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Overview

Allan H. Meltzer
Carnegie Mellon University, am05@andrew.cmu.edu

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Overview

Allan H. Meltzer*

From the opening on October 14, 1987 through the market close on October 19, major indexes of market valuation in the United States declined by 30 percent or more. On October 20, the major indexes recovered part of their loss. For the next four months, these indexes remained within a narrow range, though they were often subject to relatively large daily changes.

Seven groups—the Chicago Board of Trade (CBOT), the Chicago Mercantile Exchange (Miller), the Commodity Futures Trading Commission (CFTC), the General Accounting Office (GAO), the New York Stock Exchange (NYSE), the Presidential Task Force on Market Mechanisms (Brady), and the Securities and Exchange Commission (SEC)—have reported on aspects of the October events in the United States and, in some cases, recommended courses of action including changes in market regulations, new regulations and new arrangements for coordination. The seven reports differ in quality, in depth of analysis as well as in their recommendations. In part, these differences reflect the different missions undertaken. The diversity of the reports and the differences in recommendations suggest that an independent review of the reports and their recommendations may be useful.

In addition to these reports about the performance of the United States markets, the International Stock Exchange (London) and the Bank of England (Bank) report on the performance of securities markets in London. Differences in performance and in organization, under broadly similar circumstances, permit helpful comparisons to be made, so these reports are discussed also.

* I have benefited from discussions with Franklin Edwards.
This volume is the result of an effort to review the analysis of the October events and the responses to them. Of particular interest is the relation between the reports on United States markets and the recommendations. A striking but generally disregarded feature of the recommendations made is that, often, no claim is made and no evidence is offered that the events of October would have been different if the recommended changes had been in effect. Indeed, in some reports, there is little relation between the problems described and some of the solutions proposed.

There are three separate aspects of what is called the October "crash." First is the size of the market decline. What can be said about the cause or causes of the decline? Second is the speed of decline. Third is the performance of the markets for shares and derivative products during and after the decline or crash.

CAUSES OF THE DECLINE

Although there are a large number of competing explanations of the size of the market decline, all relevant explanations can be grouped under three headings—reductions in anticipated future earnings, rising interest rates and increased uncertainty. Of particular interest, in view of the attention it has received, is the effect on volatility and uncertainty of such market arrangements as computerized trading and index arbitrage. A fourth explanation, attributing the decline entirely to chance, is difficult to reconcile with two different observations—the universal decline in share prices and the fact that three to five months after the decline, stock price indexes in all countries remained below their previous peak. This pattern of change in all markets suggests that some systematic change, or changes, occurred to lower share prices in all markets.

The international nature of the decline also helps to dispose of some principal explanations of the decline that attribute the decline to uncertainty arising from the stock market's internal processes—mainly computer trading in the United States—or to the development of new trading techniques—particularly the use of index futures or derivative securities. The problem with these explanations is that neither the use of the computer in executing trades nor the development of futures markets and derivative securities is universal, whereas the market decline is.
Richard Roll's paper, later in this volume, compares the decline in 23 stock markets around the world. He finds that trading procedures, trading rules and market organizations differ along several dimensions. Some countries have developed futures and forward markets. Some have continuous auctions, margins or computerized trading. Others do not. Roll finds very little relation between these organizational factors and trading arrangements and the size of the decline when he allows for the interaction of the many differences in market arrangements.

One possible reason for this weak association is that the decline may have started in the United States. On this commonly advanced explanation, computerized trading or futures market initiated a sharp decline in the United States that spread to other countries. Roll's data permit us to reject this explanation for the major decline on October 19. On Monday, October 19, markets in some countries declined before the United States market opened. The countries include Belgium, France, Germany, Hong Kong, Malaysia, Singapore, but there are others as well.

Further, if computer trading procedures or the use of derivative securities in the United States had been responsible for the decline by increasing variability, risk and uncertainty, there is no reason for markets in other countries to decline and certainly no reason why some markets would decline relatively more than the United States markets. Increased risk in United States markets should cause a decline in the United States market relative to foreign markets; securities used in program trading or traded in the futures market should decline relative to other securities in United States markets. This is not what occurred. Roll reports that the October decline in the United States S&P 500 index is near the mid-point for the 23 countries in dollar value and is one of the smallest when declines are measured in each country's currency. The October decline in the S&P 500 index was about the same as the decline in the American Stock Exchange index but smaller than the decline in the more actively traded over-the-counter market (NASDAQ) or in the over-the-counter market as a whole (SEC, p. xi). Since these smaller markets have different risk characteristics than the New York Stock Exchange, it seems unlikely that the relative decline in United States markets can be explained satisfactorily by differences in market risk arising from computer directed trading, or derivative securities.
Any surprise, or shock or macroeconomic change affecting the United States would also affect markets in the rest of the world. For example, a recession concentrated in the United States would lower world demand and, therefore, affect markets around the world. The largest effects should be felt in countries most dependent on exports to the United States. There is some evidence of a strong response in countries like Hong Kong, Singapore and Mexico with relatively large exports to the United States, but the explanation fails for Japan, where the decline is relatively small, and does not explain the sizeable decline in Germany or France, countries that depend relatively little on trade with the United States. There is a relatively high degree of correlation between stock prices in major countries—the United States, the United Kingdom, Germany and Japan. Pairwise correlations of daily prices on these markets for the period September 15 through November 15 are typically 0.9 or above.\(^1\) Earlier periods surrounding major changes in dollar exchange rates, July 1 to August 30, 1979 and February 15 to March 30, 1973, show either weak positive or negative correlations.\(^2\) These latter patterns are the patterns expected at the time of a major change affecting principally the United States. Roll finds that, even when measured in a common currency, monthly changes in stock prices typically are not highly correlated. In contrast, stock price indexes fell in all countries in October 1987, as would be expected from a common shock.

No complete explanation of the shock affecting world markets is likely to be found. However, we know that interest rates on long-term bonds and stock prices in the United States are closely correlated (-0.95) for the October trading days prior to the October 19th decline. The correlation is much higher than usually found between these variables. Whatever caused the rise in rates produced similar increases in all major markets at the time.

The rise in interest rates became a source of contention between countries, particularly between Germany and the United States, since the rise in rates abroad necessitated an increase in the United States. The reason is that, under the so-called Louvre agreement, major countries had

\(^1\)An exception is the correlation between the Dow Jones Industrial and the Nikkei index, 0.81. Prices are measured in local currency.

\(^2\)Japan and the U.S. are an exception in 1979.
agreed in January to maintain a band on exchange rates. To maintain the band, in the face of rising interest rates abroad, the United States was expected to increase rates further. United States long-term rates on Treasury bonds reached a peak of 10.5 percent on the morning of Monday, October 19, then declined.\footnote{3}

This explanation is incomplete. Interest rates and stock prices have a low, positive correlation from October 19 to the end of the month. In this period, the movement of stock prices in the United States may have been influenced more by uncertainty or anticipated income than by interest rates.\footnote{4}

In sum, the decline was international in scope. Stock prices fluctuated around the new lower level until, months later, evidence of lower interest rates, stronger growth and reduced uncertainty contributed to a new moderate rise in some countries.\footnote{5} The movement in stock prices in October is suggestive of a change in valuation, not a random movement or a response solely to market arrangements such as the existence of markets for futures or derivative securities.

Fama's and Telser's papers, below, consider the possibility that the decline on October 19 was a bubble, or purely random movement

\footnote{3}{The SEC report reaches a similar conclusion about the effect of interest rates, but their discussion refers to short-term rates. See SEC, p. 3-9 and 3-10. The Governor of the Bank of England lists the possible collapse of the dollar and rising interest rates as the immediate cause of the decline in stock prices. See R. Leigh-Pemberton, "Addressing the Stock Market Crash," February 11, 1988, p. 2. The Federal Reserve Bank of New York reports: "As interest rates moved higher abroad, market participants took the view that, given the commitment to exchange rate stability, interest rates in the United States must move up at least as much to maintain sufficient interest rate differentials. In this context, the announcement on October 14 of another large U.S. trade deficit for August at first had a much more pronounced impact on securities and equities markets than on the exchange markets." ("Treasury and Federal Reserve Foreign Exchange Operations," Quarterly Review, Federal Reserve Bank of New York, Winter 1987-88, p. 50.) The article continues with discussion of concerns about possible breakdown of the Louvre accord and the decline in the dollar during the week ending October 17.}

\footnote{4}{If one interprets short-term movements of the gold price as reflecting uncertainty, the correlation between gold and stock prices should be negative. From October 19 to the end of the month, there is a negative correlation of -0.66. From October 1 to 16, the correlation is +0.01.}

\footnote{5}{At the October 26 close, the Dow Jones Industrials were only 55 points above the level reached at the October 19 close and 842 points below the October 1 close.}
unrelated to any news, information or event. Telser cites the size of the decline, and the asymmetry between the speed of decline and the rate of rise as a possible support for the bubble hypothesis. Both Fama and Telser note, however, that economic theory does not predict the precise price at which markets clear, so it is difficult to reject, directly, arguments about bubbles or purely speculative changes. On the other hand, it is difficult to explain why such changes would occur on the same day in all markets and, having occurred, would persist for weeks or months.

THE SPEED OF DECLINE

A notable feature of the October decline in the United States is the concentration of the price change within a very short period. Even if we date the beginning of the decline as October 14, the entire decline in the United States (but not in all countries) was compressed into four trading days with most of the adjustment on a single day, Monday, October 19. In some other countries, limits on price movements distributed the decline over several days. In some, costs of transacting are higher than in the U.S., so adjustment to "news" may be slower. The similar size of the October decline in several of these countries suggests that the main effect of price limits on price movements is to spread the movement over several days. Once again, this is consistent with a persistent price correction, not a transitory or purely random change.

Costs of buying and selling securities in the United States have declined markedly since the early 1970s. Some of the reasons for the reduction include the introduction of negotiated commissions, block trading, and the development of futures markets in which claims to entire portfolios can be purchased and sold. As a result of these changes, transactions volume has increased to many times the levels achieved a decade or even a few years ago.

One effect of lower transactions costs and improved information technology is to concentrate the response to new information within a smaller time frame. It should not be surprising, therefore, that when new information implies lower (or higher) prices, U.S. markets respond more quickly than in the past.
Fama's paper argues that it is socially desirable for markets to respond more quickly. The reason is that more rapid adjustment allows new information, "news," to affect prices promptly. There is less chance that people will buy or sell at prices that do not fully reflect events that have occurred or are anticipated to occur in the future. Higher volatility is a possible offset to the gain from lower transactions costs. As Fama notes, lower transactions costs may increase volatility.

There is no way to establish beyond doubt either that share prices did not fully reflect "news" or that prices responded excessively to new information. To test either conclusion formally, we would have to be precise about the particular news that drove the markets. Several pieces of new information arrived during the period immediately preceding the market decline that could substantially change securities prices in major markets. Rising interest rates were mentioned earlier. Monthly trade figures for the United States, announced on October 14, showed a record trade deficit thereby raising concern about a further decline in the dollar or a rise in U.S. interest rates. There were rumors and fears of increased involvement by the United States in the conflict in the Persian Gulf. A conflict in the gulf that disrupted oil supply or that juxtaposed the United States and the U.S.S.R. would have potentially large effects. During the days preceding the market decline on October 19th, open disagreements about interest rate and exchange rate policies between United States and West German officials became known. Doubts arose, therefore, about the direction of monetary policy in major countries and about the future of the so-called Louvre agreement on bands for exchange rates. In addition, news affecting individual countries occurs with high frequency. An example was concern in the London market about the large sale of BP shares by the government in October.

Even if the markets' responses were entirely a response to news, it is not an easy task to link specific responses to specific events. As the Barro and Fama papers note, research has produced better evidence of effects of the stock market on the economy than the reverse. Further, the evaluation of "news" changes. What at first appears important, or unimportant, is often perceived differently at a later time. Questionnaires that ask people, after the event, to cite events important at the time must face this and other problems.
Despite these well-known problems of explaining market movements, we can reach some judgment about the degree to which markets overreacted to news on October 19 and 20. An excessive response would be followed by a reversal; market prices would rise. Those who had sold near the bottom of the decline would, in retrospect, find that they had been too hasty.

Market prices in the United States show only slight evidence of overreaction for the next three months. The intraday low point for the Dow Jones Industrial average during the decline is 1708.70 on October 20 (SEC, p. 2-1). The industrial average ended the week at 1794, only 55 points higher than the close on "Black Monday," October 19. During the next three months, the industrial average remained between 1800 and 2000 with rare exceptions, so the intraday low point is less than 100 points (5.5 percent) below the bottom of the range within which the market fluctuated, and the close on October 19 (1738.74) is less than 3.5 percent below that range. These data suggest that transactors, with hindsight, appear to have valued securities in the days and weeks after the crash not very differently from valuations that prevailed on October 19 and 20. By the end of March 1988, none of the market averages had reached its previous peak. Although the Nikkei average for Japan was within two percent of its peak, most averages remained between 20 percent and 40 percent below their previous peak. Indeed, some continued to fall through late March (see Figure Roll-10). The speed of the market's decline does not appear to have been a cause of substantial overshooting of the major indexes.6

MARKET PERFORMANCE

On October 19 and 20, the value of trading was far in excess of any previous experiences. Several of the reports comment favorably on the quality of performance under the circumstances prevailing at the time. Quality of performance was marred, however, by problems on which several of the official reports comment. Some people who would have liked to trade on October 19 and 20 were unable to reach their brokers.

6 Individual stock prices would provide additional information on the presence or absence of overshooting.
Specialists were unable to establish prices for some securities for relatively long periods during the trading day. Some market makers are reported to have withdrawn from trading in the over-the-counter and other markets on these days, thereby reducing the public's opportunities to transact (Brady, pp. VI, 49-50).

Volume of trading became so heavy that reporting of transactions prices and transactions to buyers and sellers was delayed for long periods, in some cases for days. Some reports note that the absence of information on transactions and prices may have inhibited trading. This could occur if potential buyers did not know what they had purchased or sold, the prices to which securities had fallen or the prices at which purchases could be made.

Much attention has been focused on market organization and trading procedures as causes or contributors to problems that transactors experienced during the market decline. Computerized trading, portfolio insurance and index arbitrage have been singled out for attention.

A problem with discussions of this kind is that markets all over the world declined. Only a few countries have computerized trading, index arbitrage, and portfolio insurance. Further, as Telser notes in his paper, none of these techniques or procedures were present in previous large sudden market declines—1914, 1929, 1962 and other periods.

The spread between spot and futures market prices widened during the market decline. Several reports including Brady, the CFTC, Miller, and SEC comment on or direct attention to the relatively large difference between the market price of S&P 500 futures and the spot price of the securities in the S&P 500 index. Several of the reports note that part of the difference can be explained by delays in information about spot prices, particularly the price of securities in which trading had stopped.\(^7\) A considerable difference in the spread remains from October 19 to October 23 even after adjustments are made to allow for securities that did not trade.

\(^7\) GAO (p. 55) reports that there were 195 trading delays and halts on October 19 and 280 delays and halts on October 20. For stocks in the S&P 500, the average halts were 51 and 78 minutes.
The data suggest that arbitrage between the futures, traded on the Chicago Mercantile Exchange (CME), and the spot securities traded on the New York Stock Exchange (NYSE) was insufficient to keep the spread between the two markets within the usual (one percent) trading range. During most of the week of October 19 to 23, the CME index was below the NYSE index much of the time. The discrepancy between the two market prices increased uncertainty about prices. Transactors could not know whether the discrepancy was likely to be removed by a further, at times relatively large, decline in spot prices or a rise in futures prices.

Two main explanations of the unusual discrepancy have been offered. One attributes the spread to the non-availability of the NYSE's Designated Order Turnaround (DOT) system. The other, suggested by the Brady report, attributes some of the differences to concerns about the solvency of clearing market firms and their customers. In addition, some part of the discrepancy may have resulted from the "up tick" rule requiring short sellers on the NYSE to sell at a price higher than the previous transaction, and part may have resulted from slow and uncertain execution of orders on the NYSE (Miller, pp. 26-7).

Again, no full explanation of the persistent discount is likely to be found. The fact that the discount on the futures market persisted through Friday, October 23 suggests that it cannot be explained fully by temporary closing of trading in components of the index or by the up tick rule. The latter may have been a hindrance to short sales on October 19 or early on October 20, but it cannot explain why relatively large discounts persisted when the market averages rose on October 20 and later in the week.

Concerns about settlement and the viability of the clearinghouses, or clearing firms, would raise the risk for transactors. The risk is not the same for CME and NYSE transactions. Every loss on the CME is balanced by a gain. On the NYSE transactors as a group experienced large losses. If the losses had any effect, they should have caused the NYSE to sell at a discount.

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8 The spread depends on the dividend rate on the spot shares, the short-term interest rate and transaction costs.
The persistence of the discount on the CME is a problem. No later than October 21, it should have been apparent that CME settlements for the days of the crash had been made. Since these settlements are due on the morning following execution, and the clearing corporation cannot by charter extend credit to a clearing firm, it should have been apparent that defaults were limited. (In fact, there were none.) Perhaps some residual uncertainty remained about whether banks would continue to lend (on collateral). NYSE transactions settled after five days, so many of the Monday and Tuesday transactions on the NYSE remained to be settled. There may have been questions and rumors about the prospects for these settlements. If so, the NYSE should sell at a discount to the CME index. Generally, the NYSE sold at a premium in the October 19 week.

Many transactors trade in New York, Chicago and elsewhere. Clearing is not centralized. The same person may have net credit or debit balances in more than one market. Concern that transactors would be forced to liquidate futures positions to satisfy clearing balances in New York could explain a discount of the futures index. I know of no evidence that these concerns arose or, if they arose, that they were sufficiently important to explain the discount.

The closing of the DOT system to arbitrage transactions—restrictions on so-called computerized trading—raised the cost of arbitrage transactions and reduced the volume of such transactions. Since futures prices were below equivalent spot prices, arbitragers would have purchased futures and sold on the spot market to reduce the discount. In the absence of "computer trading," arbitragers had to sell each of the 500 stocks separately. Further, trading interruptions and inability to get current spot price information limited arbitrage and other trading on October 19 and 20, but, as previously noted, this explanation is not relevant for the discount that remained later in the week.

In summary, there is clear evidence in the Brady, CFTC, Miller, and SEC reports of problems in the execution of transactions and the dissemination of information about prices and market transactions. Recommendations for changes in market operations and regulations should attempt to find solutions to these problems.
THE LONDON MARKET

The International Stock Exchange (London) and the Bank of England studied the performance of the London markets during the market decline. Although there are significant differences in the relative size of futures markets in the United States and the United Kingdom, and differences in operating rules, comparison of the two countries' markets helps to isolate some of the reasons for performance problems in the United States.

Futures markets in the United Kingdom are small whether judged relative to the size of the London market or relative to the United States futures market. Futures option trading on market indexes is currently about 20 percent of the volume of trading in the London equity markets. For the United States, the ratio of trading in the S&P 500 futures to trading in the NYSE has been about two to one (London, p. 36). Nevertheless, London futures markets were active during the crash, and trading was at record volume. As in the United States, futures prices traded at a discount to the spot market much of the time, but the difference between cash and futures prices ranged from 60 to -350 points, the latter a very short-lived event lasting three to four minutes (London, p. 41). For the week as a whole, the discount was in the neighborhood of five percent.

London, unlike New York and Chicago, has very little portfolio insurance in force. Index arbitrage occurs, but it is limited, in part by differences in tax treatment (London, p. 43, Bank, p. 9). These features, often blamed for the discount in the United States, were small or absent in London. Hence, they cannot explain the discount in the United States.

The International Stock Exchange report suggests that the principal reasons for the discount include two factors that were a feature of the United States markets also (Ibid). First is the rate of price decline. This reduced the

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10 The London market was closed on Friday because of a hurricane. Holders short put options and futures apparently dumped their positions at the opening.
opportunity to sell in the cash market at or near (last) quoted prices. Some transactors turned to the futures market. Second, there was uncertainty about the possibility of executing in the cash market. "[T]he experience of those trading simultaneously in both the cash and futures markets suggests that, because of access difficulties in the cash market, some investors may have chosen to deal in a discounted market because it was more accessible and so provided certainty of execution" (London, p.43).

These attempts at explanation are partial. They do not explain why the discount persisted on average, in London and New York, after October 20. And, they do not explain why more transactors did not attempt to profit from the discount by selling in the cash market and buying futures. The comparison does point out, however, that computerized trading and portfolio insurance are not sufficient to explain the discount between the two markets.

The International Stock Exchange dismisses clearing difficulties as a possible explanation of the discount. As noted, the futures markets are relatively small, so the risk of large exposures in both cash and futures markets is limited (London, p. 36).

An important difference between the United Kingdom and the United States is that most securities traded continuously in London. Spreads between bid and ask prices widened, and quotation sizes fell. However, "market makers' quotations provided a fair representation of the market" (London, p. 37). For shares regarded as highest quality, bid-ask spreads rose as high as 3.4 percent, from an average of 1.2 percent prior to October 19. Average quote size declined to one-half of normal size. For other shares, spreads are typically higher at 2.5 percent to three percent. These spreads doubled to five percent and six percent; average quote size declined to 12,000 shares from 50,000 before October 19 on medium quality shares and from 7,000 to 2,500 shares on lower quality shares (London, p. 17).

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11 Under the prevailing uncertainty, the quality of quotations was underestimated, as noted previously.

12 Average volume per quotation declined by half to 145,000 by October 21 (Bank, p. 8).
Quotations moved in step with actual transactions. In the London market, "fast markets" are periods in which transactions volume is so heavy that market makers cannot keep quotations up to date. During these periods, price quotations on computer screens are indicative only and must be confirmed prior to transacting. Only two "fast markets" were declared on October 19, for 13 minutes and one hour, and on October 20, for approximately 120 and 90 minutes. Even during these periods, there is no evidence of excess divergence between quotations and transactions prices (London, pp. 13 and 19). A general conclusion of the studies of the London market is that the volatility of the Dow Jones index for the United States "was higher during the crash than that of either the FTSE (London Financial Times index) or the [Tokyo] Nikkei Dow. This contrasts with the third quarter data which show little difference in the price volatility in each market" (Bank, p. 4).

Several major differences between the rules of United Kingdom and United States markets may have contributed to the more orderly decline in London. First, since the liberalization of trading known as "Big Bang" in October 1986, the London market has competitive market makers who are required to make two way price quotations. Quotations are available on all computer screens. Second, the penalty for suspending trading is a three month suspension of the right to trade. Although spreads widened and quotation size declined, as noted, the reported changes do not suggest that market makers circumvented the rules by making extreme bids and offers—in effect, closing their market while observing the rules. Third, there is no "up tick" rule for short sales in London. Fourth, increased capital following Big Bang enabled market makers to take sizable positions. On October 19, market markers' net long positions increased by about £250 million.

**EFFECTS ON THE ECONOMY**

Robert Barro's paper, later in the volume, investigates the effects of the stock market decline on the economy. He finds that the decline in October 1987 lowered the rate of return on stocks from above average to

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13 In January 1988, NASDAQ adopted a rule calling for twenty day suspension for failure to maintain markets.
below the average rate of return for the years 1927 to 1987. He finds, consistent with earlier work, that changes in the expected rate of return are a useful predictor of changes in real GNP in the following year. These predictions are far from exact, but they appear to be as reliable as other commonly used methods of forecasting.

Barro estimates that the October decline lowered the forecast growth rate of 1988 GNP to 1.4 percent. This suggests that any recession caused by the market decline will be mild. He warns, however, that forecasts of GNP from past stock market returns, like other forecasts, are subject to relatively large errors.

RECOMMENDATIONS

The most important recommendation of this report is that there should not be a rush to judgment. The October experience focuses attention on the markets and provides an opportunity to make changes that lower risk and increase welfare. Some changes may reduce the risk of repeating the October experience. Other proposed changes, though widely publicized, and advocated in some reports, have limited merit or may be counterproductive.

In the past few years, securities markets have developed a limited capacity to permit portfolio adjustment to be made at relatively low cost. The development of the S&P 500 contract and other futures contracts permit portfolio adjustments to be made by selling a basket of securities at transaction costs that are a small fraction of the costs paid 15 or 20 years ago. By encouraging the use of negotiated commissions on the NYSE, and other exchanges, and by permitting trading in options and futures, the exchanges and the regulators have contributed to these improvements in markets. Costs of transacting are now substantially lower, and trading volume considerably higher, as a result of these, and other, changes in regulations and procedures.

Some proposals for change reverse the direction of change by raising costs of transacting or by limiting opportunities for portfolio adjustment. Restriction on futures trading, proposals for higher margin requirements, and limits or bans on portfolio insurance are examples. Proposals for limits on daily price changes change the risks faced by transactors.
Dynamic hedging strategies and other recently developed portfolio management techniques permit transactors to manage risk more efficiently. Few who argue for controls or bans on these techniques argue that markets would function more efficiently if portfolio managers returned to stop-loss orders and other techniques that the new methods have supplanted or shifted arbitrage and hedging operations to foreign markets.

There is little doubt that markets did not function effectively on October 19 and 20. In part, the problem arose following the breakdown of the computerized order system called DOT. To reduce the risk of future breakdown and to process an extraordinary surge in trading volume, the exchange should be encouraged to acquire sufficient back-up computing power to handle a multiple of the average daily transaction volumes on each market and to avoid a breakdown. The exchanges appear to be making the required investments.

The rules of the NYSE do not permit that market to service the demand for portfolio trading in a fully efficient manner. The DOT system is a compromise that permits buy or sell orders for each of the stocks in a basket, such as the S&P 500, to be placed at one time, but each separate order must be routed to a specialist in the particular stock. The SEC report suggests that consideration be given to the creation of posts at which specialists would trade entire portfolios. Presumably, posts would be established for each of several portfolios such as the S&P 100, S&P 500 and other actively traded portfolios off the floor of the exchange. Changes to permit portfolios to be traded, on or off the NYSE floor, should be adopted.

Several reports discuss the capital requirements of specialists, block traders and market makers. Capital requirements should not be set at an arbitrary level. Consideration should be given to the development of risk related capital requirements for market makers.

\[14\] To the extent that the insurers underestimated the cost of the insurance prior to the crash, the role of insurance and dynamic hedging will decline. It is not clear why regulation would be needed.
The SEC and the Brady reports provide details on the performance of exchange specialists and other market makers.\(^\text{15}\) Neither report suggests an alternative to the present system, although both reports criticize the performance of some specialists on October 19 and 20. The larger issue is whether the specialist system should be replaced, in part or whole, on the NYSE. The volume of trading and size of turnover in large capitalization stocks has increased to levels at which an alternative method of trading may now be more efficient for many securities. The performance of the London market system, discussed earlier, suggested that the London system, with competitive market makers and severe penalties for withdrawing from the market, functioned continuously, albeit with increased spreads between bid and ask prices. A study, including outside experts as part of the study group, should be undertaken of alternatives to the current, specialist system for large capitalization stocks and possibly for others as well.

Two recommendations have been made to increase confidence in the financial position of market makers, market participants and clearing firms. One calls for development of a more unified clearing system. A more unified clearing system would reduce risk by consolidating information on net positions. The scope of present day trading limits the possibility of complete coverage of international markets with different closing times, but information can be increased. A related recommendation would strengthen the financial position of clearing firms by clarifying the responsibility of parent firms for the liabilities of clearing subsidiaries or affiliates and, where useful, by increasing capital.

Higher margin requirements raise the cost of transactions. Proposals to equalize margins in financial futures with stock exchange margin requirements treat the two margin requirements as equivalent. They are not. Margin requirements on stocks are a down payment, paid by a purchaser of shares who borrows the balance of the purchase price. Futures margin is a performance bond, paid by both the buyer and the seller, to assure that the transactor can cover any losses resulting from price changes. Settlement is made at least daily, and intraday margin calls are made in periods of substantial price change. The use of stock margin

\(^{15}\) Brady, pp. 49-50 has a succinct summary.
typically indicates a leveraged position, while much of the trading in futures markets, particularly arbitrage transactions, does not involve leverage. Further, the effect of margin requirements is uncertain. A study of stock market requirements by the staff of the Federal Reserve, several years ago, did not develop a rationale for margin requirements.

The setting of margin requirements should be left to the exchanges. The system worked satisfactorily during the October break. Margin requirements on futures were adjusted, flexibly, in relation to volatility and risk. As Telser notes, margin requirements originated as a solution adopted by borrowers and lenders. Markets have increased the use of intraday margin calls and, in the futures market, margin requirements have been raised.

The Brady report recommends "circuit breakers" to slow the rate of price change. Telser argues that daily limits on price changes in futures markets reduce the cost to a non-member of trading in futures. The broker or dealer has time to contact the non-member when there are large price changes and to get new instructions or additional margin. Fama argues that trading halts can increase volatility by inducing trading in anticipation of a trading halt. The Governor of the Bank of England argues that closing one market may shift pressure to other markets. He concludes:

I have yet to be persuaded of the need to introduce artificial breaks in the markets. I can see that they might impose a semblance of orderliness, but this would have to be at the expense of...liquidity.16

It seems clear that, despite the appeal of the name "circuit breaker," there is considerable difference of opinion about their effect. The evidence in Roll's study shows no significant effect of price limits. Indeed, once allowance is made for differences in volatility, price limits on cash markets have no effect at all.

The Brady report recommends a single public regulator to coordinate intermarket issues. The report presents no evidence that regulatory failures played a part in the October decline. Self-regulation receives little criticism and much praise in several reports. However, rumors of a possible SEC decision to recommend a closing of the stock exchanges contributed to the uncertainty experienced in mid-October.

GAO recommends the development of intermarket contingency plans involving public regulators and self-regulators. This recommendation seems a more useful way of dealing with intermarket and international coordination. Public regulators would coordinate their own activities and monitor the markets.