| 22        | (8.93)                                 | 2.94                            | (13.45)                     | 0.00                                      | (7.42)                         |
| 23        | (4.55)                                 | (4.76)                          | (20.75)                     | 15.33                                     | (14.29)                        |
| 24        | (10.92)                                | (0.47)                          | (12.04)                     | 8.24                                      | (14.67)                        |
| 25        | (6.98)                                 | (1.25)                          | (4.64)                      | (6.99)                                    | (11.30)                        |
| 26        | (4.08)                                 | (8.50)                          | (10.00)                     | (7.79)                                    | 2.89                           |
| 27        | (7.16)                                 | 6.79                            | (10.63)                     | 22.32                                     | (16.85)                        |
| 28        | (6.76)                                 | (3.94)                          | (11.11)                     | 2.56                                      | (7.86)                         |
| 29        | (12.33)                                | 10.16                           | (3.88)                      | 1.54                                      | (14.39)                        |
| 30        | (4.13)                                 | (1.41)                          | (4.26)                      | (10.00)                                   | N/A                            |
| 31        | (4.37)                                 | (3.76)                          | (8.50)                      | (1.83)                                    | (11.80)                        |
| 32        | (15.70)                                | 9.80                            | (20.04)                     | 16.77                                     | N/A                            |
| 33        | (2.96)                                 | (1.51)                          | (5.23)                      | (1.38)                                    | (1.75)                         |

"N/A" means the stock was not open at the relevant time.

As noted above, the market depth test only relates to trades of up to 2,000 shares and thus is neither relevant to block trades (10,000 shares or more), which accounted for approximately 50.7 percent of NYSE volume on October 19 and 56.4 percent on October 20, nor to other trades of more than 2,000 shares.

The market depth statistics for October 19 in Table B-5 show a fairly sharp decline from the opening to 11:00 a.m. followed by a slight improvement for the rest of the day. Market depth on October 20 was on average slightly worse than October 19, with not much variation during the day.

The quotation spread test gives a limited picture of quotations in effect over the day as a quotation in effect for a short period of time is given the same weight as one in effect for a long period. Nevertheless, Table B-3 shows a significant widening of quotation spreads on October 19 and, more so, on October 20. Compared to 28.1 percent for September 1987, the percentage of quotations with a spread of  $\frac{1}{8}$  declined to 8 percent for October 19 and 5.2 percent for October 20. Similarly, quotations with spreads of  $\frac{1}{2}$  totaled to only 6.6 percent for September (92.2 percent being at a narrower spread), but increased to 28.4 percent for October 19 (61.2 percent at a narrower spread) and 34.5 percent for October 20 (50.6 percent at a narrower spread). The time period analysis in Table B-6 shows a widening of spreads through the day on October 19, followed by a generally worse picture on Tuesday.

### (c) Specialist Performance

The NYSE uses the "price continuity" and "market depth" tests referred to in section (b) above as tests of specialist performance. In general, these tests show some deterioration in specialist performance during the relevant days. In addition, a "tick test", which is designed to measure the degree to which a specialist leans against the market, computes the frequency with which the specialist sells on an up tick and buys on a down tick (more frequent up tick sells and down tick buys theoretically represent a greater willingness to stabilize the market). The results of the tick test applied to a sample of 67 stocks (50 large capitalization stocks, 10 "tertiary" stocks with smaller capitalization and

seven "takeover" stocks) for October 16, 19 and 20 show "stabilizing" transactions by specialists in these stocks in approximately 92, 92 and 90 percent of their total transactions on these days, respectively. Results for individual specialists range from 32 percent to 100 percent. Tick test results for all NYSE specialists for the relevant dates in October were not available to the Task Force. For January to September, 1987, the overall NYSE specialist "stabilization" rate was approximately 90 percent.

However, as discussed above in connection with overall NYSE market performance, these tests are not effective measures of performance under the extreme pressures of the October market break. Like the depth and continuity tests, the tick test is intended for use in normal times (although there is significant doubt about its utility even in normal times). Selling on up ticks in a generally flat or slowly changing market may be stabilizing. However, a specialist who sells on up ticks in a market whose overall trend is rapidly downward may simply be protecting himself (by selling his inventory on the best terms possible) while reinforcing the dominant trend in the market (by aborting nascent rallies with specialist sales). For these reasons, other information on specialists' performance during October 19 and 20 is needed to supplement the standard NYSE tests.

Three additional indicia of performance, obtained from audit trail information and NYSE reports to the Task Force on specialists' trades, were examined. First, an estimate of total and net purchasing activity for all specialists was calculated by day from Wednesday, October 14, to Tuesday, October 20. Second, in order to distinguish differences in behavior among specialists, daily position changes (in numbers of shares) for a sample of 50 large capitalization stocks were examined. Third, in an attempt to investigate more finely the behavior of specialists on October 19 and 20, trading patterns for specialists in 31 stocks (the only specialists for whom detailed and usable price and trade data were available) were examined on a half hourly basis for October 19 and October 20. Of these 31 stocks, 20 were from the sample of 50 large capitalization stocks and 11 were from the sample of 17 additional stocks referred to above for which data was supplied by the NYSE.

TABLE B-8.—NET DOLLAR PURCHASES OF STOCK BY NYSE SPECIALISTS  
(DAILY)

| Date            | Daily change<br>DJIA (percent) | Net<br>purchases <sup>1</sup><br>(millions) | TTV <sup>2</sup> (percent) | Specialist<br>buying power <sup>3</sup><br>(millions) |
|-----------------|--------------------------------|---|----------------------------|---|
| October 14..... | (3.8)                          | \$142.8                                     | N/A                        | \$2,329   |
| October 15..... | (2.4)                          | 58.5  | 12.5                       | N/A   |
| October 16..... | (4.6)                          | 85.4  | 13.3                       | 2,308   |
| October 19..... | (22.6)                         | 485.6                                       | 17.5                       | 852   |
| October 20..... | 5.9                            | (457.5)                                     | 18.1                       | 1,248   |

<sup>1</sup> A negative figure denotes net sales for the day.

<sup>2</sup> TTV figures are total specialist purchases plus sales of shares divided by twice the daily share volume.

<sup>3</sup> While the net purchase figures were calculated from audit trail data, these data are taken from NYSE capital check reports and are, therefore, not fully comparable (see discussion of source in text below). Also, these figures reflect end of day buying power.

The aggregate daily information provides a generally positive view of specialists' performance (see Table B-8). On October 19 and 20, specialists participated in a relatively large number of total NYSE trades. TTV levels (calculated as total specialist share purchases plus total specialist share sales divided by twice daily share volume) were 17.5 percent and 18.1 percent on October 19 and 20, respectively. In the week of October 26 to 30, following the break, daily TTV levels averaged 15.5 percent and, for 1986 as a whole, they averaged 11.6 percent. Between October 14 and October 16 while the DJIA fell by 10.4 percent, specialists were net purchasers of about \$286 million in stock. On October 19, specialists as a whole bought heavily, making approximately \$485 million in net purchases. On October 20, when the DJIA rose by 5.9 percent, but other market indicators continued to decline, specialists as a whole sold approximately \$450 million in stock. Thus specialists' purchases and sales taken as a whole appear to have played a significant role in counterbalancing public selling pressure. Between October 14 and October 20, spe-

cialists were net purchasers of about \$314.8 million worth of stock.

The behavior of specialists trading 50 large capitalization stocks is described on a daily basis in Table B-9, which was constructed from opening position data supplied by the NYSE (see Table B-10 for a list of these stocks). As Table B-9 indicates, there was a wide range of behavior among specialists during the period in question. For a majority of the stocks studied, these specialists were net sellers only on October 13, when the DJIA rose by about 1.5 percent, and October 20.

However, specialists in 30 percent of these 50 stocks were net sellers on October 19 and specialists in 10 percent of the stocks finished the day with short positions. Thus, while specialists as a whole were purchasing stock during the sharp market decline on October 19, a substantial minority of these specialists was not, and a significant fraction ended the day with short positions. The same is true of October 16, when the DJIA declined by 4.6 percent. On that day, 48 percent of the sample were net sellers of stock and 12 percent ended the day with net short positions.

TABLE B-9.—SPECIALIST BEHAVIOR IN 50 LARGE CAPITALIZATION  
STOCKS <sup>1</sup>

| Date            | Aggregate—                                      |  | Fraction of specialists—                       |                               |
|-----------------|---|--|--|-------------------------------|
|                 | Final holding <sup>2</sup><br>(thousand shares) | Daily net purchases<br>(thousand shares) | With short positions <sup>2</sup><br>(percent) | Having net sales<br>(percent) |
| October 13..... | 429   | (203)                                    | 32   | 58                            |
| October 14..... | 992   | 563                                      | 10   | 30                            |
| October 15..... | 1,351   | 359                                      | 2  | 38                            |
| October 16..... | 1,466   | 115                                      | 12   | 48                            |
| October 19..... | 3,694   | 2,228                                    | 10   | 30                            |
| October 20..... | 119   | (3,575)                                  | 36   | 82                            |

<sup>1</sup> The source for this table is NYSE opening position data.

<sup>2</sup> Close of business.

TABLE B-10.—FIFTY LARGE CAPITALIZATION STOCKS COMPRISING SAMPLE

|                              |                                       |
|------------------------------|---------------------------------------|
| Aluminum Co. of America      | Hewlett-Packard Co.                   |
| Abbot Laboratories           | International Business Machines Corp. |
| American Home Products Corp. | International Paper Co.               |
| American Tel & Tel Co.       | Johnson and Johnson                   |
| Allied Signal Inc.           | Eli Lilly Co.                         |
| American Express Company     | McDonalds Corp.                       |
| Amoco Corp.                  | Merck Co., Inc.                       |
| Atlantic Richfield Co.       | Minnesota Mng & Mfg Co.               |
| Boeing Co.                   | Mobil Corporation                     |
| Bell Atlantic                | Navistar International Corp.          |
| Bellsouth Corporation        | Nynex Corporation                     |
| Bristol Myers Co.            | Philip Morris Companies Inc.          |
| Bethlehem Steel Corp.        | Primerica Corp.                       |
| Chevron Corp.                | Proctor & Gamble Co.                  |
| Coca-Cola Co.                | Royal Dutch Petroleum Co.             |
| DuPont DeNemours E.I. Co.    | RJR Nabisco, Inc.                     |
| Digital Equipment Corp.      | Sears Roebuck Co.                     |
| Dow Chemical Co.             | Schlumberger Ltd.                     |
| Eastman Kodak Co.            | Texaco Incorporated                   |
| Exxon Corp.                  | Union Carbide Corp.                   |
| Ford Motor Co.               | United Technologies Corp.             |
| General Electric             | USX Corp.                             |
| General Motors Corp.         | Wal-Mart Stores Inc.                  |
| Goodyear Tire Rubber Co.     | Westinghouse Electric                 |
| GTE Corp.                    | F.W. Woolworth                        |

Of the 50 stocks in the large capitalization sample and the additional 17 stocks discussed above, the Task Force was supplied with sufficiently good information to track the performance of 31 stocks throughout the day on October 19 and on October

20. The source of this information is the Form 81 information provided upon request by specialists to the NYSE. Table B-11 sets forth aggregate hourly purchases and sales by the specialists in these stocks.

TABLE B-11.—PATTERNS OF HOURLY STOCK PURCHASES AND SALES FOR 31 SPECIALISTS

[In thousands of shares]

| Time                 | October 19       |             |              |               | October 20       |             |              |               |
|----------------------|------------------|-------------|--------------|---------------|------------------|-------------|--------------|---------------|
|                      | Shares purchased | Shares sold | Total volume | Net purchases | Shares purchased | Shares sold | Total volume | Net purchases |
| 9:30 to 10:00 .....  | 1,377            | 259         | 1,636        | 1,118         | 313              | 1,049       | 1,362        | (736)         |
| 10:00 to 10:30 ..... | 636              | 294         | 930          | 342           | 1,058            | 1,833       | 2,891        | (775)         |
| 10:30 to 11:00 ..... | 1,278            | 1,123       | 2,401        | 155           | 1,408            | 678         | 2,086        | 730           |
| 11:00 to 11:30 ..... | 678              | 1,616       | 2,294        | (938)         | 1,071            | 896         | 1,967        | 175           |
| 11:30 to 12:00 ..... | 676              | 818         | 1,494        | (142)         | 823              | 416         | 1,239        | 407           |
| 12:00 to 12:30 ..... | 912              | 753         | 1,665        | 159           | 616              | 654         | 1,270        | (38)          |
| 12:30 to 1:00 .....  | 524              | 470         | 994          | 54            | 615              | 1,207       | 1,822        | (592)         |
| 1:00 to 1:30 .....   | 601              | 868         | 1,469        | (267)         | 773              | 636         | 1,409        | 137           |
| 1:30 to 2:00 .....   | 547              | 425         | 972          | 123           | 643              | 753         | 1,396        | (110)         |
| 2:00 to 2:30 .....   | 470              | 615         | 1,085        | (145)         | 347              | 574         | 921          | (227)         |
| 2:30 to 3:00 .....   | 433              | 572         | 1,005        | (139)         | 618              | 658         | 1,276        | (40)          |
| 3:00 to 3:30 .....   | 551              | 266         | 817          | 285           | 694              | 708         | 1,402        | (14)          |
| 3:30 to 4:00 .....   | 1,383            | 842         | 2,225        | 541           | 1,070            | 910         | 1,980        | 160           |
| Total .....          | 10,066           | 8,921       | 18,987       | 1,146         | 10,049           | 10,972      | 21,021       | (923)         |



The basic pattern of net purchases on Monday and net sales on Tuesday is consistent with that which characterized specialist activity as a whole and these specialists as a group were usually, but not always, acting to counterbalance trends in market demand.

During the first hour and one half on October 19, as stocks were opening down sharply, the specialists' net purchases were 1.6 million shares, worth approximately \$70 million. In the next four hours, after a slight rally, prices moved gradually downward and on balance the specialists sold 1.3 million shares which were then worth about \$60 million. Finally, in the last hour of trading on October 19, when share prices were dropping sharply, the specialists made net purchases of about 0.8 million shares worth \$32 million. Except for net sales in the middle of the trading day, specialists' activity in the 31 stocks as a whole ran counter to overall market trends.

However, during the final hours of trading on October 19 when the DJIA fell by 11.2 percent, the volume of net specialist activity fell substantially below the levels that they had maintained in the slightly less difficult opening period. This is reflected also in the widening of quotation spreads during this time (see Table B-6 above). Reasons for the diminution of the extent of the specialists' intervention could include their already high inventory levels and the decline over the course of October 19 in their capacity to purchase stocks. According to a rough survey conducted by the NYSE, specialists' buying power fell by more than 60 percent from \$2,308 million at the close of business on October 16 to \$852 million at the close of business on October 19. Whatever the cause for the reduced extent of specialist intervention later on October 19, the broad picture that emerges from the analysis of half-hourly activity is one of significant intervention to support the market early in the day, net sales during

the midday decline and much less extensive (and less effective) support of the market in the sharp decline in the last hour of trading.

Aggregate specialist activity on October 20 (for the sample of 31 stocks) is much more difficult to interpret. The delays in opening the large capitalization stocks (some of which only opened in the afternoon) and the significant trading halts throughout the day complicate the process of matching specialist activity to price trends. For example, many stocks which opened later in the day did so at levels substantially above their closing prices on October 19 at times when the prices of already opened stocks were declining rapidly. Under these circumstances, it is difficult to know whether net specialist sales in the opening blocks should be regarded as stabilizing or destabilizing. This ambiguity is intensified if after the stock in question opened at a substantial increase over the previous close, its price dropped rapidly (following the general market trend). For these reasons analysis of specialists' behavior was done on a case-by-case basis.

A further reason for examining individual cases is that the aggregation process may obscure individual behavior and either mask the effectiveness of individual specialists, or exaggerate the degree to which individual specialists are stabilizing the markets in particular stocks. Unfortunately, describing a wide range of individual specialists' behavior efficiently requires a substantial degree of data compression. In order to satisfy the competing needs of detailed exposition and efficiency of presentation, a number of exemplary types of specialists' behavior, which seem to characterize effectively the broad range of specialist behavior on October 19 and 20 have been identified. The extent to which these behaviors appear in the sample of 31 stocks has then been tabulated. The types of exemplary behavior are as follows:



*(i) Generally Counterbalancing Intervention and Smooth Price Transitions*

An example of behavior which represents in most transactions the commonly held view of what a specialist should do is presented in Table B-12. On the morning of October 19, this specialist made extensive purchases (126,600 shares) as his stock opened down sharply (about 9 percent). Then, during the subsequent rally from 11:00 a.m. to noon, he sold a substantial amount of stock (69,900 shares). At the peak of this rally, the price of the underlying stock was up by only 3.7 percent above the opening price (in steady trading) which suggests that the opening price had not been misjudged to any significant extent. From noon, when the brief rally peaked, until 3:00 p.m., the specialist was a net purchaser of 47,500 shares as the stock declined steadily. Significant net specialist sales (15,900 shares) during this period only occurred at the time of a brief rise between 1:00 p.m. and 1:30 p.m. In the last hour on

Monday, the specialist purchased 63,900 shares without making a single sale. Nevertheless, the price of the stock in question fell by over 10 percent during the hour.

On Tuesday, October 20, the specialist opened his stock promptly at the previous close and sold 112,600 shares to maintain this price. A short-lived rise of 4.7 percent followed, during which the specialist did not go against the market as he purchased 67,000 shares. Then, as the price declined to and through its opening level between 11:00 a.m. and 12:30 p.m., the specialist purchased 189,800 shares. During the remainder of October 20, with his stock price rallying more or less steadily to the close, the specialist made net sales of 205,300 shares.

Overall, the specialist's net activity tended to counter market trends and, while still unable to smooth out all interim fluctuations, his stock price moved reasonably steadily despite an overall two-day decline of 29.5 percent.

TABLE B-12.—EXAMPLE OF A CATEGORY (i) SPECIALIST

| Time period         | October 19                 |   | October 20                 |   |
|---------------------|----------------------------|---|----------------------------|---|
|                     | Average price <sup>1</sup> | Net purchases <sup>1</sup><br>(thousands of shares) | Average price <sup>1</sup> | Net purchases <sup>1</sup><br>(thousands of shares) |
| 9:30 to 10:00.....  | ( <sup>2</sup> )           | ( <sup>2</sup> )                                    | \$44.3                     | (112.6)   |
| 10:00 to 10:30..... | ( <sup>2</sup> )           | ( <sup>2</sup> )                                    | 46.4                       | 67.5  |
| 10:30 to 11:00..... | \$50.8                     | 126.6   | 42.9                       | 133.0   |
| 11:00 to 11:30..... | 51.5                       | (32.7)  | 40.5                       | 63.4  |
| 11:30 to 12:00..... | 52.7                       | (37.2)  | 37.5                       | 69.3  |
| 12:00 to 12:30..... | 51.8                       | 40.0  | 35.1                       | 57.1  |
| 12:30 to 1:00.....  | 51.4                       | (0.2)   | 35.7                       | (120.9)   |
| 1:00 to 1:30.....   | 51.7                       | (15.9)  | 37.0                       | 8.5   |
| 1:30 to 2:00.....   | 51.2                       | 2.5   | 36.4                       | (10.8)  |
| 2:00 to 2:30.....   | 49.7                       | 22.5  | 36.9                       | (14.5)  |
| 2:30 to 3:00.....   | 49.5                       | (1.4)   | 37.9                       | (26.4)  |
| 3:00 to 3:30.....   | 48.2                       | 17.4  | 38.8                       | (36.3)  |
| 3:30 to 4:00.....   | 44.3                       | 46.5  | 38.2                       | (4.9)   |
| Day total.....      |                            | 168.1   |                            | 72.4  |

<sup>1</sup> For specialists' transactions only.

<sup>2</sup> Not open.

*(ii) Generally Trend Reinforcing Specialist Activity*

Specialist purchase behavior of a second and contrasting type is presented in Table B-13. After the opening hour (for a discussion of which see (iv) below), the specialist's net purchases on October 19 were almost universally timed to amplify market movements. From 11:30 a.m. to noon, while his stock price was rising the specialist bought 14,750 shares. From 12:30 p.m. to 1:00 p.m., he sold 26,700 shares in the face of a declining market.

From 1:00 p.m. to 1:30 p.m., as the market again began to rise, the specialist bought 13,000 shares. Then as the market declined sharply, the specialist first stood aside and afterwards sold 28,300 shares. Finally, after selling in the course of a short rally from 2:30 p.m. to 3:00 p.m., the specialist sold on balance 51,700 shares as the price declined precipitously in the last hour of trading. This particular specialist's trades on Tuesday were not consistently better.

TABLE B-13.—EXAMPLE OF A CATEGORY (ii) SPECIALIST

| Time                              | October 19                 |   | October 20                 |   |
|-----------------------------------|----------------------------|---|----------------------------|---|
|                                   | Average price <sup>1</sup> | Net purchases <sup>1</sup><br>(thousands of shares) | Average price <sup>1</sup> | Net purchases <sup>1</sup><br>(thousands of shares) |
| 10:30 to 11:00 <sup>2</sup> ..... | \$125.0                    | 78.7  | \$119.7                    | (98.7)  |
| 11:00 to 11:30 .....              | 128.3                      | (58.2)  | 117.0                      | 119.0   |
| 11:30 to 12:00 .....              | 128.9                      | 14.7  | ( <sup>3</sup> )           | ( <sup>3</sup> )                                    |
| 12:00 to 12:30 .....              | 126.9                      | 0.6   | ( <sup>3</sup> )           | ( <sup>3</sup> )                                    |
| 12:30 to 1:00.....                | 125.4                      | (26.7)  | 114.0                      | (2.6)   |
| 1:00 to 1:30.....                 | 126.6                      | 13.0  | 112.1                      | 28.1  |
| 1:30 to 2:00.....                 | 121.8                      | 0.2   | 112.2                      | 6.5   |
| 2:00 to 2:30.....                 | 117.3                      | (28.3)  | 111.7                      | (13.1)  |
| 2:30 to 3:00.....                 | 118.3                      | 28.0  | 116.4                      | 7.1   |
| 3:00 to 3:30.....                 | 113.2                      | (20.3)  | 119.3                      | 0.3   |
| 3:30 to 4:00.....                 | 105.7                      | (31.4)  | 118.9                      | 39.5  |
| Day total .....                   |                            | (29.7)  |                            | 86.1  |

<sup>1</sup> For specialist transactions only.<sup>2</sup> On neither day did the stock open before 10:30 a.m.<sup>3</sup> No trades.*(iii) Limited Specialist Involvement*

Still another pattern of specialist behavior was a reluctance by the specialist to assume any net position at all despite what market movements may have required. Examples of this behavior are shown in Table B-14. On October 19 and 20, these special-

ists purchased relatively few shares (compared to prior purchases and sales) despite dramatic declines in price. Another example appears in Table B-13. Between 1:30 p.m. and 2:00 p.m. on October 19 that specialist made net purchases of only 200 shares in the face of a rapidly declining stock price.

TABLE B-14.—LIMITED SPECIALIST INVOLVEMENT  
VARIOUS STOCKS

| Date             | Time period                  | Percentage change in price from previous period | Net shares purchased |
|------------------|------------------------------|---|----------------------|
| October 19 ..... | 9:30 a.m. to 10:00 p.m.....  | (7.1)   | 100                  |
| October 19 ..... | 3:00 p.m. to 4:00 p.m.....   | (5.2)   | 100                  |
| October 20 ..... | 2:00 p.m. to 2:30 p.m.....   | (4.4)   | 200                  |
| October 20 ..... | 11:30 a.m. to 12:30 p.m..... | (11.7)  | (3,100)              |
| October 20 ..... | 12:00 p.m. to 1:00 p.m.....  | (9.9)   | 3,500                |
| October 20 ..... | 12:00 p.m. to 12:30 p.m..... | (5.9)   | 800                  |

*(iv) Overreaction in Setting Opening Prices*

A fourth type of specialists' behavior, that was not uncommon on October 19 and widespread on October 20, consisted of setting an opening price characterized by a large gap from the previous close. This gap was then rapidly eliminated in immediately subsequent trading. One implication of such a rebound is that the specialists in question misjudged the opening markets.

An example of this type of specialist's behavior appears in Table B-13. After opening his stock up 17 percent on October 20, this specialist disposed of approximately 100,000 shares. From the open the price declined steadily, as the specialist repurchased an amount of stock just slightly in excess of his earlier sales. After a decline in price of roughly 5 percent, trading in the stock was suspended and it reopened at a price down just over 9 percent from the opening price. This at least suggests that the opening price may have been overly optimistic and the specialist's action in setting it may have exacerbated price volatility. At the opening on October 19, a similar but opposite pattern occurred as the stock opened down sharply and promptly rebounded. These pricing patterns were widely observed (often to a more extreme degree) at the openings on Monday and, especially, on Tuesday.

These four examples—(i) counterbalancing behavior, (ii) trend reinforcing behavior, (iii) limited involvement and (iv) overreaction in setting opening prices—are not precisely representative of the behavior of any specialists except those cited and even those specialists did not behave with perfect consistency throughout the two-day crisis period. However, specialists within our sample of 31 stocks can be roughly assigned to the first three of these categories. The results of such an assignment are presented in Table B-15.

On Monday, October 19, 58 percent of the specialist sample purchased stock in a way that generally tended to counterbalance market trends and smooth out price fluctuations (although not all specialists were completely successful at doing so), 26 percent of the sample acted in a way that exacerbated trends and 16 percent took only limited net positions.

Over the course of the trading day on October 19 there were distinct differences in this pattern of performance. At the open, most of the specialists in the sample were active in resisting downward selling pressure and only about 10 percent of the openings were characterized by significant rebounds in price. As the day progressed, both the quality and extent of specialist involvement diminished. And, although at the close almost all specialists in the sample were again net purchasers of shares in the face of strong selling pressure, the extent of their intervention was measurably less extensive than it had been at the open.

TABLE B-15.—SUMMARY OF SPECIALIST BEHAVIOR (SAMPLE OF 31 STOCKS)

| [In percent]      |            |            |
|-------------------|------------|------------|
|                   | October 19 | October 20 |
| Type of behavior: |            |            |
| (i) .....         | 58         | 39         |
| (ii) .....        | 26         | 39         |
| (iii) .....       | 16         | 22         |

On Tuesday, October 20, the quality and extent of specialist behavior deteriorated. Only about 39 percent of specialists in the sample of 31 generally resisted price changes, a further 39 percent tended to exacerbate trends and 22 percent limited the extent of their efforts. Moreover, the fraction of rebound openings increased to over 30 percent from about 10 percent on October 19. In contrast, however, to October 19, specialist behavior appeared to improve as prices firmed and specialists depleted their inventories later in the day.

Overall, a relatively consistent picture of specialist behavior emerges from this information. In general, while specialists fulfilled their responsibilities in the face of extreme selling pressure at the opening on October 19, only about 40 percent of specialists did so consistently throughout the two-day period. On October 20, specialists' opening price setting and later inconsistent behavior may have contributed to the disorder on that day. Whether this was due to capital shortages or the natural reluctance of specialists to sacrifice their capital in what they regarded as a hopeless cause is impossible to determine with certainty (see Tables B-16 and B-17 for data regarding specialist buying power).

The NYSE computers monitoring trading activity during the period October 15 to 21, 1987, detected numerous instances that prompted NYSE inquiries concerning specialist performance. The Task Force staff has been informed by the NYSE that these inquiries resulted in 15 investigations having been initiated, two of which have to date resulted in referrals for NYSE enforcement action. Specialist activities under formal investigation by the NYSE do not include those shown on Tables B-13 and B-14. The sample of 31 specialists studied above includes two specialists under formal investigation for their activities on October 19.

The events of October 1987 had a sharp but temporary effect on aggregate specialist capital. Table B-16 sets forth for the close of business on selected dates in October 1987 aggregate NYSE specialist net liquid assets, excess equity (total net liquid assets minus margin required, which is assumed to be 25 percent of market value of specialty stocks) and buying power, which is assumed to be four times excess net liquid assets.



TABLE B-16.—SPECIALIST FINANCIAL CONDITION

[In millions of dollars]

|                               | October 14 | October 16 | October 19 | October 20 | October 21 | October 22 | October 23 |
|-------------------------------|------------|------------|------------|------------|------------|------------|------------|
| Net liquid assets.....        | \$771      | \$808      | \$550      | \$585      | \$644      | \$690      | \$724      |
| Excess net liquid assets..... | 582        | 577        | 213        | 312        | 434        | 516        | 547        |
| Buying power.....             | 2,329      | 2,308      | 852        | 1,248      | 1,736      | 2,065      | 2,188      |

Table B-17 illustrates the disparity in specialist financial strength by setting forth the same data for (1) the average of the 13 specialist units (registered with respect to 30 common stocks each on average) whose buying power was exhausted at the close of business on October 19, 1987 and (2) the average of the remaining 42 specialist units (registered with respect to 27 common stocks each on average). Table B-17 reflects the relatively weaker average capital positions as of October 14 of the 13 special-

ist units (excess net liquid assets of \$3.9 million as against \$12.6 million for the others). By October 19, average excess net liquid assets for the 13 specialist units and for the remaining 42 specialist units had both been reduced by approximately \$6.7 million from their respective levels on October 14. Consequently, the 13 specialist units beginning with weaker capital positions ended with excess net liquid asset deficits on October 19.

TABLE B-17.—AVERAGE SPECIALIST UNIT FINANCIAL CONDITION

[In thousands of dollars]

|                               | October 14 | October 16 | October 19 | October 20 | October 21 | October 22 | October 23 |
|-------------------------------|------------|------------|------------|------------|------------|------------|------------|
| (1)                           |            |            |            |            |            |            |            |
| Net liquid assets.....        | \$7,383    | \$7,119    | \$2,661    | \$3,748    | \$5,209    | \$7,248    | \$6,122    |
| Excess net liquid assets..... | 3,911      | 3,034      | (2,739)    | (819)      | 661        | 4,564      | 3,297      |
| Buying power.....             | 15,645     | 12,138     | (10,955)   | (3,275)    | 2,643      | 18,255     | 13,190     |
| (2)                           |            |            |            |            |            |            |            |
| Net liquid assets.....        | \$16,070   | \$17,038   | \$12,272   | \$12,776   | \$13,715   | \$14,196   | \$15,385   |
| Excess net liquid assets..... | 12,651     | 12,799     | 5,922      | 7,685      | 10,128     | 10,878     | 12,004     |
| Buying power.....             | 50,603     | 51,196     | 23,688     | 30,739     | 40,513     | 43,514     | 48,017     |

The NYSE has informed the Task Force staff that, prior to the opening of business on October 20, it received assurances from the specialist units whose buying power was exhausted at the close of business on October 19 that they had received capital infusions or additional financing. Accordingly, these specialists were able to commence business on October 20 without violating the NYSE requirement that they be able to assume minimum positions in their specialty stocks. The NYSE is investigating whether any specialist unit violated the NYSE's minimum liquid assets requirement (see Part II A (b) (ii) above for a description of these minimum liquid assets requirements).

At the close of business on October 20, eight specialist units had exhausted their buying power and similar procedures were followed.

The Task Force did not have sufficient data to determine whether the depletion of buying power of certain specialist units had an effect on their performance. In aggregate terms, though, the 13 firms without buying power on October 19 appear to have increased their positions slightly more than

average through October 19, and decreased their positions slightly more rapidly than average thereafter.

Some caution is required in evaluating Tables B-16 and B-17. The data was compiled for each date by the NYSE by telephone calls to officials at specialist firms on the next day. At that time the firms' data on two of the variables, long and short market value (which when added together produce total market value), was subject to error arising from inaccurate recording of trades and from trades that ultimately did not match. The third variable, net liquid assets, is also unlikely to be accurate on a day-to-day basis as it is affected by many changing factors, including profits and losses from trades. No better data exists. However, the NYSE has informed the Task Force that an analysis of audit trail data does not result in materially different specialist positions than those on which Tables B-16 and B-17 are, in part, based.

In addition, it is difficult to gauge the availability or significance of buying power during a market break. Tables B-16 and B-17 assume that financing

pursuant to generally uncommitted lines of credit will be available at 25 percent margin at a time when a specialist has probably already required significant financing. In addition, during a market break there is uncertainty about the value of the collateral when the loan will have to be made on the settlement date five business days hence. Further, even if the financing is available there is inevitably a reluctance on the part of a specialist to incur additional debt on top of that already incurred to finance an abnormally large position.

The Task Force was told in interviews that certain commercial banks were reluctant to extend credit to certain specialists during the market break, or that credit approval procedures took longer than usual. This would not be surprising given the circumstances and the uncommitted nature of the lines of credit. The NYSE did not receive any reports from specialists relating to changes in their financing arrangements as a result of the October market break (NYSE rules require any such changes to be reported).

#### **(d) NYSE Automated Systems Performance**

The Task Force did not conduct an independent investigation of the performance of the NYSE automated systems during the October market break. The following description of the performance of the systems is derived almost entirely from interviews with NYSE staff.

The Universal Floor Device Controller ("UFDC") through which all DOT and ITS orders must print has a capacity of 68 messages per second, which was exceeded by peak volume of 72 messages per second. The floor printers, which have a capacity of 10 to 12 printouts per minute, were overwhelmed at times. This resulted in a significant DOT order backlog and the expiration of ITS commitments. The delay in executing certain DOT market orders led to very different prices than envisioned. DOT limit orders directed to certain trading posts were also backed up (for up to one and one quarter hours at the worst time). The UFDC also controls the distribution of reports of trades via the "mark sense" cards. Accordingly, these reports were in some cases significantly delayed, resulting in investors not knowing whether or at what prices their orders had been executed. Overloading of member firms' links to the NYSE also contributed to delays in trade reporting.

On October 20, the NYSE requested its members to refrain from using the DOT system for orders related to index arbitrage or any other aspect of program trading. On October 23, the NYSE amended its request to ask members to refrain from proprietary program trading at any time and refrain from using the DOT system for customers' program trading orders after the opening. On November 4, members were permitted to resume proprietary program trading at the opening.

Additional data on DOT traffic is included in Study III.

The NYSE experienced two software problems. The first related to the process for cancelling orders and resulted in a delay in matching cancellations with orders. The second failure resulted in losing approximately 5,000 trade reports. Most of these reports were found overnight, but in the meanwhile investors did not know the fate of their orders.

The NYSE did not experience any hardware problems.

As a result of the delay in printing DOT orders at posts without electronic display books, the NYSE altered at those posts its rule guaranteeing execution of small DOT market orders within three minutes at the reference price. Instead, it was provided that if a report of an order had not been received within periods of up to one hour of reaching the DOT system, it would be reported at the reference price.

The UFDC queuing on October 19 and 21 also affected NYSE/ITS communications. As stated by the NYSE:

On Monday, 10/19/87, [t]his problem impacted the timely transmission of NYSE traffic to and from the ITS system. The communication lines to ITS at NYSE trading posts 1 through 7 were inhibited during this period. Time 2:13 pm to 3:27 pm (1 hour and 14 minutes). On Wednesday, 10/21/87 this impacted the timely delivery of ITS traffic to all locations [and] the NYSE/ITS market was closed from 10:33 am to 12:36 pm (2 hours and 3 minutes).

One regional exchange reported that the execution percentage for its orders sent through ITS to the NYSE on October 19, 20 and 21 was 33 percent, 54 percent and 68 percent, respectively. The normal execution percentage is approximately 78 to 80 percent.



**(e) Clearing and Settlement**

Table B-18 sets forth the number of sides (each side being half of a transaction) compared by the

NSCC on average for January to September, 1987 and for October 15 to 21, 1987:

TABLE B-18.—NSCC TRADE COMPARISON

|            | January to<br>September<br>average | October 15 | October 16 | October 19 | October 20 | October 21 |
|------------|------------------------------------|------------|------------|------------|------------|------------|
| NYSE.....  | 480,000                            | 672,446    | 934,428    | 1,625,114  | 1,423,468  | 1,542,760  |
| AMEX.....  | 40,000                             | 44,559     | 64,965     | 124,407    | 134,882    | 134,144    |
| OTC.....   | 103,000                            | 123,168    | 177,156    | 269,810    | 229,426    | 249,228    |
| Total..... | 623,000                            | 840,173    | 1,176,549  | 1,989,331  | 1,787,776  | 1,926,132  |

Table B-18 reflects increases in compared sides essentially equal to the increases in volume of shares traded. For example, the number of compared sides from NYSE transactions on October 19 was 239 percent above the average for January to September, 1987 while volume on the NYSE was 235 percent above the average for January to September, 1987. The equivalent increases in share

volume and transaction volume mean the average transaction size was unchanged.

The increase in uncomparing sides (i.e. sides for which a matching side could not be found) was disproportionately greater than the increase in compared sides. Table B-19 sets forth the number of uncomparing sides on average for January to September, 1987 and October 15 to 21, 1987:

TABLE B-19.—NSCC UNCOMPARING SIDES

|            | January to<br>September<br>average | October 15 | October 16 | October 19 | October 20 | October 21 |
|------------|------------------------------------|------------|------------|------------|------------|------------|
| NYSE.....  | 8,000                              | 11,848     | 20,098     | 56,626     | 49,413     | 37,251     |
| AMEX.....  | 1,000                              | 1,058      | 2,335      | 6,743      | 7,798      | 5,913      |
| OTC.....   | 6,200                              | 6,867      | 11,873     | 27,685     | 27,035     | 26,266     |
| Total..... | 15,200                             | 19,773     | 34,306     | 91,054     | 84,246     | 69,430     |

As a percentage of total sides submitted for comparison, the percentage of uncomparing sides increased by 83 percent from 2.4 percent to 4.4 percent. Although the percentage of uncomparing trades from NYSE transactions was lower, they increased by a greater percentage, 113 percent from 1.6 percent to 3.4 percent.

While the number of transactions and volume of shares traded tripled, the dollar value of settlements only doubled due to the efficiencies of net settlement. Table B-20 sets forth the dollar value of settlements, the net pays and collects to NSCC by participants and the dollar value of securities not delivered for settlement (these fails to deliver are

then netted into the following day's settlement) during the period October 22 to 30, 1987:

TABLE B-20.—NSCC SETTLEMENTS  
(In billions of dollars)

|                 | Value of<br>settlements | Net<br>settlements | Value of fails |
|-----------------|-------------------------|--------------------|----------------|
| October 22..... | \$6.6                   | \$1.3              | \$0.9          |
| October 23..... | 9.3                     | 2.5                | 1.1            |
| October 26..... | 12.1                    | 3.7                | 1.2            |
| October 27..... | 11.0                    | 2.3                | 1.2            |
| October 28..... | 9.9                     | 2.4                | 1.3            |
| October 29..... | 8.6                     | 1.8                | 1.0            |
| October 30..... | 6.3                     | 1.1                | 0.9            |

Despite the record volume and some participants submitting trade data one to three hours after the

deadlines, the NSCC was generally able to meet its time guidelines for comparison processing. Printed reports setting forth the results of comparison processing are due by 8:00 a.m. on the second day after the trade date. This guideline was met on all days except October 21 and 22, when the distribution was not complete until 9:30 a.m. and 10:00 a.m., respectively.

## C. The Over-The-Counter Market

### 1. Introduction

Between October 15 and October 20 the over-the-counter market as measured by the NASDAQ

OTC Composite Index declined 23.5 percent from 428.28 to 327.79. Unlike the NYSE, which rallied on October 20, the over-the-counter market declined further that day and it wasn't until October 21 that the market recovered part of its loss. Volume on the over-the-counter market on October 19 was 222.9 million shares, which was very high but nowhere near the record volume of 261.9 million shares traded on January 23, 1987. It wasn't until the 20th and the 21st that volume reached new records of 284.1 million shares and 288.1 million shares, respectively. These and other statistics on the over-the-counter market during the period of the market break are shown in Table C-1.

TABLE C-1.—THE OVER-THE-COUNTER MARKET OCTOBER 15 TO OCTOBER 21, 1987

|                                  | October 15 | October 16 | October 19 | October 20 | October 21 |
|----------------------------------|------------|------------|------------|------------|------------|
| NASDAQ OTC composite close.....  | 422.51     | 406.33     | 360.21     | 327.79     | 351.86     |
| Net change.....                  | (5.77)     | (16.18)    | (46.12)    | (32.42)    | 24.07      |
| Percentage change.....           | (1.35)     | (3.83)     | (11.35)    | (9.00)     | 7.34       |
| Issues traded.....               | 4,862      | 4,860      | 4,862      | 4,864      | 4,865      |
| Advances.....                    | 748        | 383        | 137        | 214        | 2,390      |
| Declines.....                    | 1,761      | 2,975      | 3,573      | 3,571      | 859        |
| Unchanged.....                   | 2,353      | 1,722      | 1,152      | 1,079      | 1,616      |
| Advances volume (thousands)..... | 40,869     | 15,952     | 4,763      | 20,895     | 232,695    |
| Declines volume (thousands)..... | 75,724     | 146,265    | 201,077    | 208,376    | 18,904     |
| Total volume (thousands).....    | 159,776    | 195,944    | 222,930    | 284,117    | 288,060    |
| Block trades.....                | 2,619      | 2,874      | 3,128      | 4,310      | 4,943      |

Unlike the exchange market, where the inability of the specialist to handle a large influx of buy or sell orders can result in the total suspension of trading in a stock, the large number of NASDAQ market makers each seeing a different flow of buy and sell orders almost always makes it possible for some trading to take place continuously. This is precisely what occurred during the market break. If one examines the reported transactions during the market break in over-the-counter stocks, especially the larger more active stocks, one does not see periods where trading was totally halted as it was on the exchanges. Indeed on October 19 and 20 executions were reported during every fifteen minute period during those two days for 36 of the 50 most actively traded stocks. In most of those stocks which did not have a trade reported at least once in every fifteen minute period during those two days there were generally only one or two such periods during which no transactions were reported. Despite this record of continuous trading the problems which occurred in the over-the-counter market during the market break were very significant.

In response to a question about what shocked him the most about the market break one money manager put it succinctly when, in a recent *Barron's* interview, he said, "We had not anticipated the total breakdown of the over-the-counter market." For many investors, both large and small, the over-the-counter market broke down when it failed to perform its function of providing liquidity for buyers and sellers and many customer and dealer orders did not get promptly executed if they were executed at all.

One hint of the magnitude of this breakdown is illustrated in part by Table C-2. It shows that despite the NYSE's problems with its own automated systems and the recurring halts in trading of many stocks, NASDAQ's reported volume relative to the NYSE's declined dramatically. For the 22 trading days prior to October 14, NASDAQ volume was equal to 83 percent of NYSE volume. For the six trading days starting on Wednesday, October 14 it declined to only 52 percent of NYSE volume, reaching a low of less than 37 percent on October 19.

TABLE C-2.—COMPARISON OF NASDAQ SHARE VOLUME WITH NYSE SHARE VOLUME

| Period average            | Volume (millions of shares) |       | NASDAQ volume as a percent of NYSE volume |
|---------------------------|-----------------------------|-------|---|
|                           | NASDAQ                      | NYSE  |   |
| Week of September 14..... | 142.7                       | 165.1 | 86.5                                      |
| Week of September 21..... | 146.1                       | 180.0 | 81.2                                      |
| Week of September 28..... | 148.5                       | 185.4 | 80.1                                      |
| Week of October 5.....    | 151.9                       | 175.7 | 86.4                                      |
| October 12.....           | 117.8                       | 141.9 | 83.0                                      |
| October 13.....           | 131.7                       | 172.9 | 76.2                                      |
| October 14.....           | 145.6                       | 207.4 | 70.2                                      |
| October 15.....           | 159.8                       | 263.2 | 60.7                                      |
| October 16.....           | 195.9                       | 338.5 | 57.9                                      |
| October 19.....           | 222.9                       | 604.3 | 36.9                                      |
| October 20.....           | 284.1                       | 608.1 | 46.7                                      |
| October 21.....           | 288.1                       | 449.4 | 64.1                                      |
| October 22.....           | 249.8                       | 392.2 | 63.6                                      |
| October 23.....           | 177.0                       | 245.6 | 72.1                                      |

Source: NASD.

Presumably this dramatic decline is not due to a lack of investor interest in dealing in over-the-counter securities during the market break. Rather it tends to confirm the widespread reports that many investors were less successful in their efforts to buy or sell over-the-counter securities than exchange listed securities during this period. One institutional investor quoted in the *Investment Dealers Digest* said, "On Monday the whole world was looking to sell and there were no buyers. I would guess that no more than 5 percent of the people looking to sell OTC stocks were able to." This money manager's estimate that only 5 percent of the sellers were able to sell their stocks greatly exaggerates the situation that existed during the break. It is indicative, however, of the frustrations felt by the many institutional and retail investors who were unable to have their orders in over-the-counter stocks executed during the break. In addition to those retail and institutional investors who were unable to execute transactions many market makers were unable to trade with other market makers. It is impossible to make any reasonable estimate of the volume of business or the breakdown of business by type of market participant which for one reason or another did not get executed during the break. There can be no doubt, however, that it was significant.

There are several ways in which the over-the-counter market failed to properly perform its function during the market break. These are the withdrawal from the market of market makers; the reduction by market makers in the depth of the markets made; failure of market makers to answer their telephones; widening of bid-offer spreads; a wide range of reported transaction prices and the failure of automated execution systems.

## 2. Withdrawal of Market Makers

Because there are no rules requiring any firm to make a market in a security, and a market maker can reenter the market as soon as two days after withdrawing, many market makers simply ceased making markets in many of the securities they were making markets in prior to the break. A comparison of the number of market making positions—i.e. the total number of markets in NASDAQ securities made by all market makers—at the end of October with the number at the end of September is shown in Table C-3.

TABLE C-3.—CHANGE IN MARKET MAKER POSITIONS IN NASDAQ SECURITIES SEPTEMBER 30 TO OCTOBER 30, 1987

| NASDAQ securities | Number of market makers |               | Number | Percent change |
|-------------------|-------------------------|---------------|--------|----------------|
|                   | Sept. 30, 1987          | Oct. 30, 1987 |        |                |
| Top 50 .....      | 1,420                   | 1,324         | 96     | 6.8            |
| All others.....   | 44,477                  | 37,640        | 6,837  | 15.4           |
| Total.....        | 45,897                  | 38,964        | 6,933  | 15.1           |

Source: NASD.

It shows a decline during October of 6,933 positions from 45,897 to 38,964. This decline was more pronounced among the smaller NASDAQ securities. While the number of market maker positions in the top 50 stocks declined during that period by only 6.8 percent the decline for all the other stocks was 15.4 percent. Because these smaller stocks had fewer market makers before the break, the potential impact on the market of this greater percentage loss was even more significant. The 1,456 NMS securities which had a market value on September 30, 1987 of less than \$50 million had an average of 7.2 market makers at the end of September and 6.1 market makers at the end of October. In comparison the 162 largest securities—i.e. those with a market value of \$500 million or more on September 30 saw their average number of market makers decline to 16.7 from 18.4. Several major market makers stopped making a market in more than 100 different securities during this period and several other market makers ceased making markets entirely.

During the week of October 19, 30 of the top 50 market makers ceased making NASDAQ markets in at least some securities. The number of market making positions of these 30 firms declined by 1,632 that week. The decline that week in the number of market making positions in the top 50 NASDAQ stocks from 1,402 to 1,325 was relatively modest. Despite the declines in the number of market makers during this period the number re-



maining in most securities should have been adequate to provide for the needs of the marketplace.

### **3. Reduction in Depth of Market**

Some of the market makers who remained in NASDAQ and would normally make markets in great depth, however, did not do so during the break. The obligations of a NASDAQ market maker are spelled out in Schedule D of the NASD's By-Laws which states in part that:

A registered market maker which receives a buy or sell order must execute a trade for at least a normal unit of trading at his quotations as they appear on NASDAQ CRT screens at the time of receipt of any such buy or sell order. If a registered market maker displays a quotation which indicates that it is for a size greater than a normal unit of trading, he must execute a buy or sell order up to the size displayed.

Although the normal unit of trading for most securities is one hundred shares, for competitive reasons many if not most market makers generally stand ready to buy or sell hundreds and sometimes thousands of shares at their NASDAQ bids and offers. It has been widely reported that during the market break many market makers fulfilled only their minimum obligation, refusing to buy or sell any more than 100 shares at their quotes, while other firms which would normally trade thousands of shares with their better institutional customers at their quotes were only willing to trade hundreds of shares.

Likewise, there were reports that not only did some market makers cease making markets in depth during the decline but they may have actually sold stocks on balance during it. Unlike the specialist on an exchange, the over-the-counter market maker is not obligated to abstain from initiating the sale of stock in a declining market or the purchase of stock in a rising market. Thus, it is possible that some market makers may have actually had a destabilizing influence on the market. Definitive data on purchases and sales by market makers, however, was not available to the Task Force and no conclusions were reached as to whether individual market makers, or market makers in the aggregate, were a stabilizing or destabilizing force during this period.

### **4. Failure to Answer Telephones**

There were many reports that some market makers ceased to make markets by merely not answering their phones. Joseph Hardiman the Presi-

dent of the NASD admitted that "A small number of firms haven't been answering their own phones. We were troubled by that." When the NASD queried its members about the cause of the problems associated with customers getting their orders executed most pointed to this inability to reach the market makers on the phone. It is beyond the ability of the Task Force, however, to determine to what extent firms deliberately chose not to answer their phones and to what extent they were unable to, given the high volume of phone calls placed to them. One market maker said that "his phone board looked like a disco with every light flashing all day long and even after bringing in additional help from off the trading desk it was just impossible to answer them all."

This great increase in the volume of phone calls to the market makers can be attributed to several factors. One of these was use of the phones for placing smaller orders, which became necessary when automated execution systems which normally handle those orders were unable to perform for lengthy periods during the market break. A second was the need for brokers and institutions to call multiple market makers in order to buy or sell a block of stock which in more normal markets might have been bought or sold in its entirety by one of the market makers.

### **5. Widening of Bid-Offer Spreads**

As one might have expected, the volatility of the market when combined with the withdrawal of market makers resulted in a widening of NASDAQ spreads during the week of October 19. Table C-4 shows the distribution of the inside bid-offer spreads in NASDAQ for all NMS stocks selling at \$10 per share or more for the three weeks ending October 16 and each of the days in the week of October 19. During the three weeks prior to October 19 the NMS stocks had a spread of a full point or more less than 18 percent of the time. During the week of October 19, spreads of a full point or more became more frequent, rising from 19.6 percent of the time on the 19th to 27.5 percent of the time on October 23. Likewise the percentage of time these stocks had a spread of  $\frac{1}{8}$ th to  $\frac{3}{8}$ ths of a point declined from 42.8 percent during the three week period ended October 16 to a low of 32.6 percent on October 20. If one were to take into account the decline in the average price of the NMS securities during this period and view these spreads as a percentage of the price of the securities, the widening of spreads during the week of October 19 would be of even greater significance.

TABLE C-4.—INSIDE NASDAQ SPREADS OF NMS SECURITIES PERCENTAGE DISTRIBUTION BY TOTAL TIME OF OCCURRENCE

|               | 3 weeks<br>ended Oct. 16 | Oct. 19 | Oct. 20 | Oct. 21 | Oct. 22 | Oct. 23 |
|---------------|--------------------------|---------|---------|---------|---------|---------|
| 1.00+ .....   | 17.8                     | 19.6    | 21.4    | 23.8    | 25.9    | 27.5    |
| ¾ to ⅞ .....  | 12.7                     | 11.1    | 10.0    | 10.7    | 12.2    | 12.5    |
| ½ to ⅝ .....  | 26.4                     | 22.0    | 20.3    | 21.9    | 23.0    | 23.9    |
| ¼ to ⅜ .....  | 32.1                     | 26.8    | 24.0    | 27.1    | 27.1    | 26.0    |
| ⅛ .....       | 10.7                     | 11.8    | 8.6     | 11.0    | 9.1     | 8.5     |
| Locked .....  | 0.1                      | 5.5     | 8.3     | 3.1     | 1.5     | 1.1     |
| Crossed ..... | 0.1                      | 3.3     | 7.0     | 2.2     | 1.2     | 0.3     |

Source: NASD.

## 6. Failure of Automated Execution Systems

### (a) The Impact of Automation

Despite the high degree of automation in the over-the-counter market the problems encountered in it during the market break appear to have been far more pronounced than the problems encountered on the exchange markets. The problems in the over-the-counter market did not stem from a lack of capacity of the hardware. Indeed, downtime of the systems due to mechanical malfunctions was significantly lower during the week of October 19 than it was during the first nine months of the year. Many of the problems emanated from weaknesses in the trading procedures and rules which were programmed into the automated execution systems. Many of these effectively closed down the automated systems making the industry revert to the systems in effect years ago when volume was only a very small percentage of the current level.

Some of the weaknesses in the system stemmed from a series of compromises made over the years to induce the NASD membership to accept each of the changes suggested for automating the operations of the over-the-counter market. The movement toward automation dates back to 1963 when the Securities and Exchange Commission stressed the need for it in its Special Study of Securities Markets. In that report presented to the 88th Congress the Commission stated:

There is strong reason to believe that expanded electronic systems, similar in principal to those used by the quotation companies, would be technically capable of processing information on every stock traded over the counter.

These devices could receive and store, among other things, all bids and offers in each stock and reports of all consummated transactions. The information could be made instantly available for professional and public dissemination,

and compilation relating to price and volume could be prepared in permanent form.

From the beginning, however, each advance in automating the market was greeted with apprehension by many if not most of the market makers. In a 1973 speech, John H. Hodges, Jr., the NASD executive most closely associated with the development of NASDAQ, described the difficulties as follows:

The atmosphere within which work started on the project could hardly have been less promising of success. Fear of automating any aspect of the OTC market was rampant throughout the industry.

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.

In the mid-1960's the Board of Governors of the NASD established guidelines for any future steps to be taken in automating the marketplace. To placate the members they included provisions that the system would:

- maintain and support the negotiated character of the over-the-counter market,
- provide safeguards to protect the important functions of market makers,
- not involve any electronic crossing or matching of orders in a machine thereby actually effecting trades and removing the essential function of negotiation.

In implementing this philosophy, use of many of the automated systems was never made compulsory and market makers could and often chose not to utilize them. To induce use of the systems, however, the procedures which were adopted permitted those members who chose to use the system to leave whenever they felt it was necessary. In addition, the trading rules which were established attempted to protect the participants against the perceived dangers of dealing with an impersonal machine rather



than dealing directly with the party on the other side of the trade on the telephone as market makers had done historically. Unfortunately many of these compromises came back to haunt the over-the-counter market during the October market break. The impact of some of these compromises can be seen in part by examining the automated systems for executing public customers' small orders.

### **(b) Automated Executions of Small Orders**

Although there are many proprietary automated execution systems only one, SOES, is available to all market makers. SOES which could only become a reality after the NASD changed its guidelines of the 1960's with respect to prohibiting the electronic crossing or matching of orders has been part of the marketplace since December 1984. Participation in SOES by NASDAQ market makers, however, has been voluntary, and although most major market makers participate in it, they do not do so in every stock in which they make a market. Although the percentage of NASDAQ shares traded through SOES is small—less than two percent of the total 1986 volume—the percentage of transactions involved is many times greater. Indeed, for the first nine months of 1987, the number of SOES trades as a percent of total NMS trades ranged from 12 to 15 percent per month. The widespread use of other automated execution systems makes the number of trades not requiring manual handling far greater. Some major full-line and wholesale firms estimate that more than half of their executions are normally executed through SOES and the other automated systems.

Market makers who participate in SOES are indicated by a symbol next to their quote in each stock on Levels II and III of the NASDAQ system. Any broker with a customer order to buy or sell 1,000 shares or less of an NMS security or 500 shares or less of a non-NMS security can normally execute the transaction through the Level II or III terminal without the need to speak with a market maker on the phone.

SOES automatically executes all sell orders against the highest bid in the system and all buy orders against the lowest offer in the system. These executions are generally effected on a rotational basis, first with one of the market makers with the highest bid getting the first customer sell order and then the next market maker with the highest bid in the file getting the next sell order. Any broker with a customer order, however, may choose to execute that order with a particular market maker in the system. This can be done if the chosen market maker has agreed to meet the best quote where a broker has expressed a preference to deal with his firm rather than with one of the market makers with the best bid or offer in the system selected by

SOES. No broker is obligated to use SOES to execute his customers' orders and can either call a market maker on the phone or, if available to him, use one of the proprietary automated execution systems.

In addition to automating the execution process, SOES and the other systems also eliminate much of the other paperwork involved in a transaction. All SOES transactions, for instance, are reported directly to the clearing corporation eliminating the need for the firms to report the transactions. In addition the proprietary systems are linked to the back office of the firm and when an execution occurs the trader usually does not have to complete any paperwork at all.

### **(c) Market Maker Withdrawals from SOES**

Although a market maker withdrawing from NASDAQ without a valid excuse must wait two business days before he can be reinstated as a market maker in that stock, he can withdraw from SOES at any time and re-enter it whenever he chooses to do so. No reason for a withdrawal from SOES need be given to the NASD. In addition, a withdrawal from SOES does not affect the firm's NASDAQ quote and that market maker can continue to function over the telephone.

Prior to October 19, 46 of the 50 top market makers were active SOES participants in at least some securities. During the week of October 19 many of them dropped out of SOES entirely. On the 19th, four of those 46 firms did not participate in any SOES trades as a market maker. On the 20th the number of such firms not participating in SOES leaped to 18. The number of firms declined to 16 on the 21st and remained at that level on the 22nd. As things quieted down many others returned to SOES and by the 23rd only eight of the 46 firms which were active in SOES prior to the 19th did not participate in it at all.

In addition to those firms which dropped out of SOES entirely, other firms reduced the number of securities in which they were SOES participants. Other firms dropped out of SOES entirely for some portion of one or more of the days during the break.

Given the volatility of the market, however, it is not surprising that many market makers would take advantage of the opportunity to lessen their exposure to the risks of the market by dropping out of SOES, thereby replacing the SOES obligation to buy or sell 1,000 shares with the lesser NASDAQ obligation to buy or sell only 100 shares. Withdrawal from SOES also eliminated the need for a market maker to trade up to 1,000 shares with those retail firms and institutions which previously chose not to deal with them but were now willing to deal with them only because the firm or firms they would

normally have traded with were either unreachable or unwilling to trade in depth.

#### (d) The Impact of Locked and Crossed Markets

In developing the trading procedures for SOES as well as for the other automated execution systems certain contingencies were built in to protect the market makers using the systems against the entry of quotes which were away from the market since such quotes could result in losses to those market makers executing trades at those prices. Specifically when the best bid in the system is at the same price as the best offer, a so-called locked market, or when the best bid is higher than the best offer, a so-called crossed market, those systems will not execute any transactions in that security. Until the situation is rectified and the highest bid is lower than the lowest offer, it is necessary for a broker seeking to sell or buy that security to call a market maker on the phone. Because SOES will not accept any order while the market is locked or crossed, someone seeking to buy or sell 1,000 shares or less who was unable to reach a market maker on the phone would have to wait until the market was no longer locked or crossed and resubmit the order to SOES. Although the proprietary systems do not differ from SOES with respect to their not executing orders while the markets are locked or crossed, the proprietary systems examined by the Task Force did have the capability to store orders until the markets were no longer locked. One type of system automatically executes all orders in a stock stored in the system once a market is no longer locked or crossed. A second type only executes orders stored in the system until a maximum number of shares, typically 1,000, is traded. At that point it automatically closes down for a short period to give the trader an opportunity to reconsider and, if necessary, change his quote in the system. The third type of system remains closed after the market in a security unlocks until the market maker manually restarts it.

The existence of locked and crossed markets and their impact on the volume of telephone traffic was one of the most commonly cited causes of the problems encountered during the market break. Schedule D to the By-Laws of the NASD places restrictions on market makers with respect to quotations which will lock or cross a market. The relevant provision reads as follows:

Locked and crossed markets: A registered market maker shall not be permitted, except under extraordinary circumstances, to enter quotations into the NASDAQ System during normal business hours if (1) the bid quotation entered is equal to or greater than the ask quotation of another registered market maker entering quotations in the same security or (2) the ask quotation is equal to or less than the bid

quotation of another registered market maker in the same security. A market maker has an obligation, prior to entering a quotation which locks or crosses another quotation, to make reasonable efforts to avoid such locked or crossed market by executing transactions with all market makers whose quotations would be locked or crossed.

Locked or crossed markets can occur in several ways. One way a locked or crossed market might occur is through the failure of a market maker to update his quote. For instance if all of the market makers in a stock are quoting it at 20 bid by 20½ offered and the market is declining, the failure of any one market maker to reduce his bid if the other market makers reduce their offer to 20 will result in a locked market. A further reduction by all of those other market makers to 19⅞ or lower will result in a crossed market. Under the provisions of Schedule D, prior to reducing their offer to 20, the other market makers would have been obligated to make a reasonable effort to sell stock to the market maker who was continuing to bid 20 for stock until he lowered his bid. According to many market makers, they did make a reasonable effort to contact those market makers with the high bids during the market break, but it was often impossible to reach them and it became necessary to reduce their offer to that market maker's bid, or even lower, causing the locked or crossed market. Obviously, the record volatility during the break created a situation where continuous updating of bids and offers was crucial to avoid locking or crossing markets. The extremely high volume of transactions being executed over the telephone, much of it requiring manual reporting of executions to the buyer or seller and manual reporting to the NMS, when combined with the record volatility, however, made timely updating of quotes difficult, if not impossible. This resulted in a dramatic increase in the number of markets becoming locked or crossed from more normal periods.

In other instances market makers acquiring blocks of stock at big discounts or those market makers with customers offering to sell blocks at a discount were responsible for locking or crossing the market. Those market makers finding it impossible to contact all of the other market makers in order to sell them enough stock to drive their bids down were forced to reduce their offer to or below the existing bids in the system. This was done in the hope that it would facilitate the sale of their block by alerting the other market participants of their willingness to sell at lower prices.

Other market makers with a large influx of orders on one side of the market placed quotes in NASDAQ which they believed reflected that imbalance. To the extent other firms did not have as



great an imbalance or did not feel it was necessary to make as large an adjustment in their quote where they did have a similar imbalance, the market became locked or crossed. Under normal circumstances the firm choosing to make the greater change in its quote would have had to either sell stock to or buy stock from the other market makers before changing its quote so dramatically. It is this interaction between market makers that is supposed to allow quotes to reflect the differences in order flow as well as the differences in each market maker's perception of the current market and his willingness to trade in depth under those conditions.

Given the large number of individual traders making markets it is probable that in some instances the markets in some stock became crossed when, because of the fear that was gripping the marketplace, a trader finding no other way to cope with the situation put quotes into the system with the

intent of deliberately closing down trading in those stocks.

Whatever the reason the markets became locked or crossed, the results were the same. SOES and the other automated systems became inoperable with respect to those stocks. These periods where SOES and the other automated systems were inoperable in many securities resulted in market makers receiving an ever-increasing number of small orders coming in over the telephone which further diverted them from responding to calls from those other market makers making an effort to force them to lower their bids or raise their offers. This eventually resulted in more and more markets becoming locked or crossed and a worsening of the situation.

(i) *Incidence of Locked and Crossed Markets*

On October 19, 5,074 locked or crossed markets occurred in 1,826 different NASDAQ securities.

TABLE C-5.—INCIDENCE OF LOCKED AND CROSSED MARKETS BY DURATION OF LOCKED AND CROSSED MARKET SEPTEMBER 28, 1987 TO OCTOBER 23, 1987

|                                       | Daily average<br>Sept. 28 to Oct.13 | Oct. 14 | Oct. 15 | Oct. 16 | Oct. 19 | Oct. 20 | Oct. 21 | Oct. 22 | Oct. 23 |
|---------------------------------------|-------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Duration of locked or crossed market: |                                     |         |         |         |         |         |         |         |         |
| 0 to 5 minutes .....                  | 123                                 | 153     | 174     | 247     | 2,584   | 2,709   | 1,831   | 1,043   | 256     |
| 5 to 10 minutes .....                 | 12                                  | 11      | 13      | 22      | 763     | 940     | 510     | 193     | 27      |
| 10 to 15 minutes .....                | 4                                   | 4       | 2       | 6       | 468     | 553     | 282     | 112     | 20      |
| 15 to 30 minutes .....                | 7                                   | 6       | 4       | 11      | 625     | 893     | 416     | 132     | 17      |
| 30 to 60 minutes .....                | 5                                   | 6       | 1       | 3       | 400     | 683     | 310     | 91      | 22      |
| 1 to 2 hours .....                    | 4                                   | 4       | 4       | 1       | 175     | 452     | 174     | 56      | 15      |
| 2 to 3 hours .....                    | 1                                   | 3       | 0       | 1       | 48      | 101     | 38      | 14      | 11      |
| 3 hours and over .....                | 6                                   | 14      | 4       | 1       | 11      | 75      | 34      | 12      | 4       |
| Total .....                           | 162                                 | 201     | 202     | 292     | 5,074   | 6,406   | 3,595   | 1,653   | 372     |

Source: NASD.

As is shown in Table C-5, 1,259 of those markets were locked or crossed for periods of longer than 15 minutes and 239 were locked or crossed for longer than one hour. On the 20th, the situation worsened with a total of 6,406 locked or crossed markets occurring in 2,375 different NASDAQ securities. Of these 6,406 locked or crossed markets, 2,204 were locked or crossed for longer than 15 minutes with 628 of them being locked or crossed for more than one hour. Only when one looks at a more normal period in the market—i.e. the 12 trading days from September 28 to October 13, can one fully comprehend the magnitude of the problem of

locked and crossed markets during the October market break. During that period, the number of locked and crossed markets averaged only 162 per day in approximately 90 different securities and of those 162, on average, just 23 were locked or crossed for longer than 15 minutes and only 11 for longer than one hour.

(ii) *Locked and Crossed Markets in the Most Active Stocks*

An analysis of the locked and crossed markets occurring in the 50 most active NMS stocks is shown in Table C-6.

TABLE C-6.—REPORT ON LOCKED AND CROSSED MARKETS FOR THE TOP 50 MOST ACTIVE NASDAQ/NMS STOCKS, OCTOBER 19 AND 20, 1987

|                                 | October 19                           |  | October 20                           |  |
|---------------------------------|--------------------------------------|--|--------------------------------------|--|
|                                 | Minutes<br>unlocked and<br>uncrossed | Percentage of<br>time unlocked<br>and<br>uncrossed | Minutes<br>unlocked and<br>uncrossed | Percentage of<br>time unlocked<br>and<br>uncrossed |
| American Greetings Corp.....    | 363                                  | 93   | 151                                  | 39   |
| Apollo Computer, Inc.....       | 84                                   | 22   | 35                                   | 9  |
| Apple Computer, Inc.....        | 63                                   | 16   | 85                                   | 22   |
| Ashton-Tate Corp.....           | 103                                  | 26   | 79                                   | 20   |
| Bank of New England.....        | 244                                  | 63   | 173                                  | 44   |
| Cetus Corporation.....          | 131                                  | 34   | 71                                   | 18   |
| Charming Shoppes, Inc.....      | 284                                  | 73   | 208                                  | 53   |
| Cordis Corporation.....         | 307                                  | 79   | 27                                   | 7  |
| Corestates Financial.....       | 335                                  | 86   | 245                                  | 63   |
| Crazy Eddie, Inc.....           | 380                                  | 97   | 229                                  | 59   |
| CVN Companies, Inc.....         | 370                                  | 95   | 298                                  | 76   |
| Farmers Group, Inc.....         | 291                                  | 75   | 208                                  | 53   |
| First Executive Corp.....       | 330                                  | 85   | 174                                  | 45   |
| First Union Corp.....           | 146                                  | 37   | 195                                  | 50   |
| Genentech, Inc.....             | 65                                   | 17   | 183                                  | 47   |
| Henley Group, Inc (The).....    | 255                                  | 65   | 37                                   | 10   |
| Intel Corp.....                 | 97                                   | 25   | 69                                   | 18   |
| Integraph Corp.....             | 128                                  | 33   | 129                                  | 33   |
| Jaguar plc.....                 | 203                                  | 52   | 5                                    | 1  |
| Kemper Corporation.....         | 283                                  | 73   | 145                                  | 37   |
| LIN Broadcasting Corp.....      | 286                                  | 73   | 330                                  | 85   |
| Liz Clairborne, Inc.....        | 214                                  | 55   | 308                                  | 79   |
| Lotus Development Corp.....     | 57                                   | 15   | 261                                  | 67   |
| Maxicare Health Plans, Inc..... | 219                                  | 56   | 192                                  | 49   |
| Maxtor Corp.....                | 248                                  | 64   | 36                                   | 9  |
| MCI Communications Corp.....    | 110                                  | 28   | 140                                  | 36   |
| Microsoft Corporation.....      | 54                                   | 14   | 145                                  | 37   |
| Midlantic Banks, Inc.....       | 335                                  | 86   | 325                                  | 83   |
| Miniscribe Corporation.....     | 232                                  | 60   | 72                                   | 19   |
| Network Systems Corp.....       | 209                                  | 54   | 84                                   | 22   |
| Nordstrom, Inc.....             | 236                                  | 61   | 347                                  | 89   |
| Peoples Heritage Savings.....   | 388                                  | 100  | 331                                  | 85   |
| Pic 'N' Save Corp.....          | 316                                  | 81   | 144                                  | 37   |
| Price Company (The).....        | 209                                  | 54   | 142                                  | 36   |
| Reuters Holdings PLC.....       | 248                                  | 64   | 165                                  | 42   |
| Saatchi & Saatchi Co., PLC..... | 235                                  | 60   | 169                                  | 43   |
| SafeCard Services.....          | 353                                  | 91   | 209                                  | 54   |
| Safeco Corporation.....         | 309                                  | 79   | 158                                  | 41   |
| Seagate Technology.....         | 144                                  | 37   | 85                                   | 22   |
| Shared Medical Systems.....     | 158                                  | 41   | 333                                  | 85   |
| Sovran Financial Corp.....      | 269                                  | 69   | 255                                  | 65   |
| Subaru of America, Inc.....     | 248                                  | 64   | 213                                  | 55   |
| Sun Microsystems, Inc.....      | 168                                  | 43   | 144                                  | 37   |
| Tele-Communications, Inc.....   | 184                                  | 47   | 211                                  | 54   |
| St. Paul Companies, Inc.....    | 234                                  | 60   | 209                                  | 54   |
| U.S. Healthcare, Inc.....       | 269                                  | 69   | 315                                  | 81   |
| Viratek, Inc.....               | 295                                  | 76   | 326                                  | 84   |
| Worlds of Wonder, Inc.....      | 250                                  | 64   | 312                                  | 80   |

It shows that for some time in each of the days of October 19 and 20 the markets were locked or crossed in each of the 50 securities. On average during the 19th the market in these 50 stocks was locked or crossed for all but three hours and 43 minutes of the six and one half hour trading day. In most instances the locked or crossed markets in these stocks occurred during the first two hours after the opening and the half hour before the close. On the 20th, the situation worsened and on average the market for the 50 stocks was locked or crossed for all but three hours and four minutes of the trading day. For those stocks which were among the 10 most active during the week of October 19, the situation was even worse. On the 19th the markets in those stocks on average were locked and crossed for all but one hour and 59 minutes. The next day the markets in those stocks were not locked or crossed for an average of only two hours and 29 minutes.

### (iii) Market Maker Involvement in Locked and Crossed Markets

The high incidence of locking and crossing markets was not limited to any firm or category of firms but was widespread among the various types of market participants. As one would expect, the large national full-service firms and wholesale market making firms which make markets in more than a 1,000 securities were responsible for the greatest number of locked and crossed markets. On the 19th of October several of these firms locked or crossed markets at least once during the day in more than 100 different securities. Even among the regional and institutional firms, making a smaller number of markets, there were many instances where they locked and crossed markets, with several of these firms responsible for locking or crossing markets in more than 50 different securities.

No particular firm or type of firm was responsible for locking or crossing the markets of others in those stocks which were among the 10 most active during the week of October 19. On October 19, for instance, after the opening of trading, 45 different market makers were involved in locking or crossing the markets in these stocks. There were also 45 firms whose markets were locked or crossed by others. Thirty-two of these 45 also locked or crossed one or more markets during that day. Of the 45 market makers who locked or crossed the markets of others, six were responsible for locking or crossing the markets in these stocks on at least 10 separate occasions. Three of the six firms were major institutional firms which, among them, accounted for 40 instances of locking or crossing the markets. Two of the other firms were wholesalers and they were responsible for locking or crossing the markets in these stocks a total of 43 times that

day. Of the 45 market makers whose markets were crossed by others, eight had their markets crossed at least 10 times that day. These firms included two of those three major institutional firms, which were also responsible for crossing other markets at least ten times. None of the major wholesalers were among these firms. Included among them, however, were several national full line firms.

### (iv) Examples of the Impact of Locked and Crossed Markets

Because of these locked and crossed markets, executions—especially those of 1,000 shares or less—were often deferred until such time as the markets were no longer locked or crossed. Thus, in many instances during the period when the market was rapidly changing many buyers and sellers who placed orders did not get executions until the markets were no longer locked or crossed, with the execution of such orders often occurring at much different prices from the prices prevailing when the orders were placed. This can be seen in the following examples, which compare the prices of executions reported during those times when the markets were locked or crossed with those occurring once the market was no longer locked or crossed.

At the opening of trading on October 19 the market in Microsoft Corporation Common Stock was crossed at 64½ bid by 63 offered and despite many changes in quotes remained locked or crossed until 11:03 a.m. As is shown in Table C-7, between the opening and 11:00 a.m., 33,700 shares traded in 80 separate transactions of 1,000 shares or less. These trades averaging 421 shares were executed at prices ranging from a high of 63½ to a low of 57. During the next 15 minutes the market was unlocked on two separate occasions for brief periods aggregating only 37 seconds. The first of these occurred for 30 seconds at 11:03 a.m. when the quote was 57¾ bid by 58 offered. The second occurred two minutes later at the same quote. During the 15 minute period from 11:00 a.m. to 11:15 a.m., 213 separate transactions of 1,000 shares or less totaling 62,577 shares or an average of 294 shares were reported. Most of these were customer orders being executed when automated systems became operable for the first time that day. Since the market was unlocked for a brief period and SOES does not store orders, only one transaction for 350 shares was effected in that system. Most of the executions were by one market maker in its automated quotation system which executes all small orders stored in it once the market unlocks. Between 11:03 a.m. and 11:07 a.m. that firm reported that it purchased 48,000 shares at 57¾ in 160 separate transactions and sold 4,000 shares at 58 in 18 separate transactions. Except for that minority of customers who were successful in their efforts to buy or sell shares of Microsoft prior to 11:03 a.m. there was the equiv-



alent of a delayed opening in the stock. Thus many of those sellers who placed their orders prior to the times when executions occurred at prices as high as 63 did not get an execution until more than one and one half hours after the market opened at a price of 57¾. Apparently many of the customers of those other firms whose automated systems do not automatically execute all orders when the market

unlocks did not get their orders executed at 11:03 a.m. and had to wait until even later when the market in Microsoft was not locked or crossed for a longer period of time. Obviously for the small minority of customers who on the morning of the 19th were seeking to purchase the stock, this delay worked to their advantage.

TABLE C-7.—TRADING OF MICROSOFT CORPORATION ON OCTOBER 19, 1987

[Includes trades of 1,000 shares or less]

| Time period beginning | Volume reported in sequence | Number of trades | Dollar volume | High price | Low price | Minutes net locked/crossed |
|-----------------------|-----------------------------|------------------|---------------|------------|-----------|----------------------------|
| 9:30 .....            | 1,250                       | 3                | 78,175        | 63.00      | 61.50     | 0                          |
| 9:45 .....            | 4,500                       | 8                | 277,575       | 62.50      | 61.00     | 0                          |
| 10:00 .....           | 7,860                       | 18               | 478,395       | 62.50      | 60.00     | 0                          |
| 10:15 .....           | 6,040                       | 15               | 364,195       | 61.50      | 59.00     | 0                          |
| 10:30 .....           | 5,400                       | 13               | 322,625       | 61.50      | 58.50     | 0                          |
| 10:45 .....           | 8,650                       | 23               | 513,300       | 63.50      | 57.00     | 0                          |
| 11:00 .....           | 62,577                      | 213              | 3,624,093     | 61.50      | 57.75     | 1                          |
| 11:15 .....           | 20,352                      | 61               | 1,182,582     | 58.50      | 57.00     | 9                          |
| 11:30 .....           | 14,632                      | 49               | 847,098       | 59.25      | 57.25     | 5                          |
| 11:45 .....           | 16,930                      | 49               | 971,878       | 57.75      | 57.00     | 6                          |
| 12:00 .....           | 13,532                      | 48               | 772,312       | 61.00      | 56.50     | 6                          |
| 12:15 .....           | 14,340                      | 34               | 802,415       | 57.75      | 55.25     | 1                          |
| 12:30 .....           | 12,607                      | 27               | 695,460       | 58.00      | 54.00     | 0                          |
| 12:45 .....           | 21,045                      | 56               | 1,129,295     | 54.75      | 53.25     | 1                          |
| 13:00 .....           | 21,445                      | 51               | 1,145,771     | 60.25      | 52.75     | 6                          |
| 13:15 .....           | 14,381                      | 37               | 770,396       | 53.75      | 53.25     | 10                         |
| 13:30 .....           | 5,806                       | 23               | 310,714       | 55.00      | 52.75     | 0                          |
| 13:45 .....           | 13,130                      | 45               | 692,215       | 56.25      | 52.00     | 5                          |
| 14:00 .....           | 5,800                       | 16               | 304,250       | 54.25      | 51.25     | 1                          |
| 14:15 .....           | 2,325                       | 12               | 118,369       | 53.50      | 49.75     | 1                          |
| 14:30 .....           | 4,020                       | 16               | 203,365       | 60.00      | 49.50     | 1                          |
| 14:45 .....           | 7,540                       | 35               | 385,100       | 58.75      | 49.00     | 0                          |
| 15:00 .....           | 5,500                       | 14               | 271,450       | 50.75      | 48.50     | 0                          |
| 15:15 .....           | 14,506                      | 66               | 700,862       | 57.50      | 47.00     | 1                          |
| 15:30 .....           | 4,400                       | 19               | 209,380       | 57.75      | 46.00     | 0                          |
| 15:45 .....           | 6,427                       | 20               | 298,543       | 53.00      | 45.00     | 0                          |
| Total .....           | 314,995                     | 971              | 17,469,812    | 63.50      | 45.00     | 54                         |

Source: NASD.

The market in Apple Computer, Inc. Common Stock was locked at the opening on the 19th and remained so until about an hour later when a similar surge of trades were executed. At 10:03 a.m. the market became locked again at 43¼ and remained locked with the exception of one 15 second period until 11:45 a.m. at which time it was being quoted at 42 bid by 42¼ offered. As is shown in Table C-8, during the next 15 minutes, 242 separate transactions of 1,000 shares or less were reported. Many of

these transactions were at 42, the bid price at the time the market unlocked. Although not as extreme, other increases in volume can be noted after these other periods where the market in Apple Computer was locked or crossed during the day. In many respects the effect on those people seeking to buy or sell an over-the-counter stock of the closing down of these automated systems is similar to the effect on those people attempting to trade in a listed stock during a halt in trading on the exchange.

TABLE C-8.—TRADING OF APPLE COMPUTER, INC. ON OCTOBER 19, 1987

[Includes trades of 1000 shares or less]

| Time period beginning | Volume reported in sequence | Number of trades | Dollar volume | High price | Low price | Minutes not locked/crossed |
|-----------------------|-----------------------------|------------------|---------------|------------|-----------|----------------------------|
| 9:30                  | 100                         | 1                | 4,825         | 48.25      | 48.25     | 0                          |
| 9:45                  | 6,356                       | 18               | 283,728       | 45.50      | 44.25     | 3                          |
| 10:00                 | 27,835                      | 74               | 1,230,708     | 46.00      | 43.25     | 3                          |
| 10:15                 | 11,050                      | 33               | 480,225       | 44.50      | 42.50     | 0                          |
| 10:30                 | 9,182                       | 28               | 389,144       | 44.75      | 40.50     | 0                          |
| 10:45                 | 16,660                      | 30               | 694,448       | 46.00      | 40.00     | 0                          |
| 11:00                 | 24,442                      | 48               | 1,006,162     | 45.00      | 40.50     | 0                          |
| 11:15                 | 24,420                      | 53               | 1,009,580     | 43.00      | 40.00     | 0                          |
| 11:30                 | 27,499                      | 66               | 1,153,064     | 44.75      | 40.00     | 0                          |
| 11:45                 | 85,493                      | 242              | 3,598,452     | 43.50      | 41.00     | 14                         |
| 12:00                 | 28,851                      | 83               | 1,219,217     | 42.50      | 41.00     | 3                          |
| 12:15                 | 28,000                      | 81               | 1,177,428     | 42.25      | 41.75     | 14                         |
| 12:30                 | 12,780                      | 41               | 535,640       | 42.50      | 41.50     | 8                          |
| 12:45                 | 22,965                      | 72               | 961,822       | 42.25      | 41.50     | 8                          |
| 13:00                 | 14,750                      | 47               | 616,600       | 42.00      | 41.00     | 8                          |
| 13:15                 | 6,644                       | 25               | 276,531       | 42.00      | 41.25     | 0                          |
| 13:30                 | 22,400                      | 59               | 926,150       | 42.00      | 40.75     | 0                          |
| 13:45                 | 20,722                      | 73               | 847,429       | 42.00      | 40.50     | 1                          |
| 14:00                 | 7,200                       | 24               | 293,300       | 42.75      | 40.00     | 0                          |
| 14:15                 | 7,115                       | 24               | 287,166       | 41.75      | 40.00     | 0                          |
| 14:30                 | 12,315                      | 40               | 501,972       | 42.75      | 40.00     | 0                          |
| 14:45                 | 21,326                      | 71               | 858,731       | 44.50      | 39.75     | 1                          |
| 15:00                 | 17,755                      | 44               | 706,188       | 41.00      | 39.00     | 0                          |
| 15:15                 | 20,315                      | 74               | 803,290       | 42.00      | 38.50     | 0                          |
| 15:30                 | 22,150                      | 71               | 884,922       | 43.00      | 37.25     | 0                          |
| 15:45                 | 30,697                      | 75               | 1,174,728     | 43.00      | 36.50     | 0                          |
| Total                 | 529,022                     | 1,497            | 21,921,449    | 48.25      | 36.50     | 63                         |

Source: NASD.

## 7. Wide Range of Reported Prices

An analysis of executions in NMS securities as reported to NASDAQ within 15 minute intervals shows an apparent lack of price continuity as evidenced by an extremely wide range between the reported high and low prices. Such a wide range frequently existed not only among a randomly selected group of stocks but among the most active stocks as well. Although a wide range of prices during any 15 minute interval could be attributed to the execution of one or more large blocks at substantial discounts from the bid or premiums above the offer, this was usually not the case. Elimination of all transactions of over 1,000 shares only makes very modest changes in the extremity of the ranges.

Tables C-7 and C-8 show the high and low prices of transactions of 1,000 shares or less reported during each 15 minute period on October 19 in Apple Computer Inc. and Microsoft Corporation. In each instance all trades which were reported as out of sequence have been eliminated. Nevertheless, wide ranges between the highs and lows can be observed. For instance in five of the six 15 minute intervals after 2:30 p.m. on October 19 the high price of reported executions in Microsoft was at least 17.7 percent higher than the low price and in one 15 minute segment the high price of 57¾ was actually 25.5 percent higher than the low price of 46. For those same 15 minute segments the high-low range in Apple was not as great. Nevertheless,

in half of those segments the high was more than 11.2 percent higher than the low.

Given the large number of market makers and the chaotic situation that existed in the market during the break it is not surprising that there was a significant lack of price continuity. It is probable, however, that problems with the system for reporting transactions to NASDAQ made the lack of price continuity appear to be more extreme than it was in reality.

## **8. Reporting of Over-The-Counter Transactions**

Schedule D of the NASD's By-Laws requires that trades in NMS securities be reported net of any markups or markdowns and the reporting dealer has some discretion as to the price he can report. The Schedule requires that:

The reported price be reasonably related to the prevailing market, taking into consideration all relevant circumstances including, but not limited to, market conditions with respect to the security, the number of shares involved in the transaction, the published bids and offers with size at the time of the execution (including the

reporting firm's own quotation), the cost of execution and the expenses involved in clearing the transaction.

The Task Force received complaints about transactions which were reported at prices significantly different from the gross price paid or received by the party on the other side of the transaction from the market maker. It did not have the opportunity to check into the validity of such complaints. It did, however, examine the incidence of transactions which were not reported promptly. Tables C-9 and C-10 compare for each of the NMS stocks that were among the 10 most active during the week of October 19 the volume which was claimed to have been reported by the member within 90 seconds of execution with the volume which was reported as late. On both days a large percentage of the volume was designated as being reported more than 90 seconds after execution. For instance, on October 19, of the 276 million shares reported on that day, more than 5.1 million shares or 20 percent was designated as being reported late. Execution of an additional 1.2 million shares was reported later in a weekly report to the NASD. Of the 4.2 million shares of Apple Computer reported as executed on that day, 26 percent was reported as late.

TABLE C-9.—SHARE VOLUME OF TRANSACTIONS REPORTED TO NASDAQ ON A TIMELY AND A LATE BASIS FOR THE 10 MOST ACTIVE STOCKS DURING WEEK OF OCTOBER 19, 1987 ON OCTOBER 19, 1987

[In thousands]

|                               | Volume reported as timely <sup>1</sup> | Volume reported as late <sup>2</sup> | Block volume reported on weekly report <sup>3</sup> | Total volume |
|-------------------------------|--|--------------------------------------|---|--------------|
| MCI Communications Corp.....  | 4,670                                  | 648                                  | 113   | 5,431        |
| Apple Computer, Inc.....      | 3,106                                  | 1,089                                | 124   | 4,319        |
| Intel Corp.....               | 3,554                                  | 487                                  | 232   | 4,273        |
| Genentech, Inc.....           | 1,484                                  | 496                                  | 185   | 2,165        |
| Liz Clairborne, Inc.....      | 1,451                                  | 551                                  | 15  | 2,017        |
| Seagate Technology.....       | 913                                    | 330                                  | 26  | 1,269        |
| Tele-Communications, Inc..... | 1,105                                  | 111                                  | 63  | 1,279        |
| Lotus Development Corp.....   | 1,899                                  | 342                                  | 19  | 2,260        |
| Jaguar plc.....               | 1,912                                  | 807                                  | 395   | 3,114        |
| Microsoft Corp.....           | 781                                    | 245                                  | 5   | 1,031        |
| Total.....                    | 20,875                                 | 5,106                                | 1,177   | 27,158       |

<sup>1</sup> Includes those transactions claimed by the reporting member to have been reported to NASDAQ within 90 seconds of execution.

<sup>2</sup> Includes those transactions reported to NASDAQ more than 90 seconds after execution and were designated by the reporting member as late.

<sup>3</sup> Includes primarily block transactions reported to NASD on Form T, many if not most of which were executed outside the hours of the reporting system.

Source: NASD.

TABLE C-10.—SHARE VOLUME OF TRANSACTIONS REPORTED TO NASDAQ ON A TIMELY AND LATE BASIS FOR THE 10 MOST ACTIVE STOCKS DURING WEEK OF OCTOBER 19, 1987 ON OCTOBER 20, 1987

[In thousands]

|                               | Volume reported as timely <sup>1</sup> | Volume reported as late <sup>2</sup> | Block volume reported on weekly report <sup>3</sup> | Total volume |
|-------------------------------|--|--------------------------------------|---|--------------|
| MCI Communications Corp.....  | 4,906                                  | 349                                  | 16  | 5,271        |
| Apple Computer, Inc.....      | 4,006                                  | 1,075                                | 143   | 5,224        |
| Intel Corp.....               | 2,275                                  | 390                                  | 23  | 2,688        |
| Genentech, Inc.....           | 2,585                                  | 738                                  | 45  | 3,368        |
| Liz Clairborne, Inc.....      | 1,453                                  | 916                                  | 21  | 2,390        |
| Seagate Technology.....       | 2,757                                  | 464                                  | 3   | 3,224        |
| Tele-Communications, Inc..... | 2,421                                  | 191                                  | 32  | 2,644        |
| Lotus Development Corp.....   | 1,883                                  | 291                                  | 2   | 2,176        |
| Jaguar plc.....               | 1,843                                  | 286                                  | 12  | 2,141        |
| Microsoft Corp.....           | 1,890                                  | 368                                  | 29  | 2,287        |
| Total.....                    | 29,019                                 | 5,068                                | 326   | 31,413       |

<sup>1</sup> Includes those transactions claimed by the reporting member to have been reported to NASDAQ within 90 seconds of execution.

<sup>2</sup> Includes those transactions reported to NASDAQ more than 90 seconds after execution and were designated by the reporting member as late.

<sup>3</sup> Includes primarily block transactions reported to NASD on Form T, many if not most of which were executed outside the hours of the reporting system.

Source: NASD.

Table C-11 shows the transactions in Apple Computer reported to the NASD between 11:06 a.m and 11:11 p.m. on the 19th. Although many of the trans-

actions in Apple Computer were designated as late as shown by the symbol SLD, others which were not so designated are at prices so far out of line as to



raise serious questions about the timeliness of the reporting. If on the other hand, the executions were reported promptly and are in sequence even more serious questions are raised about the lack of price continuity in the market. These late reports along with any reports which may have been made at

prices significantly different from the gross price paid or received may have contributed to further confusion in the marketplace. This is especially true with respect to those securities which are part of an index on which futures are traded and those securities on which options are traded.

TABLE C-11.—REPORTED TRANSACTIONS IN APPLE COMPUTER  
11:06 A.M. TO 11:11 A.M. ON OCTOBER 19, 1987

| Time       | Volume | Price |     | Time       | Volume | Price |     |
|------------|--------|-------|-----|------------|--------|-------|-----|
| 11:06..... | 100    | 41    |     | 11:09..... | 600    | 43¼   |     |
| 11:06..... | 600    | 40    | SLD | 11:09..... | 1,500  | 40½   |     |
| 11:06..... | 100    | 43¼   |     | 11:09..... | 5,000  | 40    |     |
| 11:06..... | 300    | 41⅜   |     | 11:09..... | 100    | 41½   |     |
| 11:06..... | 300    | 41    |     | 11:09..... | 200    | 40½   | SLD |
| 11:06..... | 800    | 40½   |     | 11:10..... | 200    | 40½   |     |
| 11:06..... | 3,000  | 40¾   |     | 11:10..... | 2,000  | 41    |     |
| 11:06..... | 100    | 40½   | SLD | 11:10..... | 1,000  | 41    |     |
| 11:06..... | 400    | 40½   | SLD | 11:10..... | 300    | 41½   |     |
| 11:06..... | 100    | 40½   | SLD | 11:10..... | 200    | 40½   | SLD |
| 11:06..... | 200    | 40½   | SLD | 11:10..... | 200    | 40½   | SLD |
| 11:06..... | 100    | 40½   | SLD | 11:10..... | 200    | 40½   | SLD |
| 11:07..... | 100    | 45    |     | 11:10..... | 100    | 44½   |     |
| 11:07..... | 1,400  | 40½   |     | 11:11..... | 1,500  | 41    |     |
| 11:07..... | 3,290  | 40¾   |     | 11:11..... | 1,000  | 41    |     |
| 11:07..... | 100    | 42⅛   |     | 11:11..... | 10,000 | 41½   |     |
| 11:07..... | 400    | 40½   | SLD | 11:11..... | 1,000  | 41    |     |
| 11:07..... | 400    | 40½   | SLD | 11:11..... | 4,000  | 41    |     |
| 11:07..... | 100    | 40½   | SLD | 11:11..... | 1,000  | 40¾   |     |
| 11:07..... | 1,000  | 45¾   | SLD | 11:11..... | 5,000  | 40    |     |
| 11:07..... | 200    | 40½   | SLD | 11:11..... | 20,000 | 40    |     |
| 11:08..... | 642    | 40¾   |     | 11:11..... | 200    | 40½   |     |
| 11:08..... | 300    | 41½   |     | 11:11..... | 200    | 40½   | SLD |
| 11:08..... | 400    | 40½   | SLD | 11:11..... | 100    | 40½   | SLD |
| 11:08..... | 100    | 40½   | SLD | 11:11..... | 300    | 40½   | SLD |
| 11:08..... | 200    | 40½   | SLD | 11:11..... | 100    | 40½   | SLD |
| 11:08..... | 1,000  | 40½   | SLD | 11:11..... | 100    | 40½   | SLD |
| 11:09..... | 2,000  | 40¾   |     | 11:11..... | 100    | 40½   | SLD |
| 11:09..... | 1,000  | 41¼   |     | 11:11..... | 100    | 45½   | SLD |
| 11:09..... | 100    | 40½   |     | 11:11..... | 1,000  | 45    |     |

## 9. Conclusions

From all of the evidence available to the Task Force it must conclude that, despite the fact that throughout the period of the market break trading continued at some level in almost every over-the-counter stock, the many participants who complained that the system broke down were accurate in their assessment. For customers seeking to buy or sell over-the-counter securities bid-offer spreads were wider than normal. The execution of smaller transactions was frequently delayed by the shutting down of SOES and the other automated execution systems until such time as the markets were no longer locked or crossed. When such executions did occur they were often at prices dramatically different from the price at the time the orders were originally placed. For others, including many institutional investors seeking to buy or sell larger blocks of stocks and many market makers attempting to lay

off positions, execution was often difficult to achieve. Many transactions apparently were executed at prices far different than those of other transactions executed at or about the same time. Transactions often were not reported promptly, and in many instances it appears that transactions which were not reported promptly were not designated as having been reported late.

Many of the problems in the over-the-counter market during the market break were due to the closing down of SOES and the other automated systems in a large number of stocks. This placed such a great strain on the market participants who now had to revert to the use of manual systems that they could not interact with other market participants in the normal manner. Thus, those market makers who may have been willing to trade in depth were often so busy responding to the high volume of phone traffic and handling paperwork that many



customers and other market makers were unable to trade with them.

## **10. The NASD's Proposed Solution**

After discussions about the problems encountered in October with several of the major market makers, the NASD took swift and dramatic action to help restore confidence in the over-the-counter market. At its November 13 meeting the Board proposed amendments to the Rules of Practice and Procedures for SOES and to Schedule D to the By-Laws. The proposed rule amendments would:

- prohibit a firm that withdraws, on an unexcused basis, as a NASDAQ market maker in a security from re-entering NASDAQ as a market maker in that security for 30 days, up from the current two days;
- limit the acceptable reasons for an excused withdrawal from NASDAQ to physical circumstances; e.g. equipment malfunction or legal considerations, such as compliance with SEC Rule 10b-6 which requires market makers to leave NASDAQ in that security while involved in an underwriting or similar distribution of that security;
- make participation in SOES mandatory for all market makers in each of the NMS securities in which they make quotations in NASDAQ;
- enable the NASD to establish different levels of maximum order size limits (e.g. 1,000, 500, and 200 shares) for SOES orders, depending on the characteristics of different securities;
- provide that SOES executions will continue in an NMS security when quotes are locked or crossed, with executions up to a specified number of shares occurring against the firm causing the locked or crossed market if its price is the best for the customer;
- eliminate preferencing of market makers during a locked or crossed market situation.

It is unlikely that such radical changes could have been proposed by the Board of the NASD had it not been for the traumatic events of October. The NASD has solicited comments on the proposed changes from its members. Sometime after the December 21, 1987, deadline for receipt of those comments the Board will consult with the NASD's Trading Committee and the SOES Users Committee. It will then determine whether to adopt the proposals. If the Board acts favorably, they will be filed with the SEC for their approval.

If ultimately adopted these proposed changes will go a long way towards assuring prompt executions at the best available prices for those public customers seeking to buy and sell 1,000 shares or less in the over-the-counter market. Indeed, had the proposed rules been in effect during the market break

it is possible, if not probable, that most of the problems encountered in the execution of small orders in the over-the-counter market would not have occurred. In addition, there would not have been a need to handle a large volume of transactions over the telephone with the ensuing manual handling of paperwork. The market would then have been better able to operate more efficiently, allowing those market makers willing to trade in depth to handle those larger orders and orders for the accounts of market makers both of which are not executed by the automated systems.

## **D. Derivative Instruments**

### **1. Introduction**

In the futures market, all market orders were processed and executed. Generally, orders were executed in market conditions characterized by reasonable price fluctuations. Even during a 50-minute trading halt in the S&P 500 futures, it was possible to trade another stock index futures contract, the MMI. Other than that trading halt, the major problem in the futures market was confined to a few periods discussed herein, in which prices fluctuated in an extreme and disorderly fashion.

The options market not only experienced instances of extreme and disorderly price fluctuations which the futures market experienced, but also severe problems of lack of availability. Apparently, the unique problems faced by this market (i.e. the need to provide, manage, and properly price numerous option series) simply overwhelmed the ability of existing systems to fully cope with the unprecedented stresses on October 19 and 20. Trading in option markets was also hindered by inadequate information regarding the status and pricing of underlying stocks or indexes.

### **2. Stock Index Futures**

#### **(a) Availability of Market**

On Monday, October 19, the futures market was open and accessible throughout the day. Information about futures prices and market conditions was readily available. The S&P futures traded 162,022 contracts or 199 percent of the average January to October 1987 daily volume of 81,359 contracts. In comparison, NYSE volume was 317 percent of its average daily volume during the first 10 months of 1987 and OEX volume was 72 percent of its daily average.

For other stock index futures contracts, the percentages of average daily volume traded were 170 percent for the MMI futures, 149 percent for the NYSE futures, and 119 percent for the Value Line futures.

On October 20, accessibility varied among futures markets. The S&P futures market was open and accessible from 9:30 a.m. to 12:15 p.m. and 1:05 p.m. to 4:15 p.m. EST. The MMI futures contract traded continuously on Tuesday. Trading in the Value Line futures continued for 22 minutes after trading in the S&P 500 contract was halted by the CME, and halted only between 12:37 p.m. and 1:05 p.m. EST. Trading in the NYSE Composite futures halted at 12:20 p.m., and did not re-open until 1:15 p.m. EST.

On the 20th, information about the status of each market was not always readily available or reliable. For example, many market participants did not realize that the MMI futures were still open at the time that trading was halted in the S&P futures.

On October 20, the S&P futures traded 126,562<sup>17</sup> contracts, or 156 percent of its January to October 1987 average daily volume. In comparison, the NYSE traded 319 percent of its average daily volume on October 20. Viewed another way, S&P futures volume dropped 22 percent from Monday, while NYSE volume increased one percent from Monday. For other stock index futures contracts on Tuesday, the percentage of average daily volume traded was 104 percent for the MMI futures, 83 percent for the NYSE futures, and 76 percent for the Value Line futures.

Looking at average volume per minute might be too microscopic for some, yet it sheds additional light on the liquidity of the NYSE and CME floors on Tuesday, when their trading hours were different.

TABLE D-1

|                       | 1987<br>norm | Monday<br>(October 19) | Tuesday<br>(October 20) | Percent<br>change<br>from<br>Monday |
|-----------------------|--------------|------------------------|-------------------------|-------------------------------------|
| NYSE (shares) .....   | 488,651      | 1,549,487              | 1,559,230               | 0.63                                |
| CME (contracts) ..... | 201          | 400                    | 357                     | (10.75)                             |

As Table D-1 indicates, even adjusting for shortened trading hours, the CME's volume dropped on Tuesday. This lower volume may be explained by the inactivity of arbitrageurs, concerns regarding the CME clearinghouse, and the reluctance of some potential sellers to sell futures at such a deep discount. Nevertheless, volume per minute on Tuesday was still 77 percent higher than the norm for the first 10 months of 1987.

Some of the decline in volume on the 20th also may be due to the fact that many of the smaller

<sup>17</sup> Although this was the number of contracts that cleared on Tuesday night, it was unclear from preliminary conversations with the CME staff whether some of these contracts were out-trades from Monday.

locals left the S&P pit on Tuesday. However, the absence of these locals was not of great significance because larger locals apparently made up for their absence by trading even more volume than usual. A cursory review of the trading by certain large locals indicates that they did increase their activity. It should be remembered that, under the CFTC's regulatory scheme, market makers in the S&P pit have no obligation to contribute to the maintenance of a fair and orderly market or to remain in the trading ring.

There are two basic reasons that smaller locals left the pit on October 20. The obvious reason is that they had either lost too much money or feared doing so. The less obvious reason is that some clearing firms that guaranteed the locals insisted on deposits of as much as \$200,000 from some locals who lease exchange seats and normally were asked to post only \$25,000. Most smaller locals could not post the larger sum, and were unable to trade even if they wished to do so. Moreover, to free up firm capital, many firms required locals to execute liquidating trades only. In addition, some firms simply refused to continue clearing for floor brokers because of the risk of errors during this period.

### (b) Liquidity of Market

Perhaps the best measure of liquidity in a market is the bid-ask spread. Therefore, we have attempted to capture the bid-ask spread in the December S&P futures at various times during the weeks of October 12 and 19. Next, we attempted to see how much the spread widened under the most difficult market circumstances. Further, we attempted to compare the spread in the S&P futures with the spread in the S&P 500 Index itself at the same points in time. The latter spread is derived by adding up the spreads weighted by the shares outstanding for all stocks in the index and dividing by the index divisor.

Although there are no regularly disseminated bid-ask quotes captured by the CME, the bid-ask in the futures can be reconstructed reasonably reliably by looking at a time and sales run. The data for the index itself are reasonably reliable in normal markets. However, at times it is difficult to evaluate the bid-ask data for a stock index, since it includes bid-ask indications which may be several dollars apart for stocks that are halted or unopened, as well as normal bid-ask quotes. In sum, the best available data may not be perfect.

As a frame of reference, the minimum bid-ask in the S&P 500 futures market is 0.05. The minimum bid-ask in the S&P 500 index would be about 0.81 if the bid-ask for each stock were  $\frac{1}{8}$ . As a practical matter, the cash bid-ask is rarely less than 1.40, and was typically around 1.75 during the summer of 1987. Table D-2 enables one to see the degree to which the bid-ask in the cash and futures markets

adhered to or departed from its minimum differential and its norm. In addition to daily minimum and maximum spreads, we have included the highest

bid-ask in the stock market between 11:00 a.m. and 3:30 p.m. EST because the maximum often occurs early or late in the day.

TABLE D-2

| Date            | Futures |         | Cash    |                         |         |
|-----------------|---------|---------|---------|-------------------------|---------|
|                 | Maximum | Minimum | Maximum | Maximum (11:00 to 3:30) | Minimum |
| October 12..... | 0.20    | 0.05    | 1.80    | 1.63                    | 1.40    |
| October 13..... | 0.35    | 0.05    | 1.89    | 1.58                    | 1.40    |
| October 14..... | 0.55    | 0.05    | 2.02    | 1.69                    | 1.39    |
| October 15..... | 0.55    | 0.05    | 1.91    | 1.85                    | 1.59    |
| October 16..... | 1.50    | 0.05    | 3.15    | 2.32                    | 1.61    |
| October 19..... | 1.00    | 0.25    | 11.25   | 6.14                    | 2.23    |
| October 20..... | 3.00    | 0.50    | 18.36   | 9.22                    | 2.40    |
| October 21..... | 1.50    | 0.25    | 13.10   | 4.39                    | 2.02    |

The data show a tremendous widening of the spread in both the futures and cash markets starting on the 16th of October and reaching a peak on the 20th. Indeed, the minimum spread in the cash market on each day from the 19th through the 21st exceeded the maximum spread on every day from the 12th through the 15th of October. The minimum spreads in the cash markets between the 19th and the 21st ranged from 144 percent to 171 percent of the normal minimum of 1.40, and 249 to 296 percent of the absolute minimum of 0.81. At the other extreme, the minimum spreads in the futures market during these three days ranged from 500 to 1,000 percent of the minimum 0.05. A similar phenomenon was noted in the maximum

spreads. The maximum spreads in the cash market are somewhat distorted by the very wide spreads or indications displayed during delayed openings and trading halts.

Another approach to the measurement of market liquidity and depth is to examine the activity of market makers. Each futures exchange keeps a record of the activity of its locals, and through a comparison of those records with price movements we can see the degree to which they either reinforced or counterbalanced that day's price trend.

Table D-3 depicts locals' share of total volume during this period. It shows whether they were there at the moment when you needed them.

TABLE D-3

|                 | Total volume in December contract | Locals gross buys | Locals net buys | Locals net buys (dollars) | Locals gross buys as percent of total volume | Price change |
|-----------------|-----------------------------------|-------------------|-----------------|---------------------------|--|--------------|
| October 12..... | 76,825                            | 35,180            | 105             | \$16,294,477              | 45.8   | (0.60)       |
| October 13..... | 78,671                            | 38,753            | (72)            | (11,306,916)              | 49.3   | 4.05         |
| October 14..... | 109,766                           | 47,272            | (154)           | (23,844,282)              | 43.1   | (10.65)      |
| October 15..... | 122,084                           | 49,911            | 138             | 20,961,303                | 40.9   | (6.75)       |
| October 16..... | 138,692                           | 49,098            | 251             | 36,652,150                | 35.4   | (16.00)      |
| October 19..... | 154,508                           | 48,487            | 1,734           | <sup>1</sup> 213,105,132  | 31.4   | (80.75)      |
| October 20..... | 107,460                           | 24,945            | (269)           | (29,075,134)              | 23.2   | 14.75        |
| October 21..... | 76,296                            | 20,647            | (30)            | (3,727,590)               | 27.1   | 42.00        |
| October 22..... | 46,292                            | 10,993            | (128)           | (14,930,432)              | 23.7   | (13.75)      |
| October 23..... | 36,272                            | 7,779             | (160)           | (19,396,560)              | 21.4   | (3.50)       |

<sup>1</sup> Net buys in dollar terms are calculated with reference to the average price of all buys by locals in the relevant period. This figure is less precise than the \$221,323,825 total in Table D-4 because average prices are broken out for each half hour in such table.

Table D-3 confirms that despite the fact that locals account for a very significant portion of the gross buys, they tend to liquidate their positions the same day and generally take few positions home. It also shows that the net buys of locals as a group

absorbed some selling pressure on October 19. However, the table also reveals that locals' gross buys as a percentage of total volume declined considerably on Monday and Tuesday and remained lower as the week progressed.



Table D-4 breaks down locals' gross and net buys into each half hour time bracket for October 19. It reveals how participation by locals changed as the day progressed.<sup>18</sup>

TABLE D-4

| Time (EST)          | Total December volume | Locals gross buys | Locals net buys (contracts) | Locals net buys (dollars) | Locals gross buys as percent of total volume | Price change |
|---------------------|-----------------------|-------------------|-----------------------------|---------------------------|--|--------------|
| 9:30 to 10:00.....  | 19,561                | 7,278             | 600                         | \$79,058,400              | 37.2   | (20.25)      |
| 10:00 to 10:30..... | 14,134                | 5,228             | 608                         | 77,495,984                | 37.0   | (9.00)       |
| 10:30 to 11:00..... | 11,256                | 3,250             | (16)                        | (2,052,584)               | 28.9   | 6.00         |
| 11:00 to 11:30..... | 13,472                | 4,657             | (81)                        | (10,622,826)              | 34.6   | 5.50         |
| 11:30 to 12:00..... | 8,664                 | 2,676             | (179)                       | (23,422,060)              | 30.9   | (7.50)       |
| 12:00 to 12:30..... | 6,160                 | 1,883             | 16                          | 2,055,024                 | 30.6   | (3.00)       |
| 12:30 to 1:00.....  | 9,580                 | 2,913             | 216                         | 27,247,644                | 30.4   | (0.50)       |
| 1:00 to 1:30.....   | 10,990                | 3,683             | 448                         | 56,200,928                | 33.5   | (12.50)      |
| 1:30 to 2:00.....   | 12,373                | 3,999             | 340                         | 40,047,240                | 32.3   | (12.00)      |
| 2:00 to 2:30.....   | 9,095                 | 2,540             | 43                          | 4,940,205                 | 27.9   | 4.00         |
| 2:30 to 3:00.....   | 9,968                 | 2,702             | (135)                       | (15,660,877)              | 27.1   | (11.00)      |
| 3:00 to 3:30.....   | 11,006                | 3,106             | (243)                       | (26,370,360)              | 28.2   | (7.00)       |
| 3:30 to 4:00.....   | 11,097                | 3,160             | 167                         | 17,417,682                | 28.5   | (15.00)      |
| 4:00 to 4:30.....   | 7,151                 | 1,412             | (50)                        | (5,010,575)               | 19.7   | 4.00         |
| Total.....          | 154,507               | 48,487            | 1,734                       | \$221,323,825             | 31.4   |              |

On October 19, locals absorbed \$221 million of selling pressure. On a day when public customers<sup>19</sup> were net sellers of 3,706 contracts worth approximately \$469 million (gross sales of 88,326 contracts worth \$10.75 billion, less gross purchases of 84,620 contracts worth \$10.29 billion), locals as a group absorbed 47 percent of the public's net sales. After the first hour of trading, the locals absorbed a net \$64.8 million of selling pressure and through most of the day tended to counterbalance the price trend exhibited within that half hour. Thus, in 10 of the 14 brackets their net trades were on the other side of the market change. Two of the four brackets where they were on the same side occurred between 2:30 and 3:30 p.m., when the futures contract declined 18 points and locals were net sellers of 378 contracts worth more than \$42 million.

However, the locals' performance was not uniform. For instance, the few locals with reportable positions, i.e. over 300 contracts, were net sellers of 1,927 contracts on October 19. Table D-5 shows the same data for Tuesday, October 20.

Reviewing the opening and the bracket periods

<sup>18</sup> Most of the data appearing in this section came from tapes provided to the Task Force by the CFTC. Discrepancies may be noted between these data and other data provided directly by the CME. For instance, the most significant discrepancy was in the locals' net buys for October 19th, in which the CME's most recent data show 850 rather than 1734 net buys. Variations may be attributable to different treatment of (i) out-trades, (ii) trading

after the opening up to the trading halt, it appears that locals helped to absorb some of the pressure. During the first half hour of trading, when the contract rose 35 points, locals were net sellers of 312 contracts worth \$36 million. During the next two and one quarter hours the contract declined by 56 points and locals were net buyers of 383 contracts worth \$41 million. Their net activity counterbalanced the price trend in four of the morning's six half hour time brackets. During this time, most of the selling pressure came from member firm proprietary traders, who were net sellers of 1,292 contracts worth approximately \$144 million. In contrast, public customers were net buyers of 439 contracts worth approximately \$94 million. However, from 2:00 p.m. EST on, the locals' net activity reinforced the dominant trend. From 2:00 to 3:30 p.m., the contract rose 14 points and locals were net buyers of 103 contracts worth \$11 million. From 3:30 p.m. to the close, the contract declined by 10 points and locals were net sellers of 131 contracts worth \$14 million. For the day as a whole, the locals were net sellers of \$31.2 million of futures.

in back months, and (iii) trading cards marked with the incorrect time bracket. In aggregate, the data shown herein depicts the locals as more aggressive buyers during periods when prices declined than the other data provided directly by the CME.

<sup>19</sup> "Public customers" refers to customers of an FCM, and includes institutions such as pension funds, portfolio insurers, mutual funds and money managers, as well as retail customers.

TABLE D-5

| Time (EST)           | Total December volume <sup>1</sup> | Locals gross buys | Locals net buys (contracts) | Locals net buys (dollars) | Locals gross buys as percent of total volume | Price change |
|----------------------|------------------------------------|-------------------|-----------------------------|---------------------------|--|--------------|
| 9:30 to 10:00 .....  | 19,590                             | 4,801             | (312)                       | \$(36,087,948)            | 24.5   | 35.00        |
| 10:00 to 10:30 ..... | 9,865                              | 2,360             | 247                         | 28,247,908                | 23.9   | (11.00)      |
| 10:30 to 11:00 ..... | 10,994                             | 2,399             | (170)                       | (17,970,615)              | 21.8   | (19.00)      |
| 11:00 to 11:30 ..... | 10,972                             | 2,224             | 281                         | 28,089,182                | 20.3   | (19.00)      |
| 11:30 to 12:00 ..... | 7,990                              | 1,739             | 77                          | 7,545,508                 | 21.8   | (5.00)       |
| 12:00 to 12:30 ..... | 3,454                              | 882               | (52)                        | (4,776,720)               | 23.8   | (2.00)       |
| 12:30 to 1:00 .....  | 362                                | 30                | (7)                         | (763,584)                 | 8.3  | 0.00         |
| 1:00 to 1:30 .....   | 7,626                              | 2,244             | (91)                        | (9,559,277)               | 29.4   | 23.00        |
| 1:30 to 2:00 .....   | 9,558                              | 2,012             | (214)                       | (23,015,379)              | 21.1   | 6.00         |
| 2:00 to 2:30 .....   | 6,062                              | 1,417             | 0                           | 0                         | 23.4   | 6.00         |
| 2:30 to 3:00 .....   | 5,744                              | 1,199             | 27                          | 3,006,180                 | 20.9   | 5.00         |
| 3:00 to 3:30 .....   | 5,628                              | 1,456             | 76                          | 8,430,794                 | 25.9   | 3.00         |
| 3:30 to 4:00 .....   | 6,722                              | 1,655             | (92)                        | (10,144,564)              | 24.3   | (9.00)       |
| 4:00 to 4:30 .....   | 2,894                              | 587               | (39)                        | (4,178,986)               | 20.3   | (1.00)       |
|                      | 107,461                            | 24,925            | (269)                       | (31,177,501)              | 23.2   |              |

<sup>1</sup> 362 contracts were recorded as having taken place during this time bracket even though trading was halted for all of this bracket. We chose simply to analyze, and not revise, exchange data.

In sum, the locals as a group absorbed some selling pressure, but did not act uniformly and were not able to counterbalance the majority of public selling pressure. Since the locals do not, and have no responsibility to, singlehandedly absorb significant imbalances in order flow, the futures market functions as an efficient risk transfer mechanism only when the activity of locals is supplemented by market participants such as speculators and index arbitrageurs. This is especially true with respect to imbalances of the magnitude exhibited during the October market break.

### (c) Orderliness of Markets

Although movements in futures prices were reasonably orderly throughout the week of October 19, there were several notable exceptions. On at least four occasions, the market moved so rapidly as to raise questions concerning (i) its effect on the stability of the cash market and (ii) the fairness of prices at which customer orders were executed.

#### (i) Monday's Break Below the 250 Level

One such disorderly period occurred when the S&P futures broke through the 250 level, which became psychologically important when the futures reached and held that level on several occasions in the morning. However, just before 1:30 p.m. EST on October 19, the futures fell from 250 to as low as 235 in a span of two minutes, and then rebounded to the mid-240 range in the ensuing three minutes. A 15-point move in S&P futures is roughly equivalent to a move of 120 points in the Dow. At

1:27 p.m., 130 contracts traded at 250. Locals bought 25 and sold 10 contracts at 250, and the largest sale by a public customer was 75 contracts. Then the market bounced slightly. But at 1:28 p.m., 381 contracts changed hands at 250, including one sale of 225 contracts by a public customer. It was more pressure than the market could absorb, as locals purchased only 46 contracts at 250 (and sold 56 contracts there). Once there was a trade below 250, it took slightly more than one minute and sales of 1,596 contracts for the futures to reach 240. Once the futures traded under 240, it took only 122 contracts and less than a minute to push the price to 235.

During the move from 250 to 235, locals were net sellers of 266 contracts (739 sells, 473 buys) and public customers were net sellers of 163 contracts (878 sells, 715 buys). Index arbitrageurs (and other member firm proprietary traders) were net buyers of 413 contracts (463 buys, 50 sells) and locals acting as agents for the locals who were not on the floor were net sellers of 33 contracts (51 sells, 18 buys).

During the move from 240 to 235, locals were net buyers of 79 contracts, public customers were net sellers of 57 contracts, and firm proprietary traders were net sellers of 24 contracts. Interestingly, the largest trade was only a 30 lot. In the aftermath of this move, the S&P 500 cash index fell from 256.26 to below 252 within 15 minutes.

#### (ii) Tuesday Price Break

A second sudden, sharp price movement occurred between 10:36 and 10:45 a.m. EST on October 20,



when the S&P futures dropped from 227 to 209 in nine minutes, the rough equivalent of 144 Dow points. However, because of data and time constraints, no detailed study of this move was undertaken.

### (iii) Thursday's Opening

A third major price move occurred at the opening on Thursday, October 22, after the S&P futures closed at 258.25 the previous day. The MMI futures opened 26 points (6 percent) lower at 9:15 a.m. EST. But at 9:30 a.m., the S&P futures opened an unprecedented 60 points lower, trading between 195 and 201 in the first four minutes. Apparently, at the opening it became known in the pit that there was a large customer order to sell several thousand contracts, and given the uncertainty in the market, many of the locals backed away. However, beginning suddenly at 9:36 a.m., the futures began to rally sharply, reaching the 230 level within three minutes. Approximately two hours later, the S&P futures were back above 250. Thus, the futures market experienced a decline of 24 percent and a rally of 28 percent in about two hours.

A fourth instance occurred on October 20 in the MMI futures during the time that trading was halted in the S&P futures. The MMI futures remained open between 12:15 and 1:05 p.m. EST when the S&P futures were closed for 50 minutes. This instance is further discussed in the following section.

### (d) MMI Index on October 20

An article in the *Wall Street Journal* on November 20 raised the possibility that the MMI futures contract may have been deliberately manipulated by a few major firms as part of a desperate attempt to boost the Dow and save the markets. That article went on to summarize trading activity between 12:30 and 1:00 p.m. EST, noting that only 808 contracts traded, representing a cash value of about \$60 million. While that volume analysis appears to be reasonably accurate, data from the Chicago Board of Trade indicate that 820 contracts with a value of \$72.3 million were traded in that period.<sup>20</sup>

The Task Force examined all trading done in the November MMI futures from 12:15 to 1:05 p.m. EST, which is the entire period that the S&P futures halted trading. It also examined a subset of that period beginning at 12:18 p.m. with the day's low price and ending at 12:50 p.m. with the highest price reached while trading was halted in S&P futures.

The November MMI futures contract began to move sharply higher before the MMI cash index did so. The November futures made their low at 12:18

p.m., and the cash index made its low at 12:21 p.m. However, downward momentum in the cash index had slowed considerably, and the futures market often reacts to changes in the momentum of the cash index. Furthermore, several of the individual stocks in the MMI had begun to uptick.

Aside from leading the cash index, the magnitude of the futures move was substantially greater than the movement in the cash markets. The futures rallied 90 points between 12:18 and 12:50 p.m., and the index rallied only 21.4 points in that period.

The futures reached an interim peak of 375 at 12:50 p.m., and the index itself peaked at 12:57 p.m. Thus, the futures peaked seven minutes before the index peaked.

The basis, which had reached a discount of 58.64 points, shot to a premium of as much as 9.93 points. Interestingly, no arbitrage was performed when the futures were at a discount, but one program involving the sale of 25 contracts was done when the futures reached a premium.

During the S&P trading halt, the Dow rallied 106 points. However, the range of the MMI futures contract, from 285 to 375, was the equivalent of approximately 440 Dow points.

Between 12:18 and 12:50 p.m., a total of 985 November futures contracts worth \$83 million traded. A total of 61 FCMs participated in the trading during this time period. Data from major brokerage houses indicate that none of the buying of futures was part of any program arbitrage activity.

The largest buyer during the trading halt was a private investor who frequently carried overnight positions in excess of 1,000 contracts. During the day, the private investor went from a net short position of 611 contracts to a net long position of 172 contracts. Thus he bought a net of 783 contracts during the day on Tuesday. Of his total buying, 211 contracts were purchased between 12:18 and 12:50 p.m. His largest single purchase was of 150 contracts, bought at 12:18 p.m. at the day's low price of 285.00. A foreign customer was on the other side of that trade. The private investor's buying clearly began before 12:18 p.m., with at least 33 contracts purchased in the 20 minutes preceding the halt on the CME. Between 12:00 and 1:00 p.m., this private investor sold only two contracts. This trading appears consistent with the private investor's normal trading activity.

The second and third largest buyers during the halt on the CME were both large brokerage houses that typically account for an appreciable share of the volume in the MMI futures. One house bought approximately 70 contracts for its proprietary account, none of which was purchased within 50 points of the day's low. The other house bought almost exclusively for a customer, buying 75 contracts near the lows between 12:18 and 12:30 p.m. That house

<sup>20</sup> Volume counts can vary because an exchange audit trail provides a time for only about 95 percent of all transactions.

had started buying for a customer no later than 12:00 p.m., and had already purchased 30 contracts between 12:00 and 12:15 p.m. No other firm bought more than 65 contracts between 12:18 and 12:50 p.m. Ironically, the largest single player between 12:18 and 12:50 p.m. was another broker-dealer that sold 366 contracts for a foreign customer.

These data reveal no suggestion of any concerted action by any major firms or anyone else to manufacture a rally. Nevertheless, the fact that the purchase of 985 contracts, worth a mere \$83 million, could move a market up 32 percent demonstrates how thin the market had become and may be cause for concern.

### 3. Stock Index Options

#### (a) Availability of Markets

The options market was substantially less available than the futures market on both Monday and Tuesday. Despite the soaring volume in other markets, on October 19 the OEX options traded 323,291 contracts, just 72 percent of their average daily volume. Even though OEX volume often drops somewhat on the Monday following an expiration, this Friday to Monday drop was the largest in at least two years. The situation worsened on Tuesday, when the OEX options traded 185,506 contracts, or only 42 percent of their average daily volume.

As a frame of reference for Tuesday, S&P futures traded 156 percent of their average daily volume and the NYSE traded 319 percent of its average daily volume. Had the OEX options experienced the same proportional increase, trading volume would have been between approximately 694,000 contracts (156 percent) and 1,400,000 contracts (319 percent). The low volume cannot be explained by lack of capacity in the OEX pit. Indeed, that pit has traded as many as 1,450,000 contracts in a day.

The diminished volume indicates that the options market did not accommodate the needs of many of those wishing to position themselves for a market decline. There were two key reasons for the low volume. First, options were in rotation for over three hours, or nearly one half of the trading day on October 19. Second, the least expensive OEX puts shown on all quotation machines opened at a price of 66 on Monday the 19th, or more than 10 times the price of the typical actively-traded option series in normal circumstances.

The OEX options went through two rotations on Monday morning, with no free trading in between rotations. The first occurred between 9:30 a.m. and 11:00 a.m. and the second between 11:02 a.m. and 12:36 p.m. EST. The second rotation was requested by a number of the major brokerage houses, who apparently were concerned about their potential liability for order execution errors in a period of

hectic free trading. The combination of a lengthy rotation period and a gyrating underlying market made it difficult to place an intelligent limit order and, as some customers learned the hard way, dangerous to place a market order. In a normal rotation, one can generally estimate the time an option series will open to within 5 or 10 minutes. On the 19th it was difficult to know when and at approximately what price a particular option was likely to trade.

The most active options are the nearest expiration month, in this case the November options. But the CBOE opens the less active months first, so that on the 19th, the first rotation of November calls did not begin until 10:02 a.m. and did not end until 10:34 a.m. EST. The November puts rotated between 10:04 and 10:20 a.m. In the second rotation, which began at 11:02 a.m., the November puts and calls apparently did not begin trading until approximately 11:53 a.m.

As an example of the price difference between rotations, the OEX November 305 puts traded at 66 in the first rotation and at 58 in the second rotation.

On the 19th, the CBOE conducted a special closing OEX rotation which occurred from 4:16 p.m. to 4:56 p.m. EST, after other markets had closed.

As noted, a hedger could find few viable puts on Monday. Though the CBOE added new strike prices on Monday morning, ranging as low as 255, even the 255 series was in-the-money by 10:44 a.m. EST. Perhaps more significantly, it was not possible to access strike prices below 280 through all quotation vendors, because it takes some vendors 24 hours to display newly listed options. The lowest strike price that most brokers knew about were the 280 puts.

The situation with respect to multiple rotations, length of each rotation, and lack of viable put options did not improve on Tuesday, October 20, when the OEX again had two rotations. The first rotation took 144 minutes from 9:30 to 11:54 a.m. EST. The CBOE halted trading in the OEX between 11:54 a.m. and 1:22 p.m. in the belief that stocks representing less than 80 percent of the total capitalization of the OEX were open. The second rotation lasted 121 minutes from 1:22 to 3:23 p.m. Thus, the OEX was in free trading for only 37 minutes of the time that stocks were open on the NYSE, and for only 52 minutes altogether.

Although the CBOE again added new strike prices on the 20th down to 185, puts were still not a viable trading vehicle, as evidenced by total volume in OEX puts of only 64,579 contracts. Total volume in OEX options was 185,506 contracts. In addition to the now-familiar problem regarding uncertain time of rotation, the problem with the quote vendors was exacerbated by the use of the symbol "OEZ" rather than OEX for puts with strike prices between 185 and 250. This was necessary since the



proliferation of strike prices exceeded the capacity of the vendors to display further quotes using the symbol OEX.

### (b) Liquidity of Markets

The options story is one of lack of availability and lack of orderly prices when they did trade. In that context, the bid-ask spread is a less significant concern. Suffice it to say that the bid-ask spread widened but remained reasonable in the OEX pit. Call options in the \$1 to \$3 range, which would normally have a  $\frac{1}{16}$  spread, generally had a spread of  $\frac{1}{8}$  or  $\frac{1}{4}$ . Call options in the \$3 to \$8 range had spreads ranging from  $\frac{1}{8}$  to  $\frac{1}{2}$ . Puts with their very high premiums had spreads of one to five points.

The CBOE estimated that approximately 25 percent of market maker capital was lost during the week of October 19. But it is unclear whether these losses stemmed more from market making activity or inventory losses on positions that market makers had kept open for some time.

### (c) Orderliness of Markets

Although a purpose of an opening rotation is to insure a single price opening of each series and some orderliness in the opening process generally, the latter goal was not fully realized on October 20. Consider the opening prices of the OEX November 250 puts and the OEX November 190 puts, under market conditions as shown below:

TABLE D-6

| Series         | Times (EST) | Open | OEX at time of opening | S&P futures at time of opening |
|----------------|-------------|------|------------------------|--------------------------------|
| Nov 250 P..... | 11:31       | 75   | 222                    | 191                            |
| Nov 185 P..... | 11:54       | 81   | 218                    | 191                            |

Based on the level of the OEX shown, the 250 puts, which were in-the-money, traded at an implied volatility of about 225 and the 185 puts, which were out-of-the-money, traded at an implied volatility of about 450. Viewed another way, the buyer of the 250 puts would have broken even if the Dow had reached approximately 1400 by November 20, while the buyer of the 185 puts would not have broken even unless the Dow had reached approximately 840 by that date.

Opening volume in the 250 puts was 80 contracts and opening volume in the 185 puts was 173 contracts. Thirty of the 185 puts were purchased by market makers.

The irony in this is that the system of rotation, which is designed to protect customers, in some instances had precisely the opposite effect. Market makers were all the more reluctant to sell puts at any price because they were unable to judge how

long it would be before they could cover short positions in put options.

Due in large part to smaller order flow, rotation was not as much of a problem in other index option markets. The American Stock Exchange reports that the MMI options completed rotation within 20 minutes.

Trading in some equity options was hindered by lack of information on underlying stocks. Traders on the CBOE said that at times they could not get through to the NYSE floor to place orders to offset option positions, and, at times, could not even determine whether certain stocks had stopped trading.

## 4. The Clearinghouses' Interface with the Banking System During the Market Break

### (a) Stock Index Futures

Following customary procedures, all four CME settlement banks confirmed their customer "pays" on Monday morning, October 19, by 7:00 a.m. CST. After the S&P 500 contract opened 20 index points lower, the CME's staff responsible for recommending intraday margin calls placed the first October 19 intraday call in motion at approximately 10:00 a.m. CST. Thirteen clearing members were called for a total of \$290 million.

A second intraday call was issued in the early afternoon to 21 firms for a total of \$660.5 million. Later in the afternoon, the CME made a third intraday call on 15 firms for \$669.5 million. All intraday calls were met approximately one hour after issuance, resulting in a total of \$1.62 billion flowing into the clearinghouse.<sup>21</sup> Consistent with its rules, the CME allowed the clearing firms to put up cash, which totaled \$1.4 billion and Treasury bills or L/Cs, which made up the difference.

Total mark-to-market variation margin for October 19 set a new record of \$2.5 billion. As of the close on October 19, total original margin required was \$3.9 billion. Total margin on deposit was \$4.3 billion.

After giving credit for the intraday margin collected on Monday, the CME's total margin call Tuesday morning for house and customer accounts was approximately \$2.1 billion, comprised of \$1.13 billion in variation margin and \$997 million in original

<sup>21</sup>Two calls were adjusted. One was adjusted to account for position liquidations on Monday morning that reduced the firm's risk exposure. The second adjustment was made for a firm that met its first two calls but requested rescission of its third call of \$19 million because it had offsetting positions at the CBOE and was close to its daily banking credit limit. After meeting with the firm's principals and discussions with the CBOE and OCC, the CME allowed the firm to meet the third call in the regular fashion the next day.

margin.<sup>22</sup> In addition to variation margin, the CME clearinghouse collects new original margin each morning for all new positions established the prior day. On Monday the open interest in the S&P 500 contract increased 25,525 contracts and accordingly, CME clearing firms were required to deposit original margin at the clearinghouse. With respect to variation margin, the calls were distributed among the four settlement banks, as follows:

|              |                 |
|--------------|-----------------|
| Bank 1 ..... | \$438,000,000   |
| Bank 2 ..... | 368,000,000     |
| Bank 3 ..... | 156,000,000     |
| Bank 4 ..... | 168,000,000     |
| Total.....   | \$1,130,000,000 |

Obviously, by reason of the market's unprecedented decline, these margin calls were extraordinarily large, three times higher than the prior largest morning variation call and 10 times larger than average.

Starting before 7:00 a.m. CST, the Chicago settlement banks began calling their clearing member customers and, when necessary, their bankers in New York to obtain assurances that the large margin calls would be met that day. The banks' concern arose from the fact that in many instances their customers' margin calls exceeded existing intraday lending practices and in the event the customers failed to cover by the close of business, the overnight loans would greatly exceed the banks' lending limits. Thus, the settlement banks were reluctant to undertake credit risks to the extent required that morning without receiving some comfort from their customers and the New York banks. However, Chicago bankers responsible for credit decisions reportedly experienced serious difficulty locating their counterparts in New York. Moreover, because the Fed Wire opened at 7:00 a.m. EST (6:00 a.m. CST), there was only one hour to move funds from New York to Chicago before the settlement banks were required to notify the CME that their banking customers were good for the margin calls.

According to the CME, its officials were in contact with senior officers of the four settlement banks, the President of the Federal Reserve Bank of Chicago, and the CFOs of the major clearing members. Also, the Presidents of the New York and Chicago Federal Reserve Banks contacted the banks in their districts

that lend to financial institutions and indicated to them that the Fed was prepared to provide liquidity.

Notwithstanding the settlement banks' difficulties confirming the availability of funds to meet margin calls, by 7:20 a.m. the four settlement banks confirmed to the CME that fund transfers had occurred or would occur for all but one of the member firms. For that firm, prior to 7:20 a.m. CST the CME received confirmation that funds were being moved to Chicago to allow the settlement bank to agree to honor its commitment. Confirmation was made by that settlement bank to the CME prior to the 8:30 a.m. CST opening of the S&P 500 contract.

The accompanying "Time Line of CME Variation Margin Settlement" summarizes the cash flows between the clearing members and the CME's settlement banks on October 20. As the Time-Line indicates, the four settlement banks began the day with cash variation margin of \$1.4 billion from Monday's intraday calls. It is clear that actual cash movements between New York and Chicago, and between Chicago banks, took place throughout the day. The CME's clearinghouse accounts at the several settlement banks received payments as early as 6:30 a.m. CST and continued to receive payments until nearly 6:00 p.m. At certain points in the day "gridlock" apparently occurred as certain banks declined to transfer funds for a customer until they received covering funds for that customer's account from another source. The Fed Wire system was subject to volume-induced delays and reportedly was "down" twice for an aggregate of nearly two hours between 10:00 a.m. and 12:30 p.m. CST. Sources also attributed the delays and gridlock to bankers coming up against the daylight overdraft limits imposed by the Federal Reserve.

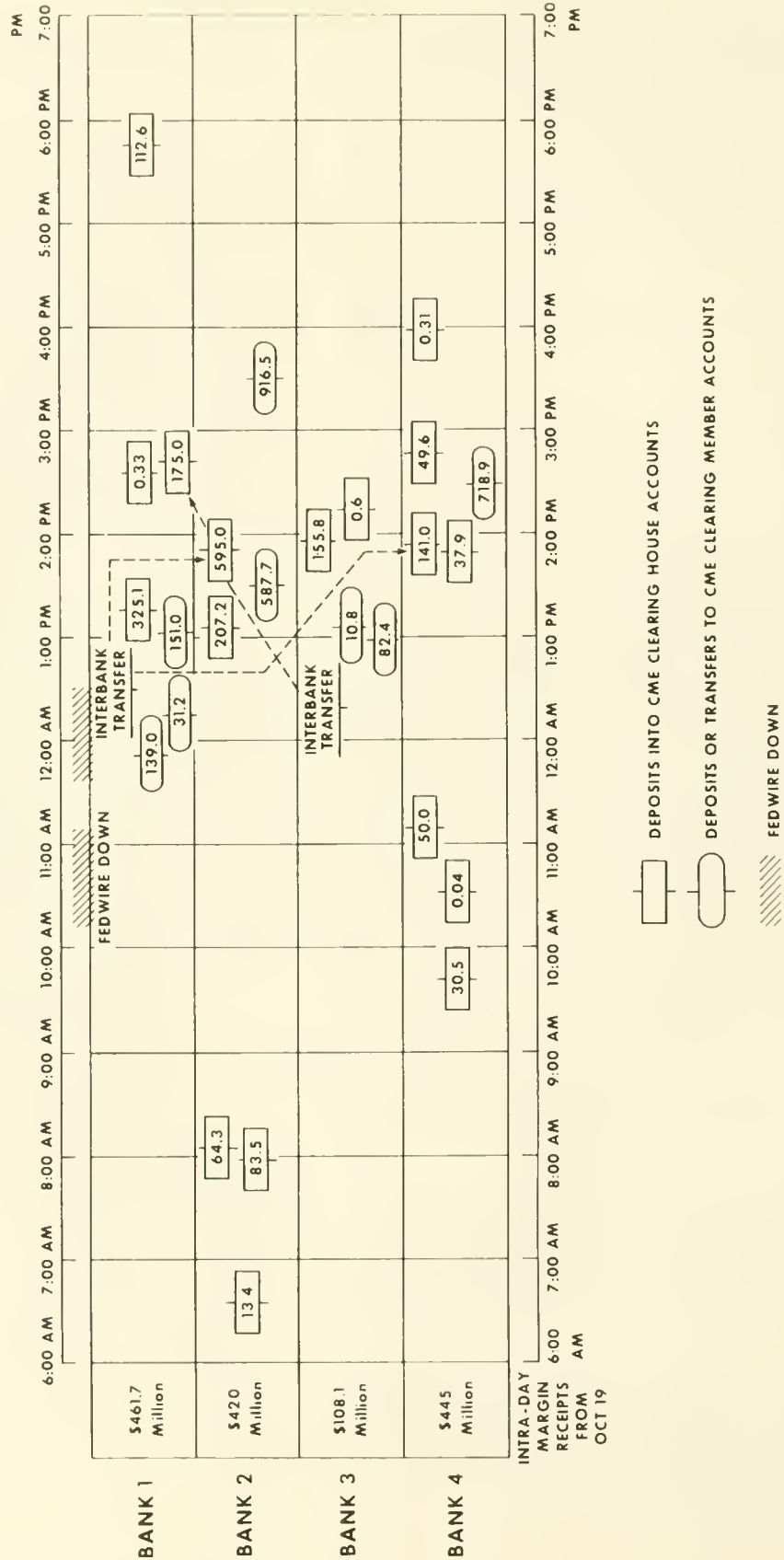
The Fed Wire remained open later than normal to permit the completion of traffic. As each anticipated closing time approached and wire traffic remained incomplete, the Fed announced that it would extend the closing time. Consequently, the settlement banks did not know from minute to minute whether their supposed intraday credit extensions would be covered by the close of business.

At the same time as the clearinghouse system was collecting \$2.1 billion in variation and original margin relating to the 19th, the CME made two intraday variation margin calls on Tuesday: one at 11:00 a.m. CST when 10 firms were called for a total of \$104 million and one at 2:00 p.m. CST for \$217 million from 14 firms. The vast majority of these intraday calls were reportedly met with cash. Total variation margin for Tuesday was \$924 million. At the close, total required original margin was \$3.8 billion and total margin on deposit was \$4.5 billion.

<sup>22</sup> The original margin amount included new margin for positions opened on October 19, and \$2,500 additional maintenance margin for all open positions. The CME had raised the maintenance margin requirement from \$5,000 to \$7,500 on Friday, effective Monday, October 19.

TIME-LINE OF CME VARIATION MARGIN SETTLEMENT  
OCTOBER 20, 1987

(Millions of dollars)  
(Times are Central Time)





With respect to variation margin payments to the clearing members, on Tuesday the settlement banks paid out \$2.5 billion in variation margin to the members with net profits. Two major CME clearing members with a total of over \$1.5 billion in variation margin collections did not receive payments by noon as is normal. These two clearing members each banked with a different settlement bank. Each of the two settlement banks was instructed to make clearinghouse payments to their customers that exceeded total payments they were to receive from their customers with margin calls. Accordingly, both banks needed to receive funds from the concentration bank to make up the difference. The concentration bank appears to have commenced the necessary transfers at approximately 12:30 p.m. CST, but Fed Wire delays slowed their receipt by the two settlement banks. The two clearing members' accounts were finally credited by 3:30 p.m. CST.

Otherwise, settlement banks began crediting their customers' accounts at approximately 11:45 a.m. CST. Because payments out of the settlement banks were finished before all margin payments were collected, it appears that the settlement banks extended intraday credit on behalf of their customers. As one Chicago banker responsible for these credit decisions put it, "The integrity of the clearing system is very important, it must be absolutely without question." Nevertheless, during the market break there were unfounded rumors that the CME clearinghouse was failing.

On Wednesday, October 21, the morning call for variation margin was \$924 million, comprised of \$711 million on customer accounts and \$213 million on house accounts. According to the CME, all margin and settlement variation obligations were honored by the four settlement banks prior to 7:00 a.m. CST. The banks paid out variation margin of \$361.5 million to customers and \$562.5 million to house accounts. Also on Wednesday, the CME issued two intraday margin calls: one at 10:30 a.m. CST for \$373 million from six firms and another at 2:00 p.m. CST for \$613 million from 15 firms. For the day, total margin required at the CME totaled \$3.97 billion and total margin on deposit was \$4.66 billion, leaving an excess of \$690 million.

Though the settlement mechanism worked on October 19, 20 and 21, both bankers and clearing members in New York and Chicago questioned whether they had complete confidence in the system underlying the Chicago exchanges. Banks were uncertain whether their intraday extensions of credit would be covered by the end of the day. Similarly, some major clearing members that wire funds to their customers early in the day were temporarily and uncustomarily overextended until their CME variation margin accounts received deposits later in the day. Furthermore, clearing members, as well as their bankers, were subjected to other cash demands

that tested the financial system's ability to accommodate their demands for liquidity. In addition, the dramatic price movements caused a number of FCMs, including CME clearing members, to fall temporarily out of compliance with financial regulations.

According to data provided by the CFTC, on October 19 and 20, 14 FCMs became undersegregated, three became undercapitalized, and two were both undercapitalized and undersegregated.<sup>23</sup> In each case, the firms came back into compliance by obtaining additional capital and by collecting customer margins. In addition, 11 firms, including six CME members, had a margin call for a single customer which exceeded the firm's adjusted net capital. In a few cases the margin call exceeded the adjusted net capital by as much as two to one. One CME clearing member, for example, with adjusted net capital of \$8.6 million had a \$22.6 million margin call for one customer. As exemplified by the 1985 Volume Investors default discussed above, this type of imbalance presents the risk that a clearing member might fail and the clearinghouse will be required to make up the shortfall. Again, each undermargined FCM came back into compliance by means of cash infusions.

According to certain CME members, one source of liquidity pressure was "third party custodial account" arrangements between these FCMs and some of their most major institutional customers. Under present SEC regulations, registered investment companies that engage in futures trading are prohibited from depositing original margin with their FCMs. Instead, pursuant to third party custodial account arrangements among the FCM, the investment company, and a bank, the investment company posts its original margin with the bank and the FCM expends its own financial resources (including capital and credit) to meet its customer's original margin obligations. In addition to investment companies, some pension funds and other institutions, such as endowment funds and foundations, elect to employ these arrangements. Some FCMs that are also broker-dealers have asserted that these third party custodial arrangements imposed financial burdens on brokerage firms handling such accounts

<sup>23</sup> "Undersegregated" refers to an FCM having less than the required cash in accounts designated as customer accounts. This condition arises when unsatisfied customer margin calls exceed the firm's "excess" margin deposits and additional deposits the firm may make out of its own capital and credit lines to bring the customer segregation account up to the required level. Obviously, if deposits to the "seg" account from capital and credit sources are excessive, the firm may become "undercapitalized." If the firm's contributions to the "seg" account are insufficient to meet regulatory requirements, the firm may become both undersegregated and undercapitalized. According to the CME, as long as a firm can meet its obligations on an immediate or short term basis, it can remain solvent even if undercapitalized.

during the market break. For example, on the morning of October 20, one major FCM/broker-dealer had to satisfy 63 percent of its customers' original margin obligations out of its own capital and credit lines.

The unusually late and large variation margin payments, as well as rumors of clearinghouse and firm failures, apparently raised fears among FCMs that they might be required to bail out the clearinghouse. Although these rumors and associated uncertainties proved unfounded, the events of October 19 and 20 have raised questions in the FCM community concerning the financial security of the futures clearinghouses and the FCMs' potential liability to their customers in the event of a clearinghouse default. Some FCMs are now of the view that if a defaulting clearinghouse fails to pay any variation margin out to its clearing members, the FCM is under no direct or immediate obligation to its customers to make up for the default and is solely liable to the clearinghouse under its assessment procedures, which could take time to effectuate. Thus, according to these FCMs, a default might leave their customers out-of-pocket at least until the clearinghouse raises funds by means of bank loans and/or clearing member assessments, notwithstanding the fact that the FCM has sufficient assets to make its customers whole. Not all clearing members appear to share this view, however, and these believe that they are obliged to make their customers whole immediately out of their own funds in the event of a default by the clearinghouse. Apparently, CFTC rules and regulations do not provide an unambiguous answer to this question.

Obviously, this "debate" raises a concern that should be resolved unequivocally. Moreover, whether or not FCMs are liable to their customers in the first instance, both clearing members and their customers should be assured that there is enough liquidity and capital in the system that even in the event of a default by a clearing member, the clearinghouse will still be able to meet its obligations. Capital strength and liquidity might be enhanced beyond current levels by creating clearinghouse sponsored insurance funds and by tying member firm capital requirements to the risks associated with house and customer positions carried by the firm.

Finally, it also appears that during the market break, the absence of commodity account insurance contributed to the uncertainty that swept through the financial system. It was reported that customers withdrew funds from their FCMs, fearing that a default might result in their loss. Though this further strained the system's liquidity, ironically, it also reduced the firms' net capital requirements because they are proportional to customer funds in segregation.

## (b) Stock Index Options

As indicated elsewhere, volatility and volume increased in the markets beginning the week of October 13. In response, OCC issued intraday margin calls on October 14, 15 and 16 for \$99 million, \$2 million and \$240 million respectively. On Friday, October 16, OCC cleared a record 3.1 million option contracts, (including stock, index, currency and other options) 143 percent higher than the average daily volume in September. Going into the week of October 19, OCC's open interest (i.e. the total number of option contracts outstanding) was reduced from 16.6 million to 10.9 million, primarily by expiration of the October series options on Saturday, October 17.

Settlement amounts for Monday morning, October 19 were higher than usual. According to the daily position reports and daily margin reports OCC was required to collect \$596.9 million and pay out \$306.5 million. Some delays were experienced in the settlement process. One New York settlement bank delayed settlement confirmation for three clearing members who owed approximately \$4 million. Confirmation was eventually made one and a half hours after OCC's normal settlement cut-off time. Later in the day, OCC discussed the status of these three clearing members with their designated examining authorities, the NYSE and the CBOE. One of the clearing members, H.B. Shaine & Co., Inc., was substantially exposed on S&P 100 put options and was placed in SIPC liquidation Tuesday morning.

In response to the market's volatility, on October 19, OCC made four intraday margin calls for an aggregate \$1.2 billion. These calls were made at 10:00 a.m., 12:00 p.m., 2:30 p.m. and 4:30 p.m. CST. The first three calls totaling \$947 million were met and provided OCC with margin coverage for a 32.5 point decline in the S&P 100 index which ultimately closed down 58.01 on the day. The fourth intraday call was made in response to the sharp decline in the final hour of trading, but because it was issued after the usual 4:00 p.m. EST cutoff for presenting drafts on a clearing member's account, it went largely unmet. Of the \$1 billion collected, approximately 40 percent was met with excess margin collateral already on deposit and the remainder was met by submitting drafts on clearing members' accounts.

Although there was extreme volatility, the volume of contracts cleared by the OCC was only 1.9 million, 40.4 percent less than the previous trading day. Nonetheless, settlement calculations were barely made in time because inaccurate price reports caused difficulty marking positions to market. Compared to Friday, open interest was down 34 percent.



On Tuesday morning, the daily position reports and daily margin reports called for OCC to collect \$194 million and \$704 million, respectively. A number of New York banks delayed confirming payment on OCC's drafts and the morning settlement was not completed until two and one half hours after the usual time. OCC's payments to clearing members' accounts were similarly delayed.

Among the financial problems encountered Tuesday morning was First Option of Chicago, Inc.'s need for additional funding. As has been publicly reported, certain First Options customers, including one OEX market maker, incurred substantial losses on their short put positions and were unable to meet margin calls. Consequently, First Options was required to meet the margin calls and was compelled to seek immediate funds from its parent corporation, Continental Illinois Corporation.

During the day on October 20, only one intraday margin call was made at 12:30 p.m. CST for \$466 million. The majority of the call was reportedly met with cash equivalents. Drafts on clearing members' accounts for \$40 million and excess margin already on deposit made up the remainder.

On Tuesday, the volume of contracts cleared by the OCC declined further to 1.6 million. Nonetheless, clearing was still complicated. Again, extensive price corrections were required and the problem was further compounded by 6,000 new options added by the exchanges, but which had not been picked up by the price reporting vendors like ADP. Upon completion of clearing, open interest totalled 11 million contracts, still only 66 percent of that on Friday, October 16.

On Wednesday, October 21, the morning daily position reports and daily margin reports called for the OCC to collect \$11.1 million and \$16.9 million respectively. Settlement delays were not of the magnitude of the preceding day, however, at least one settlement bank was approximately thirty minutes late in confirming settlement. In addition, one settlement bank refused to honor a settlement draft on a clearing member's account in the amount of \$2.7 million. This clearing member had enough margin on deposit to satisfy normal margin requirements. However, on Wednesday morning OCC had exercised its discretion to call for 130 percent of usual margin because this clearing member had lost 25 percent of its net capital on Tuesday. To avert a default, the OCC returned the firm to normal margin requirements and cancelled the draft.

The OCC made only one intraday call on October 21 at 1:00 p.m. CST for \$273 million. The majority of the call was met by excess margin and cash equivalents. The remainder of \$74 million was met by drafts on settlement members' accounts.

Clearing on the night of October 21 was again more complicated than usual due to higher than normal price corrections. The volume of contracts was still only slightly above average at 1.7 million contracts. Upon completion of clearing, open interest totalled 11 million contracts.

Throughout this period, the CBOE found meaningful capital calculations very difficult for the firms for which it was the DSRO, because of pricing errors, out-trades and processing difficulties.

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## V. The Regulatory Environment

### A. Introduction

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The groundwork for the present regulatory scheme was laid in the Securities Exchange Act of 1934 ("SEA").<sup>24</sup> That Act, as amended, gives the Securities and Exchange Commission ("SEC") authority to regulate markets in stocks and in options on stocks, as well as to oversee the self-regulatory programs of the self-regulatory organizations ("SROs"), e.g., the securities exchanges and the National Association of Securities Dealers. For the most part, the SEC has not adopted rules to directly regulate the market in stocks or in options on stocks. Instead, it has relied on the SROs to devise and implement a comprehensive scheme of regulation subject to SEC oversight. The SEC is a five member independent administrative agency. Responsibility for Congressional oversight of the SEC resides with the Committee on Energy and Commerce of the House of Representatives and with the Committee on Banking of the Senate.

The commodity futures markets including stock index futures and options on stock index futures are regulated by the Commodity Futures Trading Commission ("CFTC"), a five member independent administrative agency. The CFTC regulates commodity exchanges and their members by requiring exchanges to adopt certain rules and by overseeing exchange and member rule compliance. Responsibility for Congressional oversight of the CFTC resides with the Committee on Agriculture of the House of Representatives and with the Committee on Agriculture, Nutrition and Forestry of the Senate.

The CFTC stands on equal footing with other independent agencies, such as the SEC and the Federal Reserve. However, pursuant to Section 2(a)(8) of the Commodity Exchange Act ("CEA"), the CFTC is required to:

maintain communications with the Department of the Treasury, the Board of Governors of the Federal Reserve System, and the Securities and Exchange Commission for the purpose of keep-

ing such agencies fully informed of Commission activities that relate to the responsibilities of those agencies, for the purpose of seeking the views of those agencies on such activities, and for considering the relationship between the volume and nature of investment and trading in contracts of sale of a commodity for future delivery and in securities and financial instruments under the jurisdiction of such agencies.

The CFTC is not generally bound by the opinions of these other federal agencies and no department or unit within the Executive Branch has a direct role in the CFTC's affairs. However, as set forth below, in 1982 Congress amended the CEA to give the SEC the power to block CFTC approval of any new futures contracts on a group or index of securities.

This regulatory result, i.e. the SEC regulating stock, options on stock and stock index options and the CFTC regulating stock index futures and options on stock index futures, was arrived at after much interagency discussion, as described below.

### B. The 1981 CFTC/SEC Jurisdictional Accord

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#### 1. Events Leading to the Accord

In 1974 the CEA was amended to define a "commodity" to include "all other goods and articles \* \* \* services, rights and interest in which contracts for future delivery are presently or in the future may be dealt in."<sup>25</sup> Before this amendment, the term "commodity" was limited to certain specifically enumerated agricultural products. The purpose of the amendment was to bring under the CFTC's jurisdiction a growing number of commodities, such as coffee, gold and foreign currency, that were subject to futures trading on commodities exchanges

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<sup>25</sup> Section 101(a) of the Commodity Futures Trading Commission Act of 1974, Pub. L., No. 93-463, 88 Stat. 1389 (1974) (codified at 7 U.S.C. 2(1982)). Portions of the following descriptions of the CFTC/SEC Jurisdictional Accord are excerpted from "A Study of the Effects on the Economy on Trading in Futures and Options," submitted to Congress by the Federal Reserve, the SEC and the CFTC in December 1984.

<sup>24</sup> Section 2(a) (2)-(11), 7 U.S.C. 4a.

but not regulated under the CEA.<sup>26</sup> The amendment also was intended to assure CFTC jurisdiction over new futures contracts, such as futures on government-guaranteed, mortgage-backed securities, contemplated at the time but not yet traded.

The CEA, as amended, provides that the CFTC has "exclusive jurisdiction \* \* \* with respect to accounts, agreements (including \* \* \* an option) and transactions involving contracts of sale of a commodity for future delivery, traded or executed \* \* \* on an exchange\* \* \*"<sup>27</sup> This amendment was intended to give the CFTC exclusive control over not only futures contracts but also certain related instruments, such as commodity options. The same section of the Act also included a savings provision to the effect that, "except as hereinabove provided, nothing in this section shall \* \* \* supercede or limit the jurisdiction at any time conferred on the Securities and Exchange Commission\* \* \*"

This broad statutory language soon led to a dispute between the SEC and the CFTC as to its intended meaning. In 1975, CFTC approval of a Chicago Board of Trade ("CBOT") application for designation as a contract market in the trading of GNMA futures contracts precipitated an exchange of letters between the SEC and the CFTC. The SEC asserted that futures on GNMA's were securities, within the SEC's jurisdiction, and the CFTC responded that these instruments were within the exclusive jurisdiction of the CFTC.<sup>28</sup>

The issue was not resolved, and in 1978, it became the subject of Congressional attention during the CFTC's reauthorization hearings. SEC Chairman Harold Williams, representatives of the securities industry and others testified that the SEC's interest in the securities underlying futures contracts, and its more extensive experience in regulating the trading of options, warranted SEC regulations of futures and options on securities instruments.<sup>29</sup> The CFTC and commodities industry rep-

resentatives stated that the key regulatory distinction was whether the instrument was in fact a futures contract.<sup>30</sup> The Congress did mandate, however, that the CFTC inform and seek the views of the SEC about CFTC activities relating to the SEC's regulatory responsibilities.<sup>31</sup> Even with this amendment, however, the securities and commodities laws failed to provide a clear demarcation of the agencies' jurisdiction.<sup>32</sup>

## 2. The Accord

Under these circumstances, in December, 1981, the Chairmen of the SEC and CFTC—Chairmen Shad and Johnson, respectively—entered into an agreement ("the Accord") to clarify the respective jurisdictional responsibilities of the agencies. The agencies also submitted legislation to the Congress to codify the Accord.

Under the Accord, the SEC regulates options on securities (including exempted securities, such as GNMA certificates), certificates of deposit, foreign currency (traded on a national securities exchange), and stock groups or indices. The CFTC regulates futures (and options on futures) on: exempted securities (except municipal securities), certificates of deposit, and "broad-based" groups or indices of securities, as well as options on foreign currency not traded on a national securities exchange.

The Accord established three basic criteria a securities index futures contract must meet in order for it (or an option on the futures contract) to be eligible for trading:

- (1) The futures contract generally must be settled in cash;
- (2) It must not be readily susceptible to manipulation; and
- (3) The underlying index must reflect the market for all or a substantial segment of publicly traded equity or debt securities or a comparable measure thereof.<sup>33</sup>

It was agreed that futures (and options on futures) on individual non-exempt securities and municipal

<sup>26</sup> See S. Rep. No. 1131, 93d Cong., 2d Sess. 19 (1974); and H.R. Rep. No. 975, 93d Cong., 2d Sess. 41-42 (1974).

<sup>27</sup> Section 2 of the CFTC Act, Pub. L. No. 93-463, 88 Stat. 1389 (1974) (codified at 7 U.S.C. 2(1982)).

<sup>28</sup> Securities and Exchange Commission—Commodities Futures Trading Commission Jurisdictional Correspondence, compiled at [1975-1977 Transfer Binder], Comm. Fut. L. Rep. (CCH) 20,117, consisting of a letter to the CFTC from SEC Chairman Roderick W. Hills (November 13, 1975) and a memorandum in response prepared by the CFTC Office of General Counsel (December 3, 1975).

<sup>29</sup> See Extended Commodity Exchange Act: Hearings on H.R. 10285 before the House Subcommittee of Conservation and Credit of the House Committee on Agriculture, 95th Cong., 2d Sess. 189-91 (1978) ("1978 House Hearings") (Statement of Harold M. Williams). Others testified in support of amending the grant of exclusive jurisdiction to the CFTC to limit that jurisdiction to futures on traditional commodities, with the SEC being given jurisdiction over futures and options on securities. Reauthorization of the Commodity Futures Trading Commission: Hearings Before the Subcommittee on Agricultural Research and

General Legislation of the Senate Committee on Agriculture, Nutrition and Forestry, 95th Cong., 2d Sess. 467 (1978) ("1978 Senate Hearings") (statement of Joseph Sullivan, President, CBOE) and 1978 House Hearings, at 32-34 (GAO).

<sup>30</sup> See, e.g., 1978 House Hearings at 55 (testimony of Commissioner John V. Rainbolt II); 1978 Senate Hearings at 171-172 (testimony of Robert H. Wilmoth, President of the CBOT).

<sup>31</sup> Section 2(a)(8)(B) of the CEA, 7 U.S.C. 4(a)(g)(1982).

<sup>32</sup> Indeed, following the SEC approval in early 1981 of a CBOE proposal to trade GNMA options, the CBOT sued the SEC and the Seventh Circuit stayed the CBOE from trading GNMA options until it rendered its decision.

<sup>33</sup> Section 2(a)(1)(B)(ii) of the CEA added by the Futures Trading Act of 1982, 7 U.S.C. 2(a)(ii).



securities would not be permitted until further consideration by the two agencies.

Subsequently, Congress enacted the Accord into law in substantially the same form as proposed by the two agencies.<sup>34</sup> The principal addition to the Accord was a provision giving the SEC the authority to disapprove applications for futures on stock groups or indices submitted for approval after December 9, 1982. For contracts submitted before December 9, 1982, the legislation provided the SEC with a special consultative role. Following the enactment of the Accord, the SEC acted promptly to approve exchange proposals to trade options on GNMA's, Treasury notes, bonds and bills, certificates of deposit, and various foreign currencies. In addition, the SEC has approved options on a variety of broad-based stock and narrow-based (or industry sector) stock indices.

### 3. Joint Agency Guidelines

After the accord was in place, the agencies recognized the need to provide guidance on their view of the Accord. After further consultation and deliberation, the two agencies were able to agree on an interpretation of this statutory provision. On January 18, 1984, the two agencies published interpretative guidelines for futures on non-diversified stock indices.<sup>35</sup> To meet the guidelines, an index would have to:

- (1) include 25 or more stocks;
- (2) have a total capitalization of at least \$75 billion and be maintained at over \$50 billion; and
- (3) have no one stock that constitutes more than 25 percent of the weighted value of the index, and no three stocks that together constitute more than 45 percent of the index value.<sup>36</sup>

Thus, at the present time, in the equity and equity derivative areas, the SEC regulates markets in:

- (1) Stocks, convertibles, warrants;
- (2) Options on individual stocks; and

<sup>34</sup> The amendments to the securities laws were adopted in the Securities Acts Amendments of 1982, Pub. L. No. 97-303, 96 Stat. 1409 (1982); and the amendments to the commodities laws were adopted in the Futures Trading Act of 1982, Pub. L. No. 97-444, 96 Stat. 2294 (1983).

<sup>35</sup> Interpretation and Statement of General Policy of the CFTC and SEC, Securities Exchange of General Policy of the CFTC and SEC, Securities Exchange Act Release No. 20578 (January 18, 1984), 49 FR 2884 (January 24, 1984). The CME Energy Index contract, which the CFTC had approved prior to the publication of the guidelines, satisfied the interpretative criteria contained in those guidelines.

<sup>36</sup> The guidelines also indicate that a stock's weighted share of a non-capitalization weighted index should not exceed three times its share of the total capitalization of the index.

- (3) Stock index options;

while the CFTC regulates:

- (1) Stocks index futures; and
- (2) Options on stock index futures.

## C. Effect of Regulatory Scheme

The effect of this split regulatory scheme is that the equity market is subject to different rules depending on which segment of the market one is operating in.

### 1. Margin and Net Capital Requirements

For example, the setting of margin for the various products is done either by the Federal Reserve Board or the SROs (see Part II D and III D of this Study). Similarly, net capital requirements for market participants are set by the SEC, the CFTC and the SROs, depending on which market segment the participant is operating in (see Part II Card III C of this Study).

### 2. Suspension of Trading

In addition, the rules for suspending trading in these various instruments vary from market to market. Trading in individual stocks or options may be suspended by the SEC for up to a 10-day period. All trading on a national securities exchange (both stock and option) may be suspended by the SEC with the approval of the President for up to a 90-day period (SEA Section 12(k)).

At the present time, no organization can suspend trading in the over-the-counter market, although the NASD can halt quotes in over-the-counter securities and a rule proposal is before the SEC to permit the NASD to halt such trading. Although it is unclear whether the Commodities Exchange Act grants the power, the CFTC maintains that it has the authority to halt trading on commodities markets pursuant to its emergency powers (CEA Section 8a(7)). Each exchange also has the power to suspend trading in any or all of the instruments traded on it (See, e.g., NYSE Const., Art. VIII, Section 3 and Rule 51). Most exchange rules provide that closing is discretionary and delegate the authority to the Board or certain exchange officials. Some exchanges provide for automatic suspension in certain circumstances. For example, the CBOE rules provide that trading in index options shall be halted whenever trading is halted in underlying stocks with a weighted value representing more than 20 percent of the index (See, e.g., CBOE Rule 24.7).

### 3. Position Limits and Price Limits

Also, the matter of position limits and price limits varies depending on market segment. Apparently,

no authority to set position limits or price limits exists in the stock market. In the options markets, the exchanges on which the options are traded set position limits and exercise limits. For example, the CBOE rules provide that with respect to the OEX option, the Board of Directors will set the position limits, which may not be larger than 25,000 contracts on the same side of the market, with no more than 15,000 of such contracts in the series of such stock market index with the nearest expiration date. In addition, no more than 15,000 of such contracts may be exercised within any five consecutive business day period. There are apparently no daily price fluctuation limits in the options market. In the futures market, the CFTC has the authority to impose speculative position limits, but has delegated that authority to the exchanges. In addition, exchanges have the authority to impose daily price fluctuation limits with respect to futures. For example, the CME generally prohibits a person from owning or controlling more than 5,000 contracts net long or net short of S&P 500 futures. On October 22, 1987, the CME adopted daily price limits of 30 index points above or below the prior day's futures settlement for the S&P 500 index future.

#### 4. Clearing and Settlement

As indicated in Part II E and Part III D and E, the clearing and settlement procedures differ markedly from market segment to market segment. This is primarily because in 1975 Congress amended the Securities Exchange Act to require 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" in order to carry out the congressional finding that, "the linking of all clearance and settlement facilities and the development of uniform standards and procedures for clearance and settlement will reduce unnecessary costs and increase the protection of investors and persons facilitating transactions by and acting on behalf of investors." (SEA Section 17A). This resulted in a common clearing system for stocks, and a common clearing corporation for options. With respect to futures and options on futures, each exchange generally maintains its own clearing house.

#### 5. Short Selling

Similarly, restrictions on short selling vary between the equity market segments. Investors who believe the price of a stock is going to decline often sell the stock "short," i.e. the stock sold is borrowed from a lending broker of the investor to be deliv-

ered to the buyer in the ordinary course and the seller hopes to "cover" his short at a later time by buying the security at a lower price and delivering it to his lender.

A short sale is defined by SEA Rule 10a-1 as "any sale of a security which the seller does not own or any sale which is consummated by the delivery of a security borrowed by, or for the account of, the seller." This includes short sales "against the box," where the securities are borrowed for delivery even though equivalent securities are owned by the seller. With limited exception, however, writing uncovered options or selling uncovered futures does not fall within the definition of a short sale. The SEC has ruled that a person is deemed to "own" a security if: (i) he or his agent has title to it, (ii) he has purchased or has entered into an unconditional contract binding both parties to purchase it, but has not yet received it, (iii) he owns a security convertible into or exchangeable for it, and has tendered such security for conversion or exchange, (iv) he has an option to purchase or acquire a security, and has exercised that option, (v) he has rights or warrants to subscribe to the security, and has exercised such rights or warrants, or (vi) he has entered into a contract to purchase a "when issued" security which is binding on both parties, subject only to the condition of issuance. He is not deemed to own the security if he has not tendered the security for conversion or exchange or if he fails to exercise his right, warrant or option. One consequence of "owning" the security is that any sale is deemed to be "long" and hence the seller order ticket may be marked "long," and the sale is not subject to the prohibitions outlined in the following paragraphs.

The general restriction on short sales of stock on an exchange is that they may only be executed on a "plus-tick" or a "zero-plus-tick"—that is, at a price higher than the price of the last different trade price preceding it. This is designed to prevent short sellers from further depressing prices in a panic-filled market.

In addition, Section 16(c) of the Securities Exchange Act of 1934 prohibits officers, directors and holders of 10 percent of any class of equity security of a listed company from selling short any equity security of that company. That prohibition applies equally to uncovered short positions in call option contracts, since such positions are in essence short sales.

SEC rules exempt certain short sales from the above "plus-tick" restriction, the most significant of which are: (i) transactions not effected upon a national securities exchange in stocks not meeting the

listing requirements for the NYSE or the Amex or not listed upon a national securities exchange, (ii) sales from a "special arbitrage account" (where the seller genuinely intends to profit from a price disparity between a security owned and the security sold), (iii) sales from an "international arbitrage ac-

count," (iv) odd-lot sales, (v) sales allowed by exchanges to cover genuine errors, and (vi) market maker sales to equalize the price of a security on one exchange with that on another (effected with the approval of the exchange where the sale takes place).

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Study VII

**The Economic Impact of the Market Collapse**

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## Study VII

# The Economic Impact of the Market Collapse

The dramatic October decline of stock prices has presumably altered prospects for U.S. business activity and the U.S. financial markets over the coming year, although whether it has done so to any major extent remains unclear. A key reason why it is difficult to judge the broader economic effect of the stock market crash is that the subsequent response by the Federal Reserve System will also affect business activity and the financial markets. So too will the bipartisan budget compromise.

In assessing the economic effects of what has happened, it makes no sense to consider the consequences of the decline in stock prices without also taking into account the policy response. The net result of the stock market decline and the subsequent response of monetary and fiscal policies is highly uncertain, not just because of the lack of recent precedent for abrupt stock market movements on this scale but also because several of these new forces at work will pull the U.S. economy in opposing directions. Lower stock prices and the somewhat tighter budget posture will both restrain business activity, while lower interest rates and the lower dollar will both be expansionary.

### Stock Prices and Economic Activity

In the United States, major movements of stock prices have historically borne a systematic, though not fully reliable, relationship to fluctuations of business activity. Within the post World War II period, significant declines in stock prices, like those that occurred in 1948, 1957, 1969, 1973 and 1981, have typically presaged business recessions. By contrast, no economic downturn followed at all closely such episodes as the 29 percent stock price decline in 1946 or the 28 percent decline in 1962.

Movements in stock prices can plausibly affect the subsequent actions of both individuals and businesses in what may appear at first to be straightforward ways. With direct holdings of stocks accounting for roughly one third of the aggregate liquid wealth of all U.S. individuals on average over the past decade, it is reasonable to expect large declines in stock prices to discourage consumer spending and vice versa. With equity capital typically accounting for more than one half of the aggregate finan-

cial structure of all U.S. corporations engaged in nonfinancial lines of business, it is also reasonable to expect large declines in stock prices—which correspond to increases in the cost of equity capital—to discourage new plant and equipment investment. Lower stock prices also make buying existing corporate assets in the market cheaper, compared to building new facilities. In addition, with holdings of other corporations' stock typically accounting for more than one half of the assets in a typical company's pension fund, it is reasonable to expect large declines in stock prices to constrain business investment spending even more, because they force many companies to increase the share of their earnings that they set aside for pension contributions.

Substantial empirical evidence, based on the U.S. experience since World War II, exists to support each of these effects on nonfinancial economic activity due to movements in stock prices. Even so, none is as straightforward as it may appear.

The effect of stock price movements on consumer spending, for example, appears to be well documented. Most of the available studies based on aggregate U.S. data since World War II indicate that a one-time drop of \$100 in the value of individuals' stock market holdings will reduce consumer spending by an amount variously estimated to be between \$3 and \$10 each year, beginning in the year following the stock price decline. Estimates in this range are broadly consistent with the notion that individuals hold stocks (and other financial assets) for the purpose of financing their consumer spending over time, and that the rate at which they spend out of whatever financial assets they hold depends on such basics as how long they expect to live and what rate of return their assets can earn.

Taking account of the distribution of stock ownership within the U.S. population casts substantial doubt on the interpretation of these findings, however. Although stock ownership has increased in recent years, more than three quarters of all Americans still own directly no stock at all. Moreover, the distribution of holdings among those who do is highly concentrated. Less than one percent of Americans own fifty percent of all the stock outstanding, and just ten percent account for ninety

percent of it. Further, those individuals who own the most stock presumably have sufficient accumulated wealth to insulate their consumer spending, at least on a year-to-year basis. Many Americans who own no stock directly do have an indirect interest through pension funds or mutual insurance companies, but here again the connection is too remote to have much immediate effect on their spending.

It is not clear, therefore, how to interpret the observed relationship between stock price movements and aggregate-level consumer spending. But at any event, it is unlikely that a direct wealth effect along the straightforward lines usually described stands behind much of it. A more likely explanation is that stock price declines affect consumer spending, including spending by individuals who own no stock, in more indirect ways—for example, by shaking people's confidence in the security of their jobs and the stability of their incomes. Alternatively, declining stock prices may simply reflect independent forces—again, for example, an erosion of confidence—that would slow consumer spending with or without lower stock prices. Substantial new research is necessary before these questions can be resolved. Meanwhile, it is foolish to ignore the observed relationship between stock prices and consumer spending; but in the absence of a satisfactory explanation it is also unwise to rely on it in any very mechanical way.

The relationship between stock price movements and spending by business for investment in plant and equipment is similarly well documented empirically, but it is likewise subject to similar kinds of questions. In principle, the cost of capital to finance new investment consists of the cost of debt and the cost of equity, in whatever combination companies rely on these alternative forms of financing. For most forms of borrowing, the cost of debt is simply the interest rate that the company must pay. The cost of equity is the dividend that the company must pay to shareholders. For a given level of dividend payments at the present and the likely growth path of dividends in the future, a lower stock price means a higher cost of equity capital, just as a higher interest rate means a higher cost of debt capital.

Numerous studies based on aggregate U.S. data since World War II have documented the inverse relationship between the cost of capital to business, including the cost of debt and the cost of equity, and spending for new plant and equipment. Quantitative estimates of the strength of this relationship show less consensus than in the case of consumer spending, however. A finding that is on the larger end among such studies is that an increase of one percentage point in the cost of capital—for example, from an eight percent required rate of return to nine percent—reduces the ongoing rate of investment spending by roughly four percent, or about \$18 billion per year compared to business invest-

ment today. Estimates of the timing with which such an effect takes hold also vary greatly, however, in that the bulk of the effect presumably occurs after some delay as projects already in the pipeline move along to completion.

What casts doubt on this apparently straightforward view of corporate financing and investment decision, however, is the fact that most U.S. business corporations do not rely on new stock issues to any significant degree. Between 1953 and 1983, the net addition to the available funds of all nonfinancial U.S. corporations provided by the excess of new stock issues over retirements of outstanding stock, averaged just \$4 billion per year, compared to \$38 billion per year in net proceeds from borrowing. Since year-end 1983, the pattern of corporate financing has been even more lopsided. The wave of corporation reorganizations that has dominated American business in recent years—including mergers, acquisitions, leveraged buyouts and stock repurchase programs—has resulted in the net retirement of \$293 billion of equity from 1984 to 1986, compared to \$555 billion of net proceeds from borrowing.

U.S. corporations have not eliminated the equity component of their capital structures, of course. During the same three years in which corporations retired \$293 billion of equity in the market, they added more than \$1 trillion of equity internally by earning more than they paid out in interest, taxes and dividends. On a market value basis, equity still accounted for 58 percent of corporations' aggregate capital as of year-end 1986. At the peak of stock prices in August of this year, the market value equity share was up to approximately 65 percent. By the end of October it was approximately 59 percent. The cost of equity capital presumably represents the opportunity cost on this large pool of corporate capital, and therefore ultimately on business investment despite the absence of reliance on net new stock issues for financing purposes.

From the perspective of fluctuations in investment spending over time horizons as short as the average business cycle, however, an opportunity cost associated with capital already in hand or to be added internally by retained earnings is different from a financing cost on new capital to be raised from the market. As a result, it is plausible to expect movements in the cost of debt (on an after-inflation basis, of course) to affect investment spending more directly than movements in the cost of equity. The observed relationship between business investment and the equity component of corporations' overall cost of capital, like the relationship between stock prices and consumer spending, may therefore reflect some alternative kind of influence. One possibility is that stock price movements (and hence movements in the cost of equity) affect the choice of whether to build new facilities or to buy them in the securities



market by acquiring some company that already owns them. Another is that stock price movements merely reflect changing confidence about the state of economic activity in the future, which would independently affect incentives to expand or modernize production capacity with or without changing stock prices.

### The October Stock Price Decline and the Policy Response

The 29 percent average decline in stock prices since the August peak is almost sure to have some depressing effect on economic activity in 1988, but it is impossible to quantify this effect with any confidence. According to the standard estimates, the loss of nearly \$800 billion of paper wealth owned directly by individuals is likely to trim consumer spending by about \$40 billion per year (or, in other words, raise the personal saving rate by well over one percent). Even at the sharply lower post-October levels, however, stock prices remain above where they were a year ago. Before subtracting \$40 billion or so from 1988's likely consumer spending, therefore, it is necessary first to have included an even greater boost to spending due to the earlier stock price climb. Moreover, because of the doubts about whether this relationship really represents a wealth effect after all, any such simple calculation is inherently questionable, whether stock prices have risen or fallen.

Similarly, the two fifths increase in the cost of equity capital that resulted from the recent fall in stock prices is highly likely to retard business investment to at least some extent. With a weight of one half on the equity component of the overall cost of capital, estimates of the eventual effect on plant and equipment spending, as projects now underway are completed, range from negligible amounts to as much as \$40 billion per year. The same caveats apply here too, however. Even after so large a decline, stock prices are now not far from the level of a year ago, and therefore neither is the cost of equity capital. Further, the interpretation of the evidence underlying the entire relationship between the cost of equity capital and business investment is also subject to fundamental questions.

Together with these two likely, but hard-to-quantify, negative effects of the stock market crash on overall economic activity, it is also necessary to take into account the subsequent responses of both monetary and fiscal policy. The Federal Reserve System moved promptly to ease monetary policy in the wake of October 19, using open market purchases to add some \$2 billion to the banking system's average nonborrowed reserve between the reserve settlement period ending October 7 and that ending November 4. As a result, short-term interest rates immediately fell, and not just for instruments that

would have benefitted from a flight to quality. (The three-month Treasury bill rate dropped from 6.93 percent on October 16 to 5.29 percent a week later, while the three month commercial paper rate dropped from 8.65 percent to 7.24 percent over the same week.) The consequent decline in consumer borrowing rates and in mortgage rates should cushion a part of the effect of lower stock prices on both consumer spending and home building. The decline in business borrowing costs has lowered the cost of debt capital, thereby plausibly neutralizing part, or perhaps even all, of whatever direct effect on business investment spending that would otherwise have occurred via the cost of equity capital per se.

As frequently occurs during these kinds of financial trauma when a country also has an unbalanced fiscal policy and especially when it also happens to be a debtor country—both situations that now describe the United States—the Federal Reserve had to choose between a monetary policy designed to blunt the financial forces threatening to push the economy downward and a monetary policy designed to prop up the currency. The Federal Reserve chose the former policy. As a result, the dollar's international exchange value fell sharply. The lower dollar will ultimately help U.S. industry to increase exports and even to recapture some sales at home. To the extent that it does so, it will also support consumer spending by raising employment in relatively high wage jobs. The fact that other countries have subsequently moved to ease their own monetary policies confirms the correctness of the Federal Reserve's action, and further protects against any threat of a spreading business downturn.

Finally, the combination of spending cuts, tax increases and accounting changes, that together will trim \$30 billion from the federal budget deficit in this fiscal year and somewhat more than that next year, will act on the U.S. economy in ways that both reinforce and offset the effects of the stock price decline. To the extent that fiscal policy is actually tighter, it will depress total spending, both by the government itself and by those individuals who will either receive smaller benefits or pay higher taxes. By reducing the strain on the credit market due to federal borrowing, however, the tighter fiscal stance will also facilitate lower interest rates, and hence promote a more favorable environment for business investment and other typically debt-financed expenditures.

Nonetheless, it is important to view the fiscal response in an appropriate perspective. Although the bipartisan compromise nominally added up to \$30 billion, the agreed upon set of actions will represent a distinctly less genuine deficit reduction than the \$23 billion of spending cuts that otherwise would have taken place under the Gramm-Rudman-Hollings legislation. More importantly, even taking the

entire \$30 billion of deficit reduction slated for this fiscal year at face value, it will no more than offset the *increase* in the deficit that would otherwise have occurred because of the absence of the sudden bulge of tax payments that swelled the government's revenues last year as both individuals and

businesses hastened to conclude a variety of transactions before the more onerous provisions of the 1986 Tax Reform Act took effect. Overall, this fiscal response hardly constitutes a major force pushing the U.S. economy into a contraction.

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**Study VIII**  
**A Comparison of 1929 and 1987**

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# Study VIII

## A Comparison of 1929 and 1987

The purpose of this study is to determine the extent to which circumstances following the stock market plunge of October 1987 resemble those following the Crash of 1929. This study has a particular urgency because of the association, at least in the layman's mind, between the Crash of 1929 and the Great Depression of the 1930's. Is another Depression likely?

The study is organized into two sections. The first examines the extent to which the 1929 Crash contributed to the Great Depression. It looks at economic forces during that time that might have interacted with the stock market decline to produce the extraordinary drop in real economic activity during the 1930's. This section assembles a list of economic forces whose likely influence in 1987 resembles forces active in 1929. The second section of the report then evaluates the relative influence of these economic forces in 1987 in comparison to their influence in 1929 in an attempt to assess the probability of a Depression occurring in the 1990's. This report concludes that that probability does not appear to be high.

### I. The Events of 1929 to 1933

In examining the economic events associated with the 1929 Crash, the crucial issues relate not just to the events of 1929 itself but also to what happened in the following years. What has made 1929 exceptional is not the magnitude of the stock market plunge, but rather that, in retrospect, it signalled the beginning of the Great Depression. The market decline in 1929 marked only the beginning of a long term drop in the stock market. Between the bull market peak in September 1929 and the end of 1929, the Dow Jones Industrial Average ("DJIA") fell by 34.8 percent (an equivalent decline from the August 1987 peak would have taken the DJIA to 1,774 by December 31). By itself that decline, while large, was exceptional neither in terms of prior nor subsequent history. In the next two years, the situation worsened significantly as the market fell by 33.7 percent in 1930 and 52.7 percent in 1931. It fell a further 47.1 percent to its low in July 1932, before recovering later that year. Of the total peak-

to-trough decline of 89 percent from 1929 to 1932, only about one-fifth occurred during the 1929 Crash itself.

Changes in the economy as a whole following the 1929 Crash were similarly drawn out. Output in 1930, as measured by the Gross National Product ("GNP"), was 9.9 percent below output in 1929. In 1931, output declined a further 7.7 percent, followed by a 14.9 percent fall in 1932. In 1933 as a whole (the trough year of the Depression), output was 30.5 percent below output in 1929 and 1.8 percent below 1932 GNP. Price levels of goods declined by a total of 24.4 percent over the 1930 to 1933 period, falling by 2.5 percent in 1930, 8.8 percent in 1931, 10.3 percent in 1932 and 5.1 percent in 1933 before stabilizing in 1934. Unemployment, which in 1929 had been 5.3 percent of the non-farm civilian labor force, rose to 14.2 percent in 1930, 25.2 percent in 1931, 36.3 percent in 1932 and finally to a peak of 37.6 percent in 1933 (see Table 1).

The subsequent recovery from the Depression was equally, if not more, extended. The DJIA did not exceed its 1929 peak until November 1954. Output grew relatively rapidly from 1933 to 1937. However, a recession in 1938 reduced production below its 1936 level, and real GNP did not significantly exceed its 1929 level until 1940 and 1941. Prices as late as 1940 were more than 18 percent below their 1929 levels. Unemployment did not fall below 20 percent of the non-farm civilian labor force until 1941, when it averaged 14.4 percent.

This protracted history of decline in both the stock market and the wider economy raises two questions that must be answered before any useful comparison between recent events and those of 1929 can be made.

***Was the 1929 Crash responsible for the subsequent decline of the stock market in 1930 to 1932, and, if so, how were these events connected?***

By the end of 1929, the stock market had recovered to levels first attained in October 1928. Trailing price-earnings ratios of about 12-13 at the end of 1929 (compared to long term interest rates of less than 4 percent) could hardly have been de-

scribed as excessively speculative. Thus, at the end of 1929, the downward movement from the 1929 peak could reasonably have been interpreted as a "normal" correction. A roughly comparable correction had occurred in 1920 without leading to a steady subsequent collapse of stock prices. It is not at all clear why the 1929 Crash should inevitably have led to the extraordinary decline in stock prices which followed in 1930 to 1932. Various explanations have been suggested, three of which deserve examination.

First, margin requirements of only 10 percent may have generated a cycle in which initial stock price declines caused margin calls forcing stock sales to cover margin requirements, which in turn led to further price declines, more margin calls and more stock sales. This theory is consistent neither with the 1929 facts about margin requirements, nor with the historical pattern of price movements. Officially, minimum margin requirements for stocks listed on the New York Stock Exchange ("NYSE") were 10 percent for some well-off investors. NYSE margins were higher for other investors and were 100 percent for non-NYSE-listed stocks (including bank stocks which suffered heavily in the Crash). In addition, brokers often set margin levels above the officially mandated minimum. Beginning in the summer of 1929, brokers began to increase margin requirements and, by the time of the Crash, actual margins were about 50 percent. Total outstanding margin debt at the time of the 1929 Crash was equal to only about 10 percent of the value of outstanding stocks. It is difficult, therefore, to imagine that margin calls were sufficient to account by themselves for any significant fraction of the secular decline in the stock market following the 1929 Crash.<sup>1</sup>

A second possible connection between the 1929 Crash and the subsequent extended decline in the stock market is essentially psychological. Both stock market values and real economic activity depend to a great extent on faith in the future. Purchases of stock at the price-earnings ratios of 15 or more and the dividend yields of 3.5 percent which characterized the market in 1929 presumably reflected faith in growing profits and dividends and the "soundness" of the underlying economy (or, at a minimum, faith in ever-increasing stock prices). Investment by businesses in buildings, plant, housing, newly hired and trained workers, and research and development reflects a similar confidence in the future. It may have been that the Crash of 1929 destroyed this confidence in future profits and stock market values and began a self-sustaining cycle of falling confidence causing falling prices and generating still lower levels of confidence. This psychological explanation doesn't quite fit the facts. The decline in the

stock market from its August 1929 peak to its 1932 low is by no means a story of consistently falling stock prices. From November 13, 1929 to December 7, 1929, the DJIA rose by 32.6 percent. A 12.4 percent decline from December 7 to December 20, 1929 was followed by a rise of 27.4 percent from December 20, 1929 to April 17, 1930. Indeed, the long decline to the 1932 low was regularly interrupted by significant rallies. The question that naturally arises is how the stock market was able to produce such rallies in the aftermath of the Crash if the Crash had indeed permanently undermined investor confidence. It is hard to believe that the 1929 Crash was by itself responsible in every case for the renewed loss of faith in the economy that marked the end of each of these rallies.

A more plausible explanation lies in the interaction between the stock market and the real economy. The Crash of 1929 may have affected confidence in both the stock market and the real economy. As the economy subsequently entered a recession, continuing bad news from the real economy could have aborted each revival of confidence in the stock market which, in turn, caused continuing declines in stock prices (which, in turn, further undermined confidence in the real economy). This leads naturally to the second question about the 1929 Crash and the Great Depression.

### *To what extent was the Crash of 1929 and the post-Crash market decline responsible for the Great Depression?*

There are several mechanisms by which the stock market decline might have depressed real economic activity. These are:

- The loss of household wealth leading to greatly reduced consumer demand, which precipitated a recession;
- Stock market-related losses which undermined the solvency of and confidence in banks, leading to the collapse of the banking and lending system;
- Raised perceptions of risk in the business community and/or undermined confidence in future growth, which led to a sharp curtailment of investment; and,
- Monetary, fiscal and trade policy actions, which arose from concern over the Crash and the unsound "speculation" that preceded it, undermined the real economy.

**The Decline in Household Wealth:** In 1929 only about 6 percent of all households owned stock and hence only 6 percent of households would have been affected directly by the decline in the stock market. The total Crash-related loss in wealth between the end of August 1929 and the end of the year was about \$25 billion. The best existing estimates of the resulting drop in consumption are

<sup>1</sup> See Appendix to this study.



about 2 percent of the loss in wealth or \$0.5 billion. This would have represented only 0.5 percent of 1929 GNP. Furthermore, if a significant decline in consumption by the households had been largely responsible for the 1929 to 1930 decline in GNP, then the decline in total consumption expenditures should have been disproportionately large in these years. In fact, except for residential construction which fell sharply between 1929 and 1930 (but subsequently fell less rapidly than other categories of investment as is evident in Table 2), nominal consumption expenditures fell by 9.5 percent between 1929 and 1930 compared with an overall decline of 13.3 percent in nominal GNP.<sup>2</sup> In contrast to recent consumption-led recessions in which consumer savings rose as a fraction of disposable income, savings as a fraction of disposable income fell in every year of the post-1929 decline.<sup>3</sup> Savings fell from 5.3 percent of disposable income in 1929 to 4.8 percent in 1930, 4.2 percent in 1931, and (1.2) percent in 1932. Thus, although it is impossible to rule out conclusively a stock market-induced decline in consumption demand as a major cause of the post-1929 decline, the available information tends to argue against it.

**The Impact on the Banking System:** The existence of a strong immediate connection between the stock market Crash and the banking system is equally difficult to document. Table 3 presents the historical record of monthly bank suspensions during the years surrounding the 1929 Crash. In the immediate aftermath of the Crash, there was an identifiable increase in the number of bank failures. Between December 1929 and April 1930, 400 out of a total of about 25,000 U.S. banks suspended operations. In the corresponding months of 1928 and 1929, only 262 banks had suspended operations.

However, as a fraction of all banks, the post-Crash failure rate was not large relative to subsequent events. Post-Crash failures represented under 2 percent of all banks (compared to an equivalent 1928 failure rate of just under 1 percent) and a smaller percentage of bank assets. These failures did not result in a uniform run on the banking system as a whole. Moreover, the banking system appeared to recover in the summer of 1930. From May through July, 1930, only 190 banks failed compared to 212 failures in the comparable three month period prior to the peak of the 1929 bull market. This was followed by a more severe, but still not catastrophic, run of failures in late 1930, and early

1931. In just three months, from November, 1930 to January 1931, there were 806 bank failures, almost twice the number of failures that occurred in the five months following the 1929 Crash. However, this too was followed by a recovery and the first real deluge of failures did not begin until the late summer of 1931—nearly two years after the Crash.

In the six months from August 1931 through January 1932, a total of 1,860 banks or almost 9 percent of U.S. banks suspended operations. Yet again, however, this was not followed by a complete collapse of the system. Through the rest of 1932, bank failure rates were generally below those of 1931. Only in 1933 did the serious collapse of the system occur. In the single month of Roosevelt's 1933 bank holiday (that is, March 1933), 3,460 banks effectively suspended operations by failing to reopen for business after the bank holiday ended. The vast majority of these troubled banks, representing between 15 percent and 20 percent of all U.S. banks, never reopened.

The banking system appears to have largely survived the immediate aftermath of any securities-related losses incurred during the 1929 Crash, although perhaps in a weakened condition. The system was also able to avoid a catastrophic sequence of large scale runs through the first two years of the decline in real economic activity (which appears to have begun in August 1929). Thus, arguing that the Crash played a leading role in the collapse of the banking system appears unwarranted. Although the devastation of the banking system by 1933 may have contributed greatly to the prolonged nature of the Great Depression, it does not appear to have pushed the economy into Depression. Indeed, the condition of the banking system seems to have followed rather than led the decline in the level of real economic activity.

**General Business Confidence:** The decline of business confidence in the year following the 1929 Crash—as reflected in construction levels, employment and the extraordinary decline in business investment—is striking (see Table 2). However, from 1929 to 1930, in the immediate aftermath of the Crash, investment fell less sharply than in earlier or subsequent recessions, and there were widespread general expressions of confidence in the economy. It is impossible, therefore, to assess directly what impact the 1929 Crash might have had in this area. However, as a contributing factor, the failure of business confidence, whatever its relationship to the stock market, appears to have been highly significant to the course of the Great Depression. Even the recovery of investment in 1933 appears to have led the broad economic recovery rather than lagging the recovery as it has in post-war recessions.

**Government Policy Initiatives:** The Crash-related policy initiatives that might have helped create

<sup>2</sup> On the basis of estimated statistical models of consumption and comparisons to other inter-war recessions, Peter Temin has maintained that consumption in 1930 was below "normal" by perhaps another \$2-3 billion; but this shortfall was not directly the result of a stock market-related loss of wealth.

<sup>3</sup> For example, savings as a percentage of disposable income rose from 7.3 percent in 1972 to 9.2 percent in 1975 and from 5.9 percent in 1979 to 6.5 percent in 1981 to 1982.

and prolong the Great Depression include: reductions in government spending and increases in taxes (i.e. deficit reduction measures) designed to assure the soundness of the economy and the dollar in the wake of the "speculative excesses" of the 1929 bull market; trade policies (notably the Smoot-Hawley tariff bill) designed to protect America's recession-weakened industries against the depredations of foreign competition; and a decrease in the money supply designed first to dampen and then to ensure against the revival of these "speculative excesses". Each of these possible factors deserves separate consideration.

*Deficit Reduction:* Post-Crash federal fiscal policies were in reality neither as influential nor as restrictive as is often assumed for several reasons. First, federal government activity was only a minor part of overall government activity. It represented about 17 percent of total government expenditures on goods and services. Second, the Administration urged expanded spending by both the federal government and state and local governments. Third, the actual change in fiscal policy was negligible through 1930 and minimal thereafter. Fourth, the federal government ran substantial surpluses throughout the 1920's that turned into significant deficits from 1931 onward.

Federal government spending for goods and services in 1929 amounted to \$1.5 billion or about 1.5 percent of the 1929 GNP of \$103.9 billion. State and local government spending on goods and services accounted for a further 7.1 percent of GNP. Government transfers to individuals (not including interest on the public debt) were \$900 million, or less than 1 percent of GNP. In contrast, federal, state and local government spending on goods and services in 1986 accounted for 20.6 percent of GNP, about 42 percent of which was accounted for by the federal government. Government transfers in 1987 were 11.6 percent of GNP. Overall, therefore, the government, and especially the federal government, played a relatively minor role in the 1929 economy.

Total federal budget expenditures in 1929 were \$3.1 billion. Revenues were \$3.8 billion, producing a surplus of \$0.7 billion (0.7 percent of GNP). This surplus compared to an average annual federal surplus of about \$1 billion between 1926 and 1928 (see Table 4). In 1930, after the Hoover Administration urged an expansion of federal, state and local public works projects, federal budget expenditures rose to \$3.3 billion (a significant rise in real terms given the decline in prices between 1929 and 1930). However, rising tariff and tax receipts despite the decline in economic activity produced a 1930 budget surplus of \$0.7 billion which was almost exactly equal to that of 1929. Total government purchases of goods and services (federal plus state and local) rose from \$8.9 billion (8.6 percent of GNP) in 1929 to \$9.6 billion (10.6 percent of GNP)

in 1930. Government transfer payments rose from \$0.9 billion to \$1 billion. However, a slight rise in tax rates offset part of even this meager fiscal stimulus.

In 1931, with the Depression well underway, federal government expenditures increased by 8 percent to \$3.55 billion. The deteriorating economy and the negative impact on tariff revenues of the sharp drop in international trade lowered overall receipts. Together these factors produced a federal budget deficit of \$0.5 billion or 0.6 percent of GNP. At the same time, state and local spending on goods and services, while declining slightly in nominal terms, actually rose in real terms. In the 1932 campaign, both Hoover and Roosevelt stressed the need for a balanced budget and, to this end, tax rates were raised significantly in June 1932. However, U.S. government expenditures rose sharply to \$4.7 billion. Together with lower than expected receipts due to the continuing decline of economic activity this produced a deficit of \$2.7 billion or almost 5 percent of GNP. Any benefit from this stimulus was, however, partially nullified by a reduction in both spending and the deficit in 1933. On balance, therefore, the fiscal reaction of the government was, if anything, stimulative, but the magnitude of any government activity was so limited that any such benefit was minor. While government fiscal policy might have been formulated more effectively to stimulate the economy, it can almost certainly not be held to account for producing the decline into the depths of the Great Depression.

*Trade Policy:* Trade policy has been identified as a likelier and more significant contributor to the economic decline. The consequences of American trade policy appear to have been somewhat greater in magnitude and less constructive in effect than those of government fiscal policy. Total U.S. exports in 1929 were equal to 6.8 percent of GNP and the United States enjoyed a trade surplus of \$1.1 billion, or about 1 percent of GNP. In June 1930, Congress passed the Smoot-Hawley tariff bill in an attempt to protect American manufacturers and farmers from foreign competition. Foreign governments quickly retaliated with high tariff barriers of their own and international trade fell sharply. Exports declined between 1929 and 1933 over one-third more than overall economic activity. By 1933, exports accounted for only 4.2 percent of a much reduced GNP and the U.S. trade surplus had fallen to \$0.4 billion or 0.7 percent of GNP. Although by Keynesian standards the net depressive impact of this decline in the trade surplus may have been small, the harm done to export-intensive industries may have been more substantial. For example, automobile and automotive parts exports fell by almost 50 percent between 1929 and 1930. Certainly, coming as they did on top of already declining eco-



conomic activity, the tariff wars of the early 1930's exacerbated the situation and helped to convert what might have been merely a severe recession into the Great Depression.

However, it is difficult to assign primary blame for the depression to failures in the international trade system. Part of the disproportionate decline in the nominal trade figures was due to the concentration of trade in industrial and agricultural products whose prices declined disproportionately in the early phases of the Depression. In 1929, 68 percent of U.S. exports and 86 percent of imports were either food products or industrial materials. To cite one such example, the value of U.S. wheat exports fell by 21 percent between 1929 and 1930 while the physical volume of exports fell by less than 1 percent. Furthermore, the United Kingdom, which was far more trade dependent than the U.S., suffered much less from the post-1929 economic decline (see Table 5). Unemployment in Britain rose from a seasonal peak of about 9 percent in the winter of 1928 to 1929, to 10 percent in 1929 to 1930 and to a peak of about 19 percent in the winters of 1931 to 1932 and 1932 to 1933 before declining to 12 percent in 1933 to 1934 and 9 percent in 1934 to 1935. The comparable American figures reveal both greater and more prolonged unemployment (see Table 1). Moreover, the peak-to-trough decline in British industrial production was less than one-half that of the U.S. decline. The logical conclusion is that there were either forces in Britain that mitigated the Depression there, or forces in the U.S. that served to intensify its impact here. It is worth noting that Britain, like the United States today, had a large chronic trade deficit in 1929.

*Monetary Policy:* The role of monetary policy and lending conditions in creating and prolonging the post-1929 economic decline is the subject of extensive debate. At one extreme, Milton Friedman and Anna Schwartz maintain that monetary policy was the primary cause of the Great Depression. At the other extreme, other economic historians (notably Peter Temin and Charles Kindleberger) blame monetary factors only peripherally. In fact, while money supply movements tracked movements in real GNP quite closely (see Table 6), actual percentage changes in the money supply between 1929 and 1934 were far smaller than the corresponding changes in nominal economic activity. For example, between 1929 and 1930, the money supply fell by 3.3 percent. The contemporary decline in nominal GNP was 12.3 percent. Although measured in terms of the money supply, monetary policy may have been slightly restrictive, it seems unlikely to have been the primary cause of the post-1929 decline in real economic activity. Moreover, the observed decline in the money supply may as easily be attributed to the reaction of the banking system and individuals to declining economic activity as to con-

scious policy on the part of the Federal Reserve Board. The supply of high-powered money (reserves plus currency), which was controlled directly by the Federal Reserve Board, increased steadily throughout the Depression (except for a very small drop in 1929 to 1930).

Indeed, in terms of interest rates, the policy of the Federal Reserve was not restrictive. In 1929, the discount rate of the Federal Reserve Bank of New York fell from 6 percent in August and September to 5 percent in October and to 4.5 percent in November and December. By the end of 1930, the discount rate had been lowered further to 2 percent and by early 1931 it had reached a low of 1.5 percent. Rates on short term U.S. government securities followed this downward trend. Treasury bill rates fell steadily from a peak of 4.5 percent in 1929 to under 0.5 percent in the summer of 1931. They later increased to about 2.5 percent in the aftermath of the European currency and banking crisis in the late summer and fall of 1931, but collapsed to zero in 1932.

The central problem appears to have been the failure of longer term and business interest rates to decline commensurately. While long term interest rates did decline, the magnitude of the decline was much smaller than that of short term U.S. Government securities. The yield of Treasury bonds fell from 3.6 percent in 1929 to 3.3 percent in 1930, but never subsequently fell below 3 percent. In 1933, when the average Treasury bill rate was 0.52 percent, the rate on Treasury bonds was still 3.3 percent. Similarly, the magnitude of the post-1929 business loan rate decline was far smaller than that associated with Treasury issues of similar duration. The short term business loan rate fell from 5.8 percent in 1929 to 4.3 percent in 1931, but only fell below 4 percent (to 3.5 percent) in 1934. Long term AAA bond rates declined only marginally, falling from 4.73 percent in 1929 to 4.55 percent in 1931 to 4.40 percent in 1934. Rates on BAA bonds actually rose significantly from 5.90 percent in 1929 to 7.76 percent in 1933. Thus, whatever the impact of monetary policy on short-term rates, the persistent refusal of long-term rates to decline below 3 percent and the unwillingness of investors to assume the risks associated with business lending seem to have effectively placed a floor under the cost of business borrowing.

More importantly, real interest rates rose dramatically. From 1929 to 1933 price levels fell at an average annual rate of more than 6 percent. Thus, merely by holding currency, investors could have earned real returns of more than 6 percent per year. At rates of interest on debt of 4 percent, business investment had to earn real returns in excess of 10 percent per year. As a result, the deflation associated with the post-1929 economic decline by itself

caused a substantial deterioration in the real (i.e. price-adjusted) terms on which loans were available and, in the absence of negative nominal interest rates, this condition was not easily susceptible to correction through the impact of monetary policy on lending market conditions.

Indeed, the failure of which Friedman and Schwartz accuse the monetary authorities is, with respect to the post-1929 decline, largely one of omission rather than commission. By failing to expand the money supply, the Federal Reserve System effectively acquiesced in the long deflation from 1929 to 1933 which an aggressive monetary policy might have curtailed. The temporary increase in the discount rate and monetary stringency in October of 1931, following the international monetary crisis of that summer, accelerated the overall economic decline. The failure of the Federal Reserve to support the banking system certainly exacerbated the banking crisis in 1931 to 1933. In addition, a monetary contraction in 1937 may have been responsible for the 1937 to 1938 decline which aborted the initial recovery from the 1933 trough. However, these events occurred when the economic decline had already gone beyond the bounds of a "normal" recession and had developed considerable momentum. Thus, even in the Friedman and Schwartz view the contribution of monetary policy was more toward prolonging than creating the Great Depression.

## II. Similarities Between 1929 and 1987

The brief review in the previous section of the putative causes of the post-1929 decline in economic activity suggests that, for the purposes of analyzing real economic activity, analogies between 1929 and 1987 should be focused in rough order of importance on the following topics:

- Differences in the underlying structure of business activity (to see how far 1929 causes might apply to 1987);
- The financial positions of firms and the likely reaction of business "confidence" and investment to the stock market decline and any subsequent decline in business activity;
- The likely reaction of consumers and consumer demand;
- The impact of the Crash on international trade;
- The likely reaction of the monetary authorities and credit markets;
- The impact of the Crash on government fiscal policy;
- The response of the banking system to the stock market decline and any subsequent economic contraction.

**The Structure of Economic Activity in 1929 and 1987:** The most striking changes in the composition of economic activity between 1929 and 1987 are: the decline of agriculture; the rise in the importance of government, especially the federal government; the relative decline of goods-producing sectors (mining, manufacturing and construction) compared to service sectors; and the increase in labor force participation.

The first three of these phenomena appear clearly in comparisons of the labor force distribution (Table 7). In 1929, agriculture engaged about 22 percent of the labor force (producing about 9 percent of GNP) compared to only 3 percent in 1985 (producing just over 2 percent of GNP). Governments at all levels in 1929 employed about 7 percent of the labor force compared to 15 percent in 1985 (the most recent year for which final information is available). Finally, of the remaining 67.5 percent of the labor force in 1929, about half were employed in manufacturing, mining or construction with the remainder in various service industries. In 1985, of the 82 percent of the labor force not in government or agriculture, only 30 percent were engaged in manufacturing, construction or mining. Thus, employment in 1929 was much more heavily concentrated in cyclically sensitive areas than it is today.

While these employment figures are striking, employment data alone considerably understate the increasing importance of government activity over the years. In 1929, government expenditures on goods and services at all levels consumed 9.6 percent of GNP. Government transfer payments amounted to a further 0.9 percent of GNP. By 1986, government spending on goods and services had more than doubled to 20.6 percent of GNP and government transfers represented an additional 11.6 percent of GNP. Thus, the demand supported either directly or indirectly by government spending has slightly more than tripled from 10.5 percent of GNP in 1929 to 32.2 percent of GNP in 1986. To the extent that government spending is insulated from cyclical fluctuations (and, indeed, in many greatly expanded programs such as unemployment compensation and welfare, spending actually increases in cyclical downturns), this trend has added an important element of stability to the economy since 1929.

In addition to migrating to less cyclically sensitive sectors of the economy, the U.S. labor force has risen in size from roughly 40 percent of the total population in 1929 to just over 50 percent in 1986. In large part this is due to a striking rise in labor force participation by married females, especially those with children. As a result, many more households enjoy the stability of dual incomes today than did so in 1929. To the extent that dual incomes



stabilize consumer spending, a severe economic decline is less likely today than it was in 1929.

Other changes in the characteristics of economic activity have been noticeable but less clearly significant in their effects on economic stability. The fraction of GNP produced by non-financial corporations has risen from 48.5 percent in 1929 to 56.1 percent in 1986. The fraction provided by other business organizations has declined from 43.9 percent in 1929 to 28.8 percent in 1986 (Table 8). Since this latter category includes financial corporations which have grown relative to GNP, the declining role of proprietorship and partnerships in the economy has been substantial. The implications of this change for the stability of the real economy are unclear. On the one hand, larger corporate organizations may be more stable in economic downturns by virtue of their size and financial integrity. On the other hand, since corporations today are usually highly leveraged, the growing concentration of output among larger corporate organizations may represent a source of instability.

Still other characteristics of economic activity have exhibited surprisingly little change between 1929 and 1986. Investment in both years was about 16 percent of GNP (Table 7). Business fixed investment was 10.6 percent of GNP in 1929 compared to 10.9 percent in 1986 (although the mix between plant and equipment has changed significantly). Consumer durables expenditures were 8.9 percent of GNP in 1929 and 9.2 percent of GNP in 1986. The fraction of GNP accounted for by all categories of investment (household and business) has, therefore, remained largely unchanged. Thus, to the extent that investment is a particularly vulnerable segment of demand and equally so in 1929 and 1987, the situation is no less precarious in 1987 than in 1929.

**The Psychological and Financial Position of Business:** Comparing business "confidence" in post-Crash 1929 to business "confidence" today is an impossible task. Business leaders routinely expressed a mixture of confidence in the underlying strength of the economy along with misgivings about "speculative excesses" during both periods. Careful, systematic attitude surveys are not available for 1929 and not yet reliably available for 1987, while single short-period surveys are difficult to interpret.

The economic significance of business confidence lies in the willingness of businesses to invest. Strong expressions of belief in the future of the economy mean little or nothing if at the same time investment levels are being sharply reduced. Clearly, by this measure, there was dramatic loss of "confidence" in 1929, while the evidence on 1987 is not yet available.

However, if willingness to invest cannot be observed directly, an important related characteristic

of business conditions can be observed. One frequently mentioned "cause" of the sharp post-1929 decline in investment is the high level of corporate debt. The argument is made that highly leveraged businesses in 1929 were unable to withstand even slight decreases in demand or slight increases in the perceived uncertainty of future demand because of high debt levels. With the associated high levels of interest payments, available margins of safety that might have cushioned either demand shortfalls or increases in perceived risk were not available.

If this is true, the positions of corporations in 1987 may be more uncertain than those of corporations in 1929. Debt-equity ratios in 1929, whether measured in terms of book or market values, were low by both previous and subsequent standards. The ratio of the book value of long-term debt and preferred stock to total book capital was about 32 percent in 1929, compared to 37 percent in 1933, and 33 percent in 1927 and 1928. For a sample of large manufacturing corporations, the comparable figures were 23.2 percent in 1929, 24.5 percent in 1933, 27.7 percent in 1927 and 32 percent in 1922. In 1983, the last year for which equivalent book value figures (from tax returns) are available, the ratio of book value of long term debt and preferred stock to total book capital was 31 percent and has since increased to approximately 37 percent in the second quarter of 1987. An estimated ratio of the market value of corporate debt to the market value of total capital was 13 percent in 1929. The comparable figure in 1981 (the latest year for which equivalent data are available) was 28 percent (Table 8).

Since 1981, offsetting trends have led to no clear change in this ratio. On the one hand, corporations have been net purchasers of equity (i.e. they have retired equity) and substantial net sellers of debt. On the other hand, the market value of stocks has risen more rapidly (despite the October decline) than the market value of bonds. An estimated decrease in the ratio between 1981 and 1987 of 12 percent yields an estimated market value debt ratio of 25 percent in the summer of 1987.

Other measures of relative leverage both in operating and financial terms are obtainable from aggregate corporate income statements. In 1929, the profits (before interest and taxes) of non-financial business corporations were \$9.8 billion or 19.4 percent of gross domestic corporate product. Interest payments were \$1.4 billion, resulting in an interest coverage of seven times. In 1986, the most recent year for which complete data are available, profits (before interest and taxes) were \$258.7 billion or 11.0 percent of gross domestic corporate product. Interest payments were \$87.0 billion for a coverage ratio of about three times. Thus, even allowing that some fraction of 1986 interest payments were compensation for an inflation-related decline in the real

value of debt outstanding, leverage in these terms appears to have increased significantly. Operating leverage also appears to have increased as profit margins have fallen.

However, uncertainties in the underlying business environment also appear to have declined. Wholesale prices fell by 36.8 percent between 1920 and 1921, rose by 4.1 percent between 1922 and 1923, fell by 2.5 percent between 1923 and 1924, rose by 5.5 percent between 1924 and 1925, fell by an average of about 2 percent per year between 1925 and 1929 and then fell by about 10 percent per year between 1929 and 1933. The recent disinflation notwithstanding, the U.S. has experienced no comparable volatility in prices since the Second World War. Thus, in examining relative leverage in 1929 and 1987 it is important to look also at the consequences of that leverage.

In the period surrounding 1929, despite relatively low levels of leverage, investment fell sharply during periods of economic decline. In the 1920 to 1921 recession, when corporate debt ratios appear to have been above 30 percent, investment declined by 41.7 percent. In 1929 to 1930, with debt ratios of under 20 percent, investment declined by 35.6 percent. In 1937 to 1938, with debt ratios greater than those of 1929 to 1930, investment declined by 53.1 percent. In contrast, in the 1973 to 1974 recession, with debt ratios comparable to those in 1937, investment declined by only 7.6 percent in nominal terms or about 25 percent in real terms. In 1981 to 1982, with debt ratios slightly below those of today but above those of 1973, investment fell by 18 percent (22.2 percent in real terms). Thus, although corporate leverage is significantly higher today than in 1929, the evidence indicates that the likely consequences of this leverage for the stability of the real economy are far less serious.

There are two additional considerations. In 1929, the only direct impact of the stock market on corporations (as opposed to indirect risk perception effects) was through the terms on which equity capital could be raised. In 1929, the amount of equity capital involved was much larger relative to GNP than in recent years. Gross common stock sales were \$5.1 billion in 1929 or 4.9 percent of GNP compared to \$35.6 billion or 0.9 percent of GNP in 1985. This comparison too suggests that corporations today should be affected relatively less seriously by a decline in the stock market than corporations in 1929. However, in 1987, corporations are also directly affected by movements in the stock market through their pension plans. With defined benefit plans, corporations are for practical purposes the owners of the stocks held by their pension fund managers. If the stock market does well, future pension fund contributions may be reduced and/or the surplus may be directly appropriated. If the stock market

does poorly, any deficit must be made up by higher future corporate contributions.

How far this latter phenomenon will affect corporations is difficult to predict since the circumstances involved are largely unprecedented. It will to some extent intensify corporate reactions to the stock market. A loss of \$500 billion in the market value of stocks should translate into a loss to corporations of perhaps \$50 billion since pension funds own roughly 20 percent of all common stock and perhaps half of all pension funds fall into the relevant category. This compares to 1986 corporate pre-tax earnings of \$171.7 billion to which only a fraction of the loss of \$50 billion would apply (since it could be made up over several years). Thus, although the direction of this pension fund effect is destabilizing, the magnitude of the effect should not be sufficient to alter the basic conclusion that business investment should react far less strongly to the recent stock market decline than it did in 1929.

**The Situation of Households:** Consumption in 1929 accounted for 74.4 percent of GNP compared to 65.6 percent in 1986. Fluctuations in consumer demand are, thus, slightly less significant now than in 1929. In addition, several factors have led to greater stability in household income levels. These include the increase in government jobs and income support programs, the rising number of dual income households, the shift in demand toward services and the declining number of households in the highly volatile farm sector.

On the other hand, the asset positions of households contain substantially more debt than in 1929. Total household debt in 1929 (including mortgages and margin debt) was about 53 percent of disposable income. Net interest payments on this debt were about 2 percent of disposable income. In the second quarter of 1987, total household debts were 91 percent of annual disposable income. A rough estimate suggests that interest payments on this debt represent 10 percent of disposable income. By these standards households today are more highly leveraged than in 1929, which might make consumer demand more susceptible to the effects of any reduction in income or stock prices. With respect to stock prices, this vulnerability is heightened by the fact that today roughly 20 percent of households own stock compared to only 6 percent in 1929.

Other factors might also contribute to possibly higher household demand variability today than in 1929. Savings as a percentage of disposable income was about 4 percent in 1986, approximately equal to the 3 percent savings rate in 1929. But recent years have witnessed far higher savings rates. As recently as 1984, households saved 6.3 percent of disposable income. From 1973 to 1975, household savings exceeded 9 percent of disposable income. A return to



recent "normal" levels of household savings would mean a sharp drop in consumer demand. If, as some evidence suggests, a downward shift in the household demand function played an important role in the early stages of the post-1929 decline (see Footnote 3, page VIII-3) then at the least, the same possibility exists today. The principal difference between 1987 and 1929 is that we are now far less vulnerable to the continuing downward spiral in income (and hence consumption) which characterized the descent to the trough of the Great Depression from 1931 to 1933.

Furthermore, the degree of household leverage calculated above may seriously overstate the differences between 1929 and 1987 for two reasons. First, housing prices recently have been increasing dramatically, in contrast to 1929 when housing prices had been declining for several years (by about 12 percent from 1926 to 1929). Second, inflation and taxes greatly reduce the actual cost of debt. If interest payments represent 10 percent of disposable income, then after-tax interest payments should be only about 8 percent of disposable income (assuming most interest payments are for mortgages, which are tax deductible). An additional 4 percent of that interest is consumed by the inflationary reduction in the value of the outstanding debt. On balance, therefore, the net cost of household debt in 1987 may have been only 4 percent of disposable income.

**International Trade:** The collapse of international trade in the early 1930's has been largely attributed to the tariff wars of that time. To the extent, therefore, that those trade policies are not reproduced in 1987, it should be possible to avoid a similar experience. Since exports now account for 8.9 percent of GNP, compared to 6.8 percent in 1929, the consequences for U.S. industry would be more widespread than in 1929.

However, the current U.S. balance of trade provides a measure of protection against even misguided trade (or exchange rate) policies. In 1929, the U.S. enjoyed a trade surplus of about 1 percent of GNP. In any trade war, the potential harm to U.S. exporters in 1929 was necessarily greater than any potential gain to industries facing import competition. In 1987, the U.S. trade deficit is about 3.5 percent of GNP so that, in macroeconomic terms, industries facing import competition have potentially more to gain from trade barriers than exporters have to lose. In this, the United States in 1987 resembles the United Kingdom with its chronic trade deficit in 1929, which appears to have suffered significantly less severely than the United States from the post-1930 decline in trade (see discussion, page VIII-5). Thus, even if exchange rate instabilities rather than trade restrictions inhibit international trade, the consequences in 1987 are likely to be less adverse than the consequences in 1929.

**Monetary Policy:** In comparing the impact of monetary policy actions today with those of 1929, it is critical to note the difference in the inflationary environment. In the 1920's, the U.S. economy was in the midst of a period of falling prices which accelerated in the years after 1929. In such an environment, even if the monetary authorities succeeded in reducing nominal interest rates to zero (as they did on Treasury Bills in 1932), real interest rates would remain unavoidably high. In the 1980's, even after escaping the rapid inflation of the late 1970's, prices are continuing to rise at an average annual rate of 4-5 percent. Under these circumstances, an aggressive monetary policy (and the associated inflation) can reduce real interest rates below the high levels of 1930 to 1932. Also, the consequences of the monetary contractions in late 1931 and 1937 are familiar (whether fairly ascribed or not). Unless there is an overzealous commitment to suppressing inflation at all costs, similar monetary policies are unlikely to be pursued in 1987 and subsequent years.

**Taxation and Government Spending:** As the role of government has expanded between 1929 and 1987, the potential for misguided fiscal or spending policies to precipitate or exacerbate a recession has increased greatly. The maintenance of stability in budgetary policy is correspondingly more important. However, as with monetary and trade policy, the key to avoiding difficulties is essentially in the hands of public policy makers.

Unfortunately, since the impact of fiscal policy before 1941 was negligible, the evidence from 1929 provides little guidance for appropriate policy making in post-Crash 1987. However legitimate concern over the budget deficit may be, prudence nevertheless suggests that the implementation of drastic immediate steps to reduce it can, given the state of our current economic knowledge, only increase the risks of a severe recession.

**The Banking System:** In 1929, the collapse of the banking system appears to have largely been a consequence rather than a cause of the steep decline to the 1933 trough of the Great Depression. Thus, avoiding a similar economic contraction should go a long way to preventing a similar banking system failure. Moreover, deposit insurance and the willingness of the Federal Reserve System to support troubled banks (notably Continental Illinois) has meant that the U.S. in 1987 is far less prone to contagious banking runs than in 1929. That the national banking system has weathered the collapse of major banks like Continental Illinois and that the Texas banking system has survived its difficulties without a panic indicates that the current system is far more resilient than the banking system in 1929.



### III. Conclusion

Two important points emerge from a comparison of the market decline of 1929 to that of 1987. First, structural change in the economy since the Depression—chiefly the changing composition of economic activity, the increasing role of government and the absence of chronic deflation—means that the economy now appears to be far more stable than it was in 1929. Second, the Great Depression appears to have

been caused not by the stock market Crash but by the interaction of a number of diverse circumstances (such as the declines in agriculture and housing) and misguided policies (such as the Smoot-Hawley Tariff, the tight monetary policy in late 1931 and the tax increase in the summer of 1932). Thus, as long as a similar set of circumstances and policy initiatives are avoided, a comparable economic contraction should remain only a remote possibility.

TABLE 1.—THE POST-1929 DECLINE

[In percent]

| Year       | DJIA                         |                     | Real GNP        |               | Price level <sup>2</sup> |               | Unemployment <sup>3</sup> |
|------------|------------------------------|---------------------|-----------------|---------------|--------------------------|---------------|---------------------------|
|            | Percent of 1929 <sup>1</sup> | Annual change       | Percent of 1929 | Annual change | Percent of 1929          | Annual change |                           |
| 1929 ..... | 65.2                         | <sup>4</sup> (34.8) | 100.0           | .....         | 100.0                    | .....         | 5.3                       |
| 1930 ..... | 43.2                         | (33.8)              | 90.1            | (9.9)         | 90.6                     | (9.4)         | 14.2                      |
| 1931 ..... | 20.4                         | (52.7)              | 83.2            | (7.7)         | 76.6                     | (15.5)        | 25.2                      |
| 1932 ..... | 15.7                         | (23.1)              | 70.8            | (14.9)        | 68.0                     | (11.2)        | 36.3                      |
| 1933 ..... | 26.2                         | 66.7                | 69.5            | (1.8)         | 69.1                     | 1.7           | 37.6                      |
| 1934 ..... | 27.3                         | 4.1                 | 75.8            | 9.0           | 78.7                     | 13.8          | 32.6                      |
| 1935 ..... | 37.8                         | 38.5                | 83.3            | 9.9           | 84.0                     | 8.8           | 30.2                      |
| 1936 ..... | 47.2                         | 24.9                | 94.8            | 13.9          | 84.8                     | 1.0           | 25.4                      |
| 1937 ..... | 31.7                         | (32.8)              | 99.8            | 5.3           | 90.6                     | 6.9           | 21.3                      |
| 1938 ..... | 40.6                         | 28.1                | 94.7            | (5.1)         | 82.6                     | (8.9)         | 27.9                      |
| 1939 ..... | 39.4                         | (3.0)               | 102.8           | 8.6           | 80.9                     | (2.0)         | 25.2                      |

<sup>1</sup> For DJIA, percentage of 1929 denotes end-of-year value as a percent of the 1929 peak.

<sup>2</sup> Wholesale price index.

<sup>3</sup> Unemployment expressed as a percentage of the non-farm civilian labor force.

<sup>4</sup> Decline from 1929 peak to end-of-year.

TABLE 2.—CHANGES IN THE COMPOSITION OF GNP IN THE POST-1929 DECLINE

[In percent]

| Year      | GNP                   |               | Consumption           |               | Investment            |               | Residential construction |               |
|-----------|-----------------------|---------------|-----------------------|---------------|-----------------------|---------------|--------------------------|---------------|
|           | Percent of 1929 level | Annual change | Percent of 1929 level | Annual change | Percent of 1929 level | Annual change | Percent of 1929 level    | Annual change |
| 1930..... | 87.7                  | (13.3)        | 90.5                  | (9.5)         | 62.3                  | (37.7)        | 57.5                     | (42.5)        |
| 1931..... | 73.5                  | (16.2)        | 78.4                  | (13.4)        | 34.6                  | (44.5)        | 42.5                     | (26.1)        |
| 1932..... | 56.3                  | (23.4)        | 62.9                  | (19.8)        | 6.2                   | (82.1)        | 17.5                     | (58.8)        |
| 1933..... | 53.9                  | (4.3)         | 59.3                  | (5.7)         | 8.6                   | 38.7          | 15.0                     | (14.3)        |

TABLE 3.—BANKING FAILURES 1928 TO 1933

| Month          | 1928 | 1929 | 1930 | 1931 | 1932 | 1933  |
|----------------|------|------|------|------|------|-------|
| January .....  | 56   | 58   | 90   | 198  | 342  | 236   |
| February ..... | 48   | 70   | 87   | 76   | 119  | 150   |
| March.....     | 64   | 52   | 80   | 86   | 45   | 3,460 |
| April.....     | 47   | 40   | 90   | 64   | 74   | 30    |
| May .....      | 30   | 66   | 59   | 91   | 82   | 12    |
| June .....     | 29   | 79   | 67   | 167  | 151  | 11    |
| July.....      | 24   | 67   | 64   | 93   | 132  | 12    |
| August.....    | 20   | 18   | 67   | 158  | 85   | 22    |
| September..... | 20   | 37   | 67   | 305  | 67   | 13    |
| October.....   | 41   | 41   | 71   | 522  | 102  | 17    |
| November.....  | 77   | 70   | 256  | 175  | 93   | 8     |
| December.....  | 42   | 61   | 352  | 358  | 161  | 29    |

TABLE 4.—GOVERNMENT BUDGET POLICY

[Dollar amounts in billions]

| Year       | Purchases of goods and services<br>(Federal plus state, local) |                | Federal Government |                |                |                             |
|------------|--|----------------|--------------------|----------------|----------------|-----------------------------|
|            | Amount   | Percent of GNP | Expenditures       |                | Surplus amount | Deficit (percent<br>of GNP) |
|            |  |                | Amount             | Percent of GNP |                |                             |
| 1928 ..... | N/A  | N/A            | \$2.96             | 3.1            | \$0.94         | 1.0                         |
| 1929 ..... | \$8.5  | 8.2            | 3.13               | 2.4            | 0.73           | 0.6                         |
| 1930 ..... | 9.2  | 10.2           | 3.32               | 3.7            | 0.74           | 0.8                         |
| 1931 ..... | 9.2  | 12.1           | 3.58               | 4.7            | (0.46)         | (0.6)                       |
| 1932 ..... | 8.1  | 14.0           | 4.66               | 8.0            | (2.74)         | (4.7)                       |
| 1933 ..... | 8.0  | 14.4           | 4.60               | 8.3            | (2.60)         | 4.7                         |
| 1934 ..... | 9.8  | 15.1           | 6.64               | 10.2           | (3.63)         | (5.6)                       |

TABLE 5.—COMPARISON OF THE GREAT DEPRESSION IN  
THE UNITED KINGDOM AND THE UNITED STATES

| Year      | United Kingdom                 |                                    | United States                  |                                    |
|-----------|--------------------------------|------------------------------------|--------------------------------|------------------------------------|
|           | Unemploy-<br>ment<br>(percent) | Employment<br>(percent of<br>1929) | Unemploy-<br>ment<br>(percent) | Employment<br>(percent of<br>1929) |
| 1929..... | 11.1                           | 100                                | 5.3                            | 100                                |
| 1930..... | 20.2                           | 97                                 | 14.2                           | 94                                 |
| 1931..... | 20.9                           | 93                                 | 25.2                           | 85                                 |
| 1932..... | 21.7                           | 92                                 | 36.3                           | 75                                 |
| 1933..... | 17.6                           | 95                                 | 37.6                           | 76                                 |
| 1934..... | 16.1                           | 96                                 | 32.6                           | 83                                 |
| 1935..... | 14.2                           | 96                                 | 30.2                           | 86                                 |
| 1936..... | 12.2                           | 103                                | 25.4                           | 93                                 |

Sources: Bank of England Statistical Reports 1931-1939, Historical Statistics of the United States.

TABLE 6.—MONEY SUPPLY AND LENDING MARKET CONDITIONS DURING THE POST-1929 PERIOD

[Dollar amounts in billions]

|            | M1             |                | Nominal GNP<br>(percent<br>change) | Interest rates               |                        |                                  |
|------------|----------------|----------------|------------------------------------|------------------------------|------------------------|----------------------------------|
|            | Average amount | Percent change |                                    | Short term<br>business loans | U.S. Treasury<br>bonds | Return on AAA<br>corporate bonds |
| 1928 ..... | \$26.38        | .....          | .....                              | 5.2                          | 3.33                   | 4.55                             |
| 1929 ..... | 26.64          | 1.0            | 6.3                                | 5.8                          | 3.60                   | 4.73                             |
| 1930 ..... | 25.76          | (3.3)          | (12.4)                             | 4.9                          | 3.29                   | 4.55                             |
| 1931 ..... | 24.14          | (6.3)          | (16.2)                             | 4.3                          | 3.34                   | 4.58                             |
| 1932 ..... | 21.11          | (12.6)         | (23.5)                             | 4.7                          | 3.68                   | 5.01                             |
| 1933 ..... | 19.91          | (5.7)          | (4.1)                              | 4.3                          | 3.31                   | 4.49                             |
| 1934 ..... | 21.86          | 9.8            | 17.1                               | 3.5                          | 3.12                   | 4.40                             |

TABLE 7.—DISTRIBUTION OF EMPLOYMENT

[Percent of total]

|   | 1929 <sup>1</sup> | 1985 |
|---|-------------------|------|
| Agriculture .....                         | 22.1              | 3.1  |
| Mining, manufacturing, construction ..... | 31.7              | 24.7 |
| Government .....                          | 7.3               | 15.0 |
| Services .....                            | 35.8              | 57.3 |

<sup>1</sup> Estimated.

TABLE 8.—PRODUCTION OF OUTPUT BY ORGANIZATION TYPE

|  | [Percent of total] |      |
|--|--------------------|------|
|  | 1929               | 1986 |
| Nonfinancial business corporations ..... | 48.5               | 56.1 |
| Other business organizations .....       | 43.9               | 28.8 |
| Nonbusiness organizations .....          | 7.6                | 15.1 |

TABLE 9.—COMPOSITION OF GNP IN 1929 AND 1986

|                               | [Percent of GNP] |       |
|-------------------------------|------------------|-------|
|                               | 1929             | 1986  |
| Consumption:                  |                  |       |
| Durables.....                 | 8.9              | 9.2   |
| Nondurables.....              | 36.3             | 22.2  |
| Services.....                 | 29.3             | 34.2  |
| Subtotal.....                 | 74.4             | 65.6  |
| Investment:                   |                  |       |
| Equipment.....                | 5.3              | 7.5   |
| Plant.....                    | 5.3              | 3.4   |
| Residential construction..... | 3.8              | 5.1   |
| Inventories.....              | 1.6              | 0.3   |
| Subtotal.....                 | 16.1             | 16.3  |
| Government:                   |                  |       |
| Federal.....                  | 1.4              | 8.7   |
| State and local.....          | 7.1              | 11.8  |
| Subtotal.....                 | 8.5              | 20.5  |
| Net exports:                  |                  |       |
| Exports.....                  | 6.8              | 8.9   |
| Imports.....                  | 5.7              | 11.4  |
| Subtotal.....                 | 1.1              | (2.5) |

TABLE 10.—CORPORATE DEBT POSITIONS <sup>1</sup>

|                      | Debt ratio <sup>2</sup>           |                        | Interest coverage | Operating margin (percent) | Recessionary decline in investment (percent) |
|----------------------|-----------------------------------|------------------------|-------------------|----------------------------|--|
|                      | Book value (percent) <sup>3</sup> | Market value (percent) |                   |                            |  |
| 1922.....            | N/A [32.0]                        | N/A                    | N/A               | N/A                        | 41.7   |
| 1927.....            | 33 [27.7]                         | N/A                    | N/A               | N/A                        | N/A  |
| 1929.....            | 32 [23.2]                         | 13                     | 7x                | 19.4                       | 35.6   |
| 1933.....            | 37 [24.5]                         | 37                     | 0                 | (0.8)                      | N/A  |
| 1937.....            | 36 [23.0]                         | 27                     | 5.5               | 17.2                       | 53.1   |
| 1973.....            | 34                                | 31                     | 5                 | 17.4                       | <sup>4</sup> 7.6                             |
| 1979.....            | 33                                | 36                     | 5.5               | 18.9                       | 18.0   |
| 1981.....            | 31                                | 28                     | 4                 | 16.2                       | N/A  |
| 1983.....            | 31                                | 29                     | 3                 | 13.6                       | N/A  |
| 1987 II quarter..... | 37                                | 25                     | <sup>5</sup> 3    | <sup>5</sup> 11.0          | N/A  |

<sup>1</sup> Sources: P. Temin "Did Monetary Forces Cause the Great Depression"; R. Taggart "Secular Patterns in the Financing of U.S. Corporations", Historical Statistics of the U.S.; 1987 Economic Report of The President.

<sup>2</sup> Debt to total capital.

<sup>3</sup> Figures in brackets are a sample of large manufacturing corporations.

<sup>4</sup> In real terms the declines in investment (peak-to-trough) are 26.4 percent in 1973 to 1975 and 22.2 percent in 1979 to 1982.

<sup>5</sup> Figures are for 1986.

## Appendix—A Note on Assessing the Effects and Extent of Margin Borrowing in 1929

The 10 percent figure for margin debt as a percentage of the value of outstanding stocks is actually total brokers' loans of NYSE firms maintaining margin accounts divided by the value of stock on the NYSE. At the end of September 1929, member borrowings of NYSE firms carrying margin accounts were \$8.5 billion. The outstanding value of NYSE issues was \$87.1 billion at the end of September 1987, of which broker loans to NYSE firms represented 9.8 percent. This percentage is overstated for several reasons. First, broker loans, although predominantly made to cover margin loans, were also made for other purposes. Second, not all margin debt was to cover stock purchases. Third, collateral on margin loans did not consist solely of common stocks. Government and private bonds were also available to cover margin debt. Fourth, non-NYSE traded stocks are not included in the market value total (since margin requirements against them were 100 percent) and these included important categories of stock (e.g., bank stocks) whose sale could have covered margin debts.

Margin debt fell by \$4.6 billion or 53.3 percent from the end of September 1929 to the end of the year. If repayment were entirely from the sale of margined stock (rather than from the sale of other securities like government bonds), this represented share sales on a month-by-month basis as shown in Table 1A.

In the final three-quarters of the year, margin related selling could have contributed little more than 25 percent of volume. To account for the contemporaneous 28 percent decline in price, this implies a price plasticity of 0.9 with respect to trading volume which seems unreasonably high.

As a percentage of total shares outstanding, margin-related selling would have been much smaller. Viewed as a shift in the overall demand for stocks, margin-related selling could have accounted realistically for no more than 8 percent of the value of outstanding stock. On this basis, the implied elasticity of demand is 0.3 which is beyond the bound of reasonable estimates.

Finally, since margin debt had been so heavily liquidated in 1929, it is difficult to blame forced margin sales related to the 1929 Crash for the continuing decline of the stock market in 1930 to 1933.

TABLE 1A

| Month         | Share sales<br>(margin related) |                         | Value of margin debt<br>outstanding |                                | Change<br>in DJIA<br>(percent) |
|---------------|---------------------------------|-------------------------|-------------------------------------|--------------------------------|--------------------------------|
|               | Total<br>(mil-<br>lions)        | Percent<br>of<br>volume | Total<br>(millions)                 | Percent<br>of<br>NYSE<br>value |                                |
| October.....  | 33.0                            | 23.3                    | \$6,109                             | 8.51                           | (20.4)                         |
| November..... | 34.4                            | 46.1                    | 4,017                               | 6.32                           | (12.7)                         |
| December..... | 0.5                             | 0.6                     | 3,990                               | 6.17                           | 4.0                            |
|               | 67.9                            | 22.8                    | .....                               | .....                          | (27.7)                         |





















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