# SUMMARY OF THE FINAL REPORT ON STOCK INDEX FUTURES AND CASH MARKET ACTIVITY DURING OCTOBER 1987 TO THE U.S. COMMODITY FUTURES TRADING COMMISSION

THE DIVISION OF ECONOMIC ANALYSIS
THE DIVISION OF TRADING AND MARKETS

JANUARY 1988

## SUMMARY

During a few days in mid-October 1987--most notably October 19--U.S. and foreign stock exchanges experienced record declines in stock prices. The abruptness and magnitude of October's fall in stock values placed severe strains on the operational and financial control systems of securities and futures exchanges and created strains for the banking system as well. Although no system failed and no broader economic crisis has ensued, a number of regulatory and self-regulatory issues were raised that are receiving close scrutiny by the Congress, Federal authorities, and self-regulatory organizations in the futures and securities industries.

The Commission addressed several of the issues pertaining to trading on futures exchanges in its Interim Report and in two subsequent reports released by the Commission's Division of Trading and Markets. (See Section I.) This final report primarily focuses on the futures and related stock market activity (including "program trading") of major commercial participants in the October 1987 markets, as well as the performance and floor activities of futures exchange members. In addition, this report contains recommendations for regulatory improvements in several areas.

A persistent assertion regarding the impact of stock index futures markets on stock prices concerns the "cascade theory." That theory suggests that short portfolio hedging and stock/ futures market arbitrage activities can interact to cause a

downward spiral in stock prices. A careful examination indicates certain inherent problems with the theory as an explanation of the October 19 market break. For one thing, the theory is dependent upon some assumptions that may not correspond to actual trading practices. More importantly, the cascade theory appears to describe at most a short-term and limited technical realignment of cash and futures prices that results from, rather than causes, an overall change in the equilibrium price level.

To ascertain the pattern of futures and related stock market trading in mid-October 1987, this report contains an extensive analysis of the timed daily trading data for the index arbitrage and portfolio insurance strategies of major broker/dealers and their institutional customers. Information on other forms of program trading in the stock market also is considered. The data were collected in a special survey that was conducted by the staffs of the CFTC and SEC.

As background to the trading activity of major market participants, Section II of this report summarizes a statistical analysis of the relationship between the S&P 500 index and the price of the December S&P 500 future for the period October 14 through 26. The focus of that analysis is a "trading proxy index," which was created for each day to minimize or eliminate the impact of delayed or stale stock market prices on reported values of the S&P 500 index. That analysis indicates that, during the periods when the reported futures discount was at extremes (e.g., the mornings of October 19 and 22), a significant portion of those discounts was illusory since a substantial number of the stocks included in the S&P 500 index were not actively trading. Among other things, these findings cast substantial doubt upon both the cascade theory and the supposition that futures prices were leading the stock market as reasonable representations of what occurred during the morning of October 19.

Section III of this report provides an extensive analysis of the special intraday survey data. Index arbitrage programs in which futures contracts were bought and stocks were sold were largest on October 14, 16, and 19 but were insignificant thereafter as a result of the New York Stock Exchange's (NYSE) restrictions. The largest arbitrage trades accounted for sales of nearly 38 million shares on both October 16 and 19, representing about 11 percent and 6 percent, respectively, of total NYSE volume. On a relative basis, reported index arbitrage sell programs were more significant on October 14, when they accounted for more than 13 percent of total NYSE stock sales.

Portfolio hedge sales in the Chicago Mercantile Exchange's (CME) S&P 500 futures market were at their highest levels on October 16, 19, and 20. Daily gross sales ranged from nearly 15,000 to nearly 34,000 S&P 500 futures contracts, amounting to from 10 to 30 percent of total daily volume in that market. The largest reported net portfolio hedge sales occurred on October 19, nearly 28,000 S&P 500 futures contracts. Since index arbitrage was only significant from October 14 through 19, and portfolio hedge selling was substantial only on October 16 through 20, a significant interaction of the two trading strategies most likely would have occurred on October 16 and 19. The analysis of the survey data on an intraday basis, however, does not support the contention that the two trading strategies interacted to cause the large fall in stock prices experienced on those days.

October 16 was the expiration date of a number of index option contracts as well as the Chicago Board of Trade's (CBT) Major Market Index futures contract. Consequently, most index arbitrage activity that day occurred during the final hour of trading. Portfolio hedge selling, however, was dispersed throughout the day and was not particularly heavy during the periods when stock prices fell the most and when arbitrage sell programs were the largest. At times within the day and at the close, index arbitrage sell programs may be construed to have contributed to short-term, technical pressures on stock prices. It is noteworthy, however, that, at those times, futures prices were falling along with stock prices despite an equivalent magnitude of futures index arbitrage buying, thus indicating overall market weakness.

On Monday, October 19, the stock market opened with a massive wave of selling. Nearly 100 million shares of stock were sold in the first hour of trading on the NYSE even though a number of major stocks had delayed openings, and over 600 million shares were sold that day. One mutual fund group alone accounted for sales of 17.5 million shares (34 percent of volume) in the first half hour of trading, which was nearly three times the reported index arbitrage sell programs during that period. For the day, program selling of stocks not related to futures transactions was of a significantly greater magnitude than index arbitrage, totaling nearly 52 million shares. Clearly, index arbitrage was not the dominant selling force in the stock market that day. Also, the absolute amount as well as the percentage of arbitrage sell programs on October 19 were smaller than the stock sales associated with index arbitrage identified in prior studies that concluded that index arbitrage did not cause the significant stock price declines at other times.

Further, the intraday analysis of trading by major commercial firms does not support the interaction of index arbitrage and portfolio hedging strategies as an explanation for the extraordinarily large fall in stock prices on October 19. Although high levels of index arbitrage occurred early in the day, after 2:00 p.m. that activity diminished significantly. Moreover, for each half-hour interval after 10:00 a.m., other program selling in the stock market was larger than stock sales associated with index arbitrage. Portfolio hedge sales of futures contracts were persistent throughout the day, but the highs and lows of that activity did not correspond with the periods of greatest weakness or recovery of futures prices.

Because of the imposition of NYSE restrictions on program trading, index arbitrage was insignificant on October 20. On that day, portfolio hedge selling in the futures market was large at times and was not offset by futures purchases from index arbitrage trading. Consequently, there were large futures price discounts relative to the underlying index that persisted throughout the day.

After October 20, stock prices continued to be volatile in the absence of significant index arbitrage and significant hedge selling of futures. For example, on October 22, when the Dow fell 78 points on volume of nearly 400 million shares, reported index arbitrage stock sales were less than 3 million shares. Similarly, on October 26, when the Dow fell 157 points on volume of over 300 million shares, no index arbitrage trades were reported. Furthermore, stock prices after October 19 did not recover to near the level of October 16, much less that of October 1. At the close on October 26, the Dow was only 55 points higher than at the close on October 19. This lack of recovery in the absence of index arbitrage reinforces the conclusion that futures-related program trading was not the principal cause of the collapse of stock prices. Instead, the wave of selling that engulfed both the stock and index futures markets, particularly on October 19, appears to have been precipitated by a massive change in investors' perceptions.

The SEC/CFTC survey data and interviews conducted by CFTC staff indicate that institutional hedging in futures markets was not uniform in nature during the mid-October period under review. In particular, while some firms employed portfolio insurance strategies, others pursued more varied hedging and market-timing strategies, including several who purchased futures during periods of declining stock prices in anticipation of later purchasing stocks. And, among those firms that earlier in

October were adhering to portfolio insurance strategies, many abandoned or reduced the amount of futures or stock market sales implied by the plans. In addition, representatives of institutional investors indicated that, in the short run, they could use the stock market and stock index futures interchangeably for many portfolio management strategies. In particular, fund managers indicated that stocks would have been sold in the absence of the ability to hedge them in the futures market.

Section IV of this report examines trading in and the operational performance of the S&P 500 futures contract. Commission staff found that the operational systems of both the CME and its member firms functioned well, despite the high trading volume and price volatility in that market. Although a larger than usual number of outtrades occurred on October 16 and 19, they largely were resolved before the opening of trading the next day because of two special trade checking sessions. In addition, a staff survey of twenty-three CME member firms found that their order-routing and execution systems required no substantial modifications. The order-execution times at one major wire house were reviewed in detail, revealing that those orders generally were executed expeditiously, with nearly half of all customer orders executed within a minute of their receipt on the trading floor.

CME audit trail data document broad participation in the market on October 19 and 20 by all major market groups, including members trading for their own accounts and brokers executing customer orders. CME members trading for their own accounts absorbed customer sell orders on those days when the market was falling, including those times when the market fell the most. Further, the number of "primary" brokers executing customer trades in the S&P 500 futures market increased on October 19 and 20 from the active trading day of October 16, indicating that experienced brokers remained available to execute customer orders.

Section V of this report describes the Commission's heightened trade-practice surveillance of stock index futures trading beginning on October 14. CFTC staff maintained an almost continual presence on the floors of the CME and the CBT during the week of October 19. Through the use of the CFTC's computer-assisted trade database and one-minute execution times required by CFTC audit trail regulations, staff reviewed large amounts of trading data on an expedited schedule. In addition, market participants were interviewed and exchange investigations of potential trading abuses were monitored. In particular, staff examined October 20 trading in the CBT's Major Market Index contract and trading in the S&P 500 futures contract by a CME clearing member that took place on the morning of October 22, as well as all exchanges of futures for cash executed in the S&P 500 contract during the mid-October period under review. To date, the staff has not discovered any pattern of trading activity in futures or options on futures that would indicate violative activity.

The final section of this report examines several pertinent aspects of the current regulatory system and suggests areas for improvement. Although the staff believes its current market surveillance system for stock index futures is sound, improved data collection capabilities in other markets, particularly regarding stock market trades of firms engaging in index arbitrage, would greatly expedite any subsequent studies of these markets.

The staff examined the traditional uses of daily price limits in futures markets, assessing the advantages and disadvantages of such limits. All but one of the smaller stock index futures contracts currently have rules providing for such limits. Any tightening of those limits, however, should take into account the potential impact on other markets.

Section VI also includes a brief review of interagency coordination, which describes the Commission's establishment of surveillance liaisons with the SEC and banking regulators. While the staff believes both interagency and interexchange coordination generally were excellent during October 1987, improvements are needed regarding access of futures exchanges to accurate information on delayed openings and trading halts of NYSE stocks. Coordination among exchanges with respect to emergency closings should be enhanced.

This report also summarizes the recommendations of its Financial Follow-up Report. That report comprehensively analyzed the futures market financial systems and found that those systems withstood the stress placed upon them by the events of October 1987.

Staff considered the concept of intermarket frontrunning as it may relate to trading between securities and futures markets. It was found that both securities and futures exchanges have rules that can be applied to such activity. The Intermarket Surveillance Group was identified as an appropriate forum for facilitating the communication of intermarket surveillance data needed to monitor such activities. CFTC staff also is considering the advisability of Commission regulatory action on frontrunning.