

The Task Force Report: The Reasoning Behind the Recommendations

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The aim of this article is to provide a framework for thinking about the recommendations made by the Presidential Task Force on Market Mechanisms. The Task Force made four broad recommendations:

1) There should be a single regulatory agency (the Federal Reserve was suggested as the leading candidate) to coordinate operating procedures and regulations across the several equity-related markets. The markets for stocks, options and futures are currently subject to different regulatory authorities (e.g., the stock and options markets to the SEC and the futures markets to the CFTC).¹

2) This agency should supervise the establishment of “circuit-breaker” mechanisms, which would permit an orderly shut-down and subsequent orderly reopening of trading if conditions like those of October 19th and 20th, 1987, were to reoccur.

3) The clearing and settlement systems of the various markets should be unified in order to minimize inter-market credit exposures and the problems that these created on October 19th and 20th.

4) Finally, margin requirements across the different markets should be made consistent.²

These recommendations (and the lack of others) are supported by three conclusions that can be drawn from the Task Force’s findings.

First, the proper focus of analysis of the events of the October crash should be on “market mechanisms” rather than on fundamental imbalances in the economy as a whole. Analysis should

¹For those readers less familiar with stock market institutions, the Appendix provides a brief introduction to some of the instruments, regulations, and market structures important to understanding the events of mid-October.

²The Task Force also recommended that the quality of trade-related data be improved to facilitate future investigations like its own.

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focus on the speed and disorder of the crash rather than on reasons for the overall drop in the level of stock prices. None of the Task Force's recommendations, therefore, address widely cited "causes" of the October decline such as the budget and trade deficits.

Second, the instability evident in the events of October 1987 was not the inexorable limit of a steadily increasing level of day-to-day stock price volatility. To the extent that recent institutional developments (new investment strategies, derivative instruments, internationalization of markets, increased trading volume, and so on) caused the October crash, they did so by creating the hitherto hidden potential for such a convulsive episode. They did not generate significantly increasing disorder in daily market movements in the period prior to October 1987. Thus, whenever possible, corrective interventions should be designed to address crisis situations with as little effect on day-to-day operations as is feasible. This is the intended goal of the circuit-breakers recommended in the report. The focus on crisis management also underlies the Task Force's preference for a single agency, rather than a committee of regulators, to supervise the markets. In a crisis, a single authority with clearly established responsibility would have an advantage over other coordinating mechanisms. A major benefit to having the Fed perform this role is that it has the resources needed to support crisis intervention as it did on October 20th, when it calmed a growing financial panic by promising to make liquidity available. Finally, the proposals for common clearing and settlement would have little impact on daily market operations but could go a long way towards reducing the likelihood of credit panic during times of extreme price movements.

Third, under the sorts of conditions that prevailed on late Monday and Tuesday, an orderly halt to trading (and subsequent orderly reopening) would have been preferable to what actually took place. Price quotes gave investors virtually no information about either the levels at which their trades would actually be executed or the general state of market demand. Transactions made in these circumstances can hardly be deemed "efficient."³ Another informational problem concerned rumors about the financial viability of various participants. One important goal of any circuit breaker system should thus be to stimulate information flows during trading halts.

In what follows, we describe how the data collected by the Task Force leads us to the three broad conclusions stated above. Before proceeding, we should emphasize the consciously restricted scope of this article. Our descriptive coverage of the actual crash is limited to the aspects that most clearly distinguish it as a unique crisis event: the breakdown of price setting mechanisms on late Monday and early Tuesday, and the credit related problems and ensuing near-panic that arose on Tuesday. These aspects are crucial to an understanding of the Task Force's recommendations. They do not, however, answer the question of what external pressures led to the crisis: Who was doing all the selling? Who was failing to buy? We would also like to stress that the discussion which follows does not represent any kind of official Task Force position.

³ Economists accustomed to free trade arguments might have difficulty believing that closing markets can ever be a good thing. After all, trading is always voluntary; so how can removing this freedom make anyone better off? We address this question later in the article.

Rather, it embodies our view of how some major aspects of the Task Force's findings should be interpreted, which is a very different matter indeed.

Market Mechanisms versus Fundamental Economic Factors

A necessary first step in separating these two categories of possible causes of the October market decline is to define the basic distinction involved. Fundamental economic factors are those forces which affect the future returns (both real and nominal) paid on the securities which are traded in financial markets. These include future interest rates, exchange rates, price levels, profits and taxes. By extension, they include factors like the budget and trade deficits and increases in corporate and private debt which are likely to affect future returns. In theory, these are the forces which should govern the level of stock prices. Changes in stock prices should, therefore, be attributable to new information about these factors. In practice, such new information appears historically to have arrived in relatively limited amounts over long periods of time. Thus, fundamental economic factors could be responsible for a substantial decline in the level of stock prices but could not, by themselves, explain why the decline should be as sharp and disorderly as that of October 1987.

What we refer to here as market mechanisms are factors associated with the interaction of investors in the various equity-related marketplaces. Among these market mechanisms are portfolio insurance and other trading strategies, market-making systems, and linkages between the various stock exchanges and the futures and options markets. They offer more promise as explanations for the unprecedented suddenness of the October market move and the consequent dislocation of financial markets.⁴ These market mechanisms were, for several reasons, the proper focus of the Task Force's investigation.

The first and most important reason for not identifying and evaluating fundamental causes of the October events is that the record on the long-run magnitude of the current stock market decline is far from complete. The Dow's three month fall of 30.5 percent from the market peak of 2722 on August 25 to the level of 1892 on November 19 is smaller than many postwar 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, then the long-run magnitude of the recent crash 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 in 1930-32, it will, regardless of the sharp nature of the October drop, justifiably be the subject of intense study. Unfortunately, we do not yet know which of these possibilities will occur.⁵

⁴A third category of factors relate to investor psychology. However, for the purposes of analysis these factors can be divided into changes in investors' outlooks which change relatively slowly over time (although the magnitudes of such changes may be substantial) and changes in the attitudes of active traders which occur rapidly in response to changing market conditions. We will treat the former as fundamental economic factors and the latter as market mechanisms.

⁵Thus far, however, we are behind the pace set by the 1929-1932 decline. The market fell 34.8 percent from its peak in September 1929 to its year-end close, and another 33.8 percent in 1930, so that it stood at only 43.2 percent of the September 1929 peak by December 1930.

Table 1
Substantial Market Declines and Subsequent Economic Impacts

<i>Dates</i>	<i>Percent change in DJIA</i>	<i>Initial DJIA</i>	<i>Percent GNP change (following 12 months)^a</i>	<i>Recession</i>
a. United States (Post-War):				
5/29/46 to 10/9/46.....	(23.2)	212.5	6.4 ^b	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	(1.3) ^c	Yes
8/22/73 to 11/5/84.....	(44.4)	1,051.7	(3.6)	Yes
9/21/76 to 2/28/78.....	(26.9)	1,014.8	3.5	No
4/27/81 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
b. United Kingdom:				
6/30/55 to 2/28/58.....	(29.8)	39.97	2.4 ^b	No
4/30/61 to 7/31/62.....	(21.2)	64.05	1.1 ^b	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
c. Japan:				
9/30/49 to 6/30/50.....	(46.0)	8.46	58.6 ^b	No
2/28/53 to 4/30/53.....	(24.4)	21.97	21.1 ^b	No
7/31/61 to 10/31/61....	(37.7)	68.40	5.8 ^b	Slowdown
1/31/73 to 10/31/74....	(36.6)	145.87	(2.7)	Yes

^aFrom midpoint of decline.

^bIndustrial production (real GNP figures not available quarterly).

^cChanges for one quarter backshift in window.

^dFinancial Times 30 stock index.

^eTokyo Stock Exchange Index.

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

Second, 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 documents the fact that substantial stock market declines are often not followed by noteworthy downturns in the economy. Since World War II significant falls in the United States stock market have been followed by recessions slightly less than one-half of the time. In the United Kingdom and Japan a similar ratio prevails. In the most striking instance, a 70 percent decline in the British stock market between December 1972 and December 1974 was followed

Table 2
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 ^a	Trade deficit ^b	Government deficit ^b
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	(4.9) ^c

^aIndustrial production change (October 1986 to October 1987).

^bPercent of GNP.

^cCalculated 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.

by only a mild recession in 1974–75. Over the longer term, there have been large secular changes in both the dividend yields and price earnings ratios of common stocks that have been largely unrelated to changes in either interest rates or future earnings.⁶

Third, 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 comparable magnitudes, as shown in Table 2. At the same time, indicators of potential and current economic problems differ widely among these countries. For example, the U.S. federal government deficit is frequently cited as the root cause of the October stock market decline. For 1986 this was equal to 5.3 percent of GNP and during October 1987 the United States stock market declined by 22 percent. The comparable Australian government deficit was only 1.0 percent of GNP, but Australian stock prices declined by 45 percent in October 1987. The Italian deficit was more than 12 percent of GNP and yet Italian stock prices declined by only 12 percent.

Fourth, even if it were known with certainty that the October market decline was 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 long-stand-

⁶See Campbell and Shiller (1987) as one example from a large and growing literature.

ing 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 to sensibly apportion responsibility for the October events to causes like 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 on October 19 and the following days. What distinguished these events was the unprecedented rapidity with which prices fell, the huge 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 was to focus on those factors which transformed this downward pressure into the alarming events of these critical days 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.

Any contribution of fundamental causes to 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 of attention on these subjects may represent one of the few desirable side benefits of the October market decline. Appointment of a group with more time and greater resources to investigate these questions thoroughly before action is taken might be appropriate. This Task Force was not, however, equipped to deal with such issues in a useful way.

Historical Evidence on Stock Market Volatility: The Case Against Structural Reforms

The past several years have seen a variety of changes in equity market institutions: pension funds and mutual funds have grown in importance; trading volume has increased dramatically; index future and options contracts have emerged as widely used tools for speculation and hedging; and foreign markets have risen in relative stature.⁷

Some observers have suggested that one or more of these trends has led to steadily increasing stock market volatility. In this view, the events of October 19th and the surrounding days are simply the most visible symptoms of an inexorable movement towards greater amplitude in price changes.

If this position is accepted, it implies that "structural reforms" might be warranted as a method for preventing another crash. By "structural reforms" we mean

⁷Some examples of the above trends: In the second quarter of 1987, pension and mutual funds together controlled 26.2 percent of U.S. equity, up from 20.2 percent in 1981. The average stock on the NYSE was traded .64 times in 1986, triple the .21 turnover of 1977. And in 1986, approximately 20 million S&P 500 futures contracts (representing a dollar value of around \$2.5 trillion, roughly the same as that traded on all U.S. equity markets) were traded. These contracts were nonexistent six years earlier.



Fig. 1. 60 day historical volatility S&P 500 Index

policies that alter the behavior of the markets on a day-in, day-out basis, presumably reversing some of the above-noted trends. A couple of examples that spring to mind are the abolition of index futures and options or a trading tax designed to lower stock turnover.⁸

We find little evidence, however, to support the notion that institutional changes have led to significant increases in daily volatility. We are left to conclude that the October crash represented a fundamentally unique event, not easily extrapolated from recent trends in market participation and volatility. This casts doubt on the need for continual interference in the market as a requisite for disaster prevention.

For the most part, we focus on U.S. stock price data. Figures 1 and 2 are based on daily prices from the Standard and Poor's 500 index from 1928 through September 1987. We also touch briefly on international evidence, in order to see how trends in volatility in Japan and Germany compare to those in the United States.

Figure 1 displays one common measure of volatility: the annualized standard deviation of daily percentage returns, calculated using the preceding 60 trading days.⁹

⁸Although we will argue below that such measures are not the most effective way to prevent a recurrence of a market crisis, this should not be taken to mean that there are no grounds for considering them. For example, Summers (1987) puts forward other arguments for a trading tax. One "structural reform" that we do regard as indefensible on any grounds is the abolition of index arbitrage *without* any curbing of futures trading. If futures markets are to exist, one has to accept as a fact of life that price pressures originating there will be transmitted to the underlying cash markets. Index arbitrage is simply an efficient mechanism for performing this transmission, and abolishing it will not allow us to live in a fantasy world where massive futures activity can take place without affecting stock prices.

⁹Volatility at a given point in time is calculated as follows: Take the preceding 60 trading days worth of daily data. Calculate the standard deviation of percentage price changes, using those 60 observations. Finally, annualize by multiplying by the square root of 250 (since there are about 250 trading days in a year).

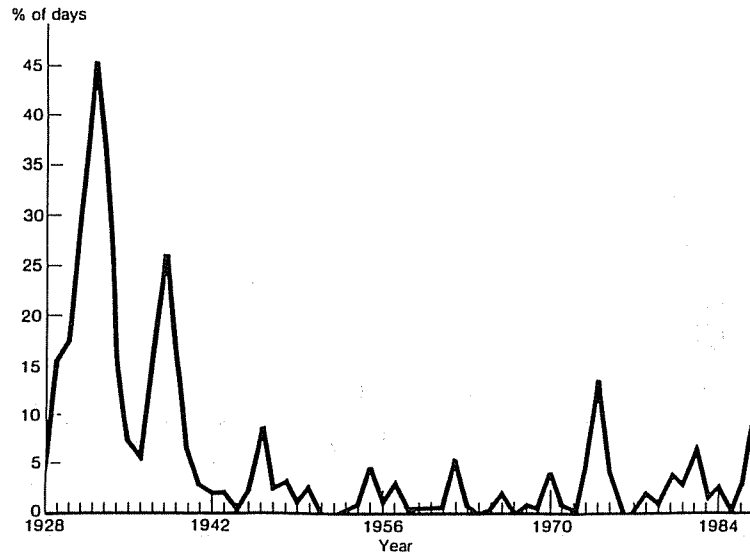


Fig. 2. Daily change > 2% S&P 500 Index

As the figure shows, this measure suggests 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. The market’s propensity for large moves can be quantified by counting the number of days during a given period in which it moved more than some threshold amount in either direction. For example, Figure 2 shows that in 1987 (prior to October) there were market moves in excess of a 2 percent threshold on approximately 10 percent of all trading days. While this is exceptional when compared with recent history, it does not approach the extreme volatility of 1933, when over 45 percent of all trading days featured moves of over 2 percent.

We also repeated the same methodology, using thresholds of 5, 4, 3, and 1 percent. 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 1930s were the most volatile period in stock market history, and most measures suggest that there are times in the early 1970s and the 1940s that were at least as volatile as the period immediately before October 19, 1987.

Table 3 compares volatility trends in Germany and Japan to those in the United States. 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.

Table 3
Volatility Trends and International Comparisons
 (Averages of 60 day annualized volatilities, in percent)

	<i>Germany</i>	<i>Japan</i>	<i>United States</i>
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.

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.

Market Performance During the Crash

As the Task Force Report itself noted, the most immediately striking fact about the performance of equity markets during the period surrounding October 19 was that they processed an unprecedented volume of trades. On October 19 and 20, the NYSE handled more than 3 times normal volume, the futures market between $1\frac{1}{2}$ and 2 times normal volume and even NASDAQ, about which there were widespread complaints, between $1\frac{1}{2}$ and 2 times normal volume. Only the options markets completed lower than normal volumes of trade. Also, in light of the pressures brought to bear, trading shutdowns were surprisingly limited. On October 19, 187 NYSE stocks (8 percent of NYSE-listed issue) failed to open at or near 9:30 a.m. By 11:30 a.m. only 41 of these stocks had yet to begin trading and by noon only 25 stocks were still closed. During the course of October 19 trading was suspended in just seven additional stocks. On October 20, the situation was slightly worse as 90 stocks failed to open promptly and trading was halted during the day in 175 more stocks. The S&P

500 futures market was open throughout October 19 and October 20, except between 12:15 p.m. and 1:05 p.m. on October 20. Only the options markets were closed for substantial fractions of October 19 and 20.¹⁰

However, availability and trading volumes are not the sole measures of market performance. Effective market mechanisms manage trades at prices that are well-defined for market participants and that efficiently convey information about current market conditions. In neither of these respects did equity markets perform adequately on October 19 and 20.

Broadly speaking, stock prices (as measured by the Dow Jones index) fell from a level of 2500 at the close on October 13 to a level of between 1900 and 2000 once markets stabilized after October 23. From October 13 to October 16, approximately half of this decline took place in a reasonably orderly way. Intra-day upward movements in market indices against the dominant downward trend never exceeded 2 percent and maximum spreads between futures and cash index prices exceeded 2 percent only slightly and briefly (see Figure 3 for a plot of prices October 14-20).

At the opening of trading on October 19, this performance began to deteriorate. Delayed openings in the stocks of many large companies created uncertainties about the true level of the cash indices. An apparently substantial discount between the futures price and cash index levels (computed using October 16 closing prices for unopened stocks) led to significant cash sales and futures purchases by index arbitrageurs which accounted for roughly 15 percent of NYSE volume between 9:30 a.m. and 10:30 a.m. In retrospect the discount was illusory.¹¹ At the same time, NYSE specialists appear to have substantially misestimated appropriate opening prices for several individual stocks.¹² For example, two large capitalization NYSE-listed stocks which did not begin trading until about 10:30 a.m. on October 19, opened down 17 percent and 19 percent. In the next hour, during which the Dow fell by 1.4 percent, these two stocks rose by 13 percent and 16 percent respectively, recovering roughly 80 percent of their opening losses. Individuals who sold at the open, thus suffered more than 10 percent losses compared to those whose sell orders were executed just one hour

¹⁰Trading delays on the NYSE arise when the specialist faces an imbalance of buy and sell orders that he feels is beyond his obligation to resolve. In such cases, he can request permission from a floor official to halt trading, during which time he displays price indications in an attempt to reduce the imbalance. The S&P futures trading halt was ordered by the CME. In the options market, each option series is opened separately in a "rotation," which ordinarily takes about 20 minutes. After this rotation, all the options trade freely. On October 19th and 20th, however, these rotations took several hours, resulting in a severe curtailment of free trading.

¹¹After correcting for the fact that October 16 closes overstated the prices of unopened stocks and that unopened stocks suffered greater opening declines than those which began trading shortly after 9:30 a.m., the cash levels of the major stock indices closely tracked their futures prices throughout the morning of October 19. This is confirmed by arbitrageurs who report earning no profits from their morning trades.

¹²A specialist faced at the opening on October 19 with a large excess of "at market" sell orders over buy orders had great discretion in determining an opening price at which he was willing to cover the resulting imbalance from his own capital. Consider, for example, the specialist (with only a smattering of limit buy orders) who faced 400,000 shares in at market sell orders and only 350,000 shares in buy orders. He would purchase the balance of 50,000 shares of his own account, but might do so at a price anywhere from 5 percent to 15 percent down from the previous closing price.

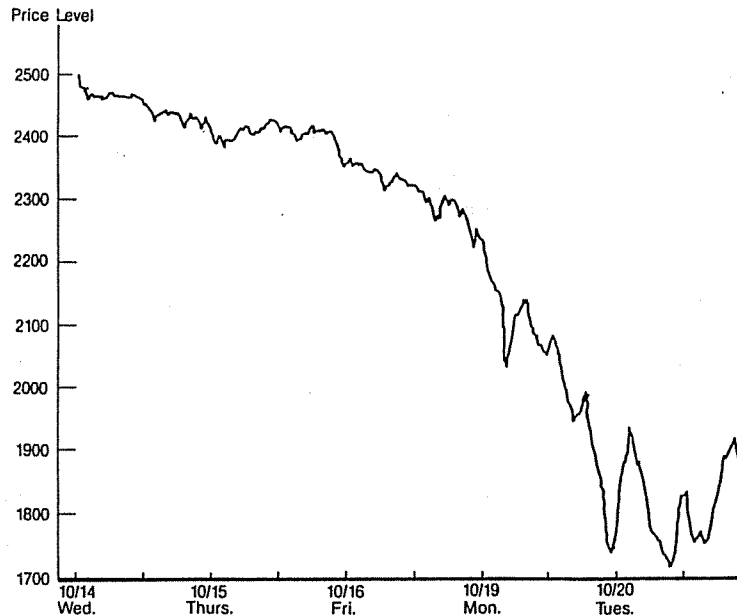


Fig. 3. Dow Jones Industrial one minute chart. October 14, 1987 to October 20, 1987

later. Nevertheless, on the morning of October 19 these cases were the exception rather than the rule (see Table 4) and by early afternoon the market appeared to have stabilized at a Dow level in the 1900–2000 range.¹³

However, from the mid-afternoon on October 19 until the late afternoon on October 20, equity markets became separated from any stable economic reality. In the cash markets, this did not occur until about 3:00 p.m. on October 19. In the final hour of trading on October 19, the Dow, which had reached a level of 1950, fell by 220 points or 11.2 percent. On October 20, the Dow opened up 12.1 percent from the October 19 close, eliminating the loss which had occurred in the final hour of trading on October 19.¹⁴ From these opening levels stock prices fell immediately and rapidly. By noon on October 20, the Dow had fallen 11.4 percent, almost exactly to the level of the close on October 19. Finally, when the Dow subsequently stabilized, it recovered most, if not all, of this loss.¹⁵ Figure 3 illustrates these whipsaw movements.

¹³Although we are describing the events of October 19th and 20th in terms of the popular Dow Jones index, it should be noted that the broader S&P 500 index tells essentially the same story.

¹⁴The openings of the Dow stocks were fairly evenly spread out between 9:30 a.m. (the official start of trading) and 11:30 a.m.

¹⁵To put these “whipsaws” in perspective, note that each leg is roughly comparable in magnitude to the previous record one day fall of 12.8 percent on October 28, 1929. Even more than the fact that stocks lost 22.6 percent of their value overnight, these whipsaws seem impossible to rationalize as driven by news about “fundamentals.” In this sense, they would appear to go a long way towards discrediting more extreme versions of the “efficient markets” hypothesis.

Table 4
A Sample of NYSE Price Changes October 19 and 20
 (Percentage price change)

<i>Stock no.</i>	<i>Close October 16 to open October 19</i>	<i>Open October 19, to 11:30 am</i>	<i>3 pm to 4 pm, October 19</i>	<i>Close October 19 to open October 20</i>	<i>Open October 20 to 11:30 am</i>
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.

Gyrations in the futures market during this time were similar to fluctuations in the cash markets, but more extreme. In the final two hours of trading on October 19, the S&P 500 futures contract fell 17 percent. Within minutes of the opening on October 20, the contract had recovered this loss, rising 17 percent. During the next two hours the S&P 500 futures contract fell by 25 percent until trading was halted at 12:15 p.m. (in the same period, the S&P 500 index itself declined by only 12 percent). Yet, as in the case of the cash market, this entire loss was recovered as the futures market stabilized on subsequent trading days.

The price behavior of individual stocks after 2:00 p.m. on October 19 mirrored the disorder in the aggregate indices. Declines of 20 percent or more in the final hour of trading on October 19 followed by opening price increases on October 20 that more than made up these losses were commonplace, as shown in Table 4. These opening increases on October 20 then tended to evaporate rapidly in the immediately following hours of trading, although they were subsequently made up again as stock prices stabilized later in the week. In the over-the-counter market, this disorder was reflected in differences of 20 percent or more between the prices at which essentially contemporaneous trades were executed.

Trading under these conditions has three unfortunate economic consequences. First, investors cannot know with any precision at what prices their orders will be executed.¹⁶ Investors who bought at the open on October 20 often paid as much as 20 percent more than either investors whose trades were executed an hour later or than the October 19 closing prices on which many purchase decisions were based. In OTC stocks, comparable price uncertainties existed throughout October 19 and 20.

Second, the information conveyed by prices may be confusing or actively misleading. Many NYSE specialists appear to have been overly optimistic in setting opening prices on October 20. The rapid run-up in futures prices may have been based on these opening prices and the resulting inferences concerning equivalent or greater demands for as yet unopened stocks. However, once the opening gains began to reverse themselves rapidly after the openings, investors outside the NYSE must have been highly uncertain of the true state of market demand. Whether or not the optimistic October 20 opening prices were due to conscious manipulation by NYSE specialists, confidence in the reliability of price-based inferences about the state of market demand for NYSE stocks must have evaporated with the opening gains. Under these conditions, it is not surprising that panic began to drive prices below what many investors would otherwise consider "reasonable" long run levels.¹⁷

Third, since prices form the basis for investor and lender calculations of net worth and solvency positions, the absence of reliable price data worsens uncertainties in these areas and can lead to unnecessarily large reductions in the credit available to market participants. Without such credit, market-making activities must be curtailed, which then further intensifies price volatility.

On October 19 and 20, these potential solvency and credit concerns were exacerbated in two important ways by the existence of several distinct clearing and settlement systems for futures, options and stocks.

¹⁶This is literally true for "at market" orders. Of course, by submitting a "limit" order (i.e. an order to buy only at prices below a certain limit) an investor can protect himself from buying at an unexpectedly high price, or selling at an unexpectedly low one. However, limit orders do not represent an especially attractive alternative under the conditions of October 19th and 20th. An investor's threshold price should depend on his most current information, which includes the current market price. Under very volatile conditions, this can mean resubmitting limit orders on an almost continuous basis, which would have been extremely difficult to accomplish.

¹⁷The impact of extremely rapid changes in futures and cash prices on investors without access to fully current information would have been similar. These investors would be unable to infer reliably either the existing terms of trade or the state of demand from price quotes available to them.

First, the existence of separate clearinghouses for stocks, futures and options means that uncertainties about the status of trades (for example, whether the other side of a trade would be solvent) applied to the net positions of trading firms in each clearinghouse separately. Thus, if a particular firm had hedged its futures trades (or options positions) with cash stock positions, the margin of safety implicit in these positions would not be apparent to the individual clearinghouses and their members. The futures clearinghouse would see only the futures side of the overall transaction and would have to infer overall exposure from that position alone. Under these circumstances, uncertainties about firm solvencies and the ultimate integrity of the settlements process created by rapidly fluctuating prices would be larger than they would be if a common clearing system took into account only *net* trading positions.

Second, during October 19 and 20, each of the individual clearinghouses placed its own separate and substantial intra-day margin demands on member firms. Margin calls to member firms on October 19 from the CME (futures) and OCC (options) clearinghouses, which had largely overlapping memberships, amounted to \$3 billion. Margin calls on the morning of October 20 were a further \$2 billion. Moreover, in the pervasive disorder of the crash, payments from the clearinghouses to members were often significantly delayed.¹⁸ Clearinghouse member firms (large investment banks and brokerages) were forced to borrow substantial short-term funds to cover these demands at a time of grave uncertainty over their creditworthiness. Without the timely intervention of the Federal Reserve System the resulting intensification of credit problems may have had very serious consequences, including perhaps the failure of one or more major investment banks. Since the positions involved were largely offsetting, a common clearing system would have greatly reduced the demand for margin funds and the consequent strain on the credit system.

Conclusions and Extensions

The Crisis Nature of the Crash

The discussion has repeatedly stressed a simple theme: the stock market crash of October 1987 was a fundamentally unique event, wholly different in character from normal market behavior. This point was first made in context of historical volatility data. Prior to the crash, there was no significant upwards trend in volatility from which one could reasonably have extrapolated the events of October 19th and 20th.

The same point reemerged when we looked at market performance during the crash, particularly on late Monday and on Tuesday. The usual informational function of prices was destroyed; trades consummated only minutes apart were executed at wildly different prices, so that an investor submitting a market order had virtually no idea where it would be completed. The magnitude and uncertainty of price movements was also more than the existing clearing mechanisms were prepared to handle: the potentially huge and unmeasurable credit expenses that developed almost instantaneously led to dangerous rumors and a near financial panic. Although total disaster

¹⁸For example, \$1.5 billion in payments to two clearinghouse members on October 20, which were due before 10:00 a.m., did not arrive until 3:00 p.m.

was averted in this regard, solvency concerns certainly did impair the market's performance. In just one example, many traders reported that they avoided the futures market altogether, for fear that the clearinghouses would fail.

Crises such as the one in October remind us that we do not live in the economist's idealized world of "frictionless markets." The stock market's infrastructure—including computerized trading systems, and market making and clearing mechanisms—are only equipped to handle a limited rate of volume flow and price change. These "institutional constraints" are usually fairly invisible; but when the pressure on them is great enough, a variety of breakdowns can occur.

In a world without institutional constraints, a one-day 500 point stock market fall would look just like a scaled-up version of a one-day 50 point drop, or like 10 days of 50 point declines strung together. In such a world, the *laissez-faire* logic of "letting prices equilibrate as rapidly as possible without interference" would be compelling. However, since this is clearly not the world we live in, it is difficult to use *laissez faire* logic to argue against well-planned and well-timed interventions during moments of market crisis. The case for pre-planned circuit breakers is further strengthened if it is noted that institutional constraints act as ad hoc circuit breakers anyway when the pressure is great enough. The October crash saw long backups of order flows and trading halts in numerous stocks, options and futures; and there were some less than responsive specialists and market makers throughout the system.

The Rationale for "Informative" Trading Halts

Up to this point we have been deliberately vague about what "circuit breakers" really are because the language of the Task Force Report was also vague in this regard. Now, however, we will attempt to push our interpretation of the October crash a little further and see where this leads in terms of specific recommendations. We will also try to address some of the objections that are likely to be raised by such recommendations.

Circuit breakers have been discussed in terms of both price limits and trading halts. Our analysis has suggested that one of the strongest arguments for a trading halt was the breakdown of normal information transmission that occurred on late Monday, October 19, and on Tuesday, October 20. The large price movements of the previous Wednesday, Thursday and Friday were not in themselves a terrible problem, as information still flowed smoothly and participants were generally aware of their trading opportunities.

We see nothing inherently wrong with large price movements, as long as they are "fair"—that is, as long as there are not tremendous asymmetries of information between, for example, specialists and their customers. Thus, when information transmission breaks down, the primary function of a circuit breaker should be to reinform participants. This could be accomplished by an orderly trading halt followed by an "open order" period of fixed duration. During the "open order" period, specialists' books of both limit and market orders would be open for general inspection.¹⁹ Orders

¹⁹A somewhat stronger recommendation, but a potentially quite sensible one, would be to have specialists' books opened regularly (say, every day at the end of trading) regardless of whether market conditions were chaotic or not.

entered during this time could be changed or withdrawn, since no trades would be executed. At the end of the “open order” period an initial price would be set and trades would be executed, with orders entered during the period receiving priority in execution over subsequent orders (to provide investors with some incentives to enter their orders). Once this has been done, the markets can be reopened, and prices can be allowed to adjust freely.

This informational view of circuit breakers respects many of the criticisms that have been raised regarding market intervention. We do not pretend that closing trading will prevent a needed price adjustment from happening; the only aim is to have this price adjustment carried out under as fair circumstances as possible. Also, we recognize that trading halts may prevent some investors from making the sales necessary to meet margin calls, thereby exacerbating credit related problems. However, it should be pointed out that many of the credit related problems seen in the October crash were not due to actual payments delays, but rather to unfounded rumors about financial solvency. If trading halts serve to improve the information of market participants, they may be helpful in quashing such rumors and the accompanying difficulties.

If trading halts are *not* carefully designed to disseminate information and to produce, within a reasonable time, a new price at which trading can resume, they may wind up being worse than the disease they seek to cure. Thus, the Hong Kong market shutdown was, in the absence of a reopening mechanism, both a disaster and not an appropriate measure of the efficacy of a properly designed circuit breaker system. And given the lack of advance planning, the choice facing U.S. policy makers who considered trading halts on October 19th and 20th was not an enviable one.

Many economists will have a natural antipathy towards trading halts for two reasons. First, there is the free trade argument: aren't people better off having an opportunity to transact, even under chaotic circumstances? They do so freely, and can always not trade if they don't like the risks inherent in doing so. Second, won't more information be revealed through continued trading than during a shutdown?

In our view, these objections overlook a very basic and important externality effect. When people are attempting to draw inferences from market prices, those prices are in a sense a public good—the more informative they are, the better. An individual trader does not take into account the fact that his (rational) actions may contribute to the overall disorder in such a way as to make prices less informative to others. When these externalities are significant in magnitude (as it is likely they were at times during October 19th and 20th), intervention that seeks to disseminate information and establish prices based on broader consensus can make everybody better off.²⁰

²⁰A formal model along these lines is developed in Stein (1987). There it is shown how the rational, profit-maximizing actions of one group of traders can lower the informativeness of prices to other traders and hence reduce social welfare. (See Greenwald and Stiglitz (1986) for a more general treatment of informational externalities.) Empirically, the work of French and Roll (1986) is also suggestive. They find that the variance of prices is greater over several day periods when the market is open every day, as compared to otherwise equivalent periods when the market is closed on some days. In other words, even under “normal conditions,” trading appears to generate additional volatility beyond that which can be attributed simply to the arrival of news.

A corollary to this externality effect is that free trading may not always be the best way to encourage traders to bring their demands to market. If prices become very uninformative, the attendant risks may discourage many people from attempting to trade. The purpose of an open order period would be to counter this problem. By allowing traders to look at the demands and supplies of others before committing to a decision, an open order period could reduce the risks arising from poor information and hence provide incentives for "value buyers" to make their liquidity available to the market.

More generally, episodes like the one on October 19th and 20th can have adverse externality effects on a much broader group of people than simply those wishing to trade during that period. Equity markets are a critical source of capital for firms, and convulsive incidents such as that of the past October may, by increasing investors' perceptions of risk, have a long-lasting impact on the cost of equity capital. Furthermore, stock holdings represent a significant fraction of household wealth, and stock prices are a widely followed indicator of economic health. The uncertainties about household wealth and the future direction of the economy that are created by violent stock market swings could conceivably lead to reductions or deferrals of consumption and investment spending and hence to a decline in overall economic activity. Thus, if trading halts can temper the nature of such swings, the benefits could potentially be widespread.

A Final Suggestion: Contingent Capital for Specialists

Although the Task Force report did not make any specific recommendations concerning the capitalization of specialists, it did point out the subject as worthy of further consideration.

Many observers have suggested that the capital base of the specialists should be augmented so that they are better able to stabilize markets in the face of the type of selling pressure seen in October. Our view of the crash as a rare event rather than as a part of an evolving trend hints at another approach. Maintaining a significantly larger amount of capital on hand on a daily basis is an expensive proposition; moreover, it would be unnecessary 99 percent of the time. What might be more effective is some sort of contingency scheme wherein the exchange as a whole would (from specialists' contributions) buy insurance from a consortium of insurance companies. In return for these premiums, the insurance consortium would agree that, in the event of an overall market move in excess of some fixed limit (perhaps 5 percent) on volume exceeding another limit (perhaps more than 135 percent above "normal"), it would buy some fraction (perhaps 80 percent) of the closing inventories of the specialists at cost (appropriately defined). This kind of term insurance would obviate the need for idle capital, minimize the incentive problems that arise when specialists are themselves required to absorb fully any losses associated with resisting selling pressure like that which materialized on October 19 and 20, and add only about 1 to 2 percent to the existing equity holdings of the insurance companies.

It should, however, be clear that this scheme, like the specific circuit breaker mechanism described above, is one with many ramifications that require careful and detailed evaluation. Since no such evaluation was possible in the time available to the

Task Force, the actual recommendations of the Task Force quite properly focus on general areas of concern rather than specific recommendations.

Appendix

Introduction to Stock Market Institutions

This appendix is designed to serve as a brief introductory guide for readers less familiar with the instruments, marketplaces and trading strategies that are important for understanding the events of mid-October.

Stocks, Futures Contracts and Options Contracts

Shares of stock are claims of ownership on corporations. The price of a stock in an effectively operating stock market will depend 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. A futures contract, for example, is an agreement to buy or sell a specified amount of some item at a specified price at a specified time in the future; the value of the contract will vary according to how the present price compares to the price specified in the contract. 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 (NYSE) and American Stock Exchange (Amex), 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 (CME), and the MMI futures contract is traded on the Chicago Board of Trade (CBOT). 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 (CBOE). 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 (often referred to as the “cash index”) 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 between futures and stocks 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, larger 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 market falls.

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