

5 Policies to Curb Stock Market Volatility

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Concern about volatility

In October, 1987, stock markets everywhere in the world fell sharply, some by more than 40 percent. Subsequently, stock price volatility increased and trading volume fell precipitously. Some contend that the fall in trading volume is a consequence of the increased volatility. Investors are being scared off. The market is viewed as too erratic, too risky. Higher volatility and narrower market participation, some also argue, may be the reason that stock prices still have not recovered to pre-crash levels.¹

Concern about stock market volatility pre-dates the October crash. Volatility was increasing even before the crash.² October 19 and 20 simply intensified this concern. In addition, several reports on the crash highlight volatility as a problem. For example, the Securities and Exchange Commission (SEC) says at the outset of its report:

“ . . . when price swings reach extreme levels, they can have a number of adverse consequences. First, such volatility

¹ Fischer Black, "An Equilibrium Model of the Crash," unpublished, March 1988, p. 7; and K. French, G. Schwert, and R. Stambaugh, "Expected Stock Returns and Volatility," *Journal of Financial Economics* 19 (1987) pp. 3-29.

² Franklin Edwards, "Does Futures Trading Increase Stock Market Volatility?" *Financial Analysts Journal* (January/February 1988) pp. 63-69.

increases market-making risks and requires market intermediaries to charge more for their liquidity services, thereby reducing the liquidity of the market as a whole. Second, if such volatility **persists**, securities firms are less able to use their available capital efficiently because of the need to reserve a larger percentage of cash-equivalent investments in order to reassure lenders and regulators. Third, greater volatility can reduce investor confidence in investing in stocks. As a result of these effects, we believe substantially increased price volatility could, in the long run, impact the ability of U.S. corporations to raise capital efficiently through the sale of equity **securities.**"³

The message of this paper is that this emphasis on volatility is misplaced and counterproductive. Curbing volatility is an elusive policy target. It is not clear why volatility rises and falls, and policies directed at reducing it are unlikely to succeed and may also have harmful effects. Finally, there are more important issues that require attention.

What has happened to stock market volatility?

While stock market volatility soared last October when stock prices plummeted, it has declined significantly from its highs during October and the months immediately following the crash. Table 1 shows that daily volatility-of the S&P 500 index, the Dow Jones index, and the NASDAQ 100 index have all declined by 50 percent during the last few months relative to volatility during the three months that followed the crash. This decline occurred in both daily close-to-close prices and intra-day high-low prices. Volatility is currently at about the level it was during the first nine months of 1987, or before the crash. Although it is higher than it was in 1986 and in many earlier years, similar or even higher levels of volatility occurred in 1974-75, 1980, and 1982 (see Charts 1 and 2).

³ "The October 1987 Market Break", A Report by the Division of Market Regulation, U.S. Securities and Exchange Commission (February 1988) p. XII.

Table 1
Alternative Estimators of Volatility for
Different Daily U.S. Stock Indexes, 1973-1988

Time Period	N ^c	S&P 500		Dow Jones		NASDAQ100	
		CC ^a	PHL ^b	CC ^a	PHL ^b	CC ^a	PHL ^b
6/1/73-9/30/79	1599	0.9117	—	—	—	—	—
10/1/79-9/30/82	760	0.9743	—	—	—	—	—
10/1/82-12/31/82	62	1.4685	—	—	—	—	—
1983	253	0.8394	—	—	—	—	—
1984	253	0.8003	—	—	—	—	—
1985	252	0.6344	0.5150	0.6459	0.5652	0.7796*	0.6362*
1986	253	0.9289	0.7556	0.9721	0.8348	0.9858	0.7258
1/1/87-9/30/87	189	0.9858	0.8907	1.0184	0.9674	1.0459	0.8682
10/1/87-10/31/87	22	6.1101	4.1255	6.6929	5.2954	5.9119	3.9023
11/1/87-1/31/88	62	1.9484	1.5391	2.0445	1.7113	2.1274	1.7747
2/1/88-5/27/88	83	1.0193	0.8444	1.1284	0.9631	1.0059	0.8845

a. CC: Standard deviation of daily close-to-close percentage price changes, measured as

$$\ln \left[\frac{\text{Close } P_t}{\text{Close } P_{t-1}} \right] * 100$$

b. PHL: Parkinson's high-low daily price estimator defined as the square root of

$$\frac{0.361}{N} \sum_{i=1}^N \ln \left[\frac{\text{High } P_t}{\text{Low } P_{t-1}} \right]^2 * 100$$

c. N: Number of days or observations in sample period.

* There were only 31 observations in 1985.

Chart 1

S & P 500 Index - Daily Volatility Monthly: June 1973 to May 1988

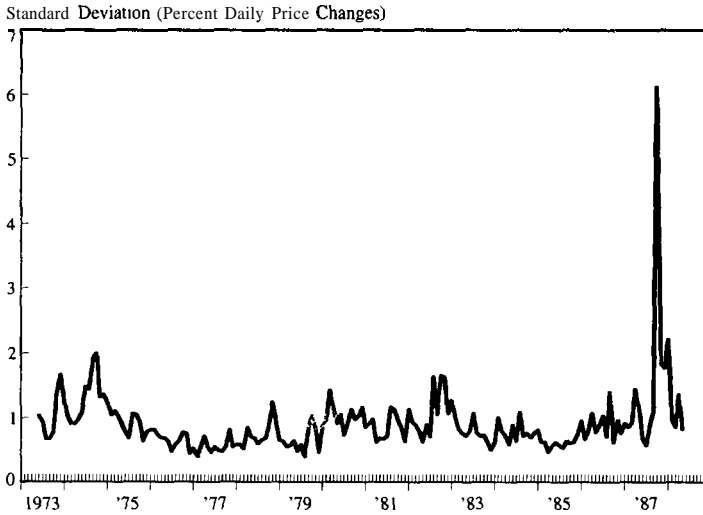


Chart 2

S & P 500 Index - Daily Volatility Monthly: June 1973 to May 1988

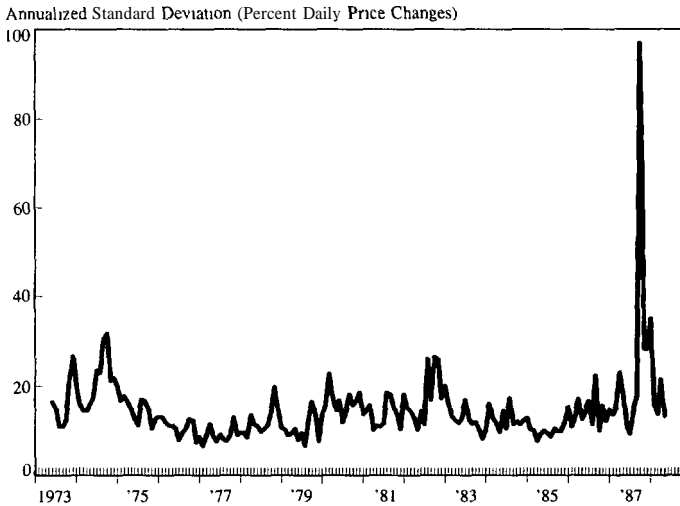


Table 2 compares stock market volatility in Japan and the United Kingdom (the other large markets) to the United States. The patterns are similar. Volatility rose substantially in all markets during October 1987 and during the three months following the crash. In the last few months it also has declined in all markets, although the decline is relatively greater in Japan and relatively less in London. Indeed, unlike the markets in the U.S. and the UK, volatility in Japan is now at the same level as in 1985.

Several conclusions emerge from the data. First, both inter-day and intra-day stock market volatility in all markets rose to unprecedented levels during October 1987 (Chart 1). Second, volatility in

Table 2
Volatility in U.S., Japan and U.K.
(Standard Deviations of Close-to-Close Daily Percentage Changes)"

<u>Time Period</u>	<u>U.S.</u> <u>(S&P 500)</u>	<u>Japan</u> <u>(Nikkei 225)</u>	<u>U.K.</u> <u>(Financial Times 500)</u>
1985	0.6344 (252)	0.5319 (245)	0.7729 (246)
1986	0.9289 (253)	0.9378 (246)	0.8094 (246)
1/1/87-9/30/87	0.9858 (189)	1.1036 (186)	1.0257 (190)
10/1/87-10/31/87	6.1101 (22)	4.4545 (22)	5.4637 (22)
11/1/87-1/31/88	1.9484 (62)	1.5773 (62)	1.4978 (62)
2/1/88-5/27/88	1.0193 (83)	0.5663 (83)	1.2010 (82)

*Standard Deviation of $1n \frac{\text{Close } P_t}{\text{Closer } P_{t-1}} *100$

The number of daily changes in each time period is shown in parentheses.

all markets has declined significantly in recent months, and especially in Japan and the U.S. (Table 2). Third, the volatility of both the S&P 500 and Dow Jones index has behaved in a similar fashion to that of the NASDAQ 100 index, on which no futures contract is currently traded (Table 1). Fourth, while volatility has declined recently, it remains somewhat higher relative to earlier years (Table 1). Fifth, although volatility remains high, today's level is not without precedent. Similar levels of volatility occurred during the 1970s and 1980s (as well as in the 1930s)⁴ (Chart 1).

Why has volatility increased?

Stock market volatility changes significantly over time. Despite many attempts to explain changes in volatility, we know very little about the factors that cause volatility to change.⁵ For example, Schwert attempts to relate changes in stock market volatility to a number of economic factors: financial leverage, corporate bond yields, corporate earnings and dividend yields, stock trading activity, the volatility of interest rates, bond prices, and macroeconomic variables. He concludes that "none of these factors . . . plays a dominant role in explaining the behavior of stock volatility over time."⁶

⁴ The conclusions, incidentally, also hold for many different estimators of volatility not shown here because of redundancy.

⁵ See e.g., R. Officer, "The Variability of the Market Factor of the New York Stock Exchange," *Journal of Business* 46 (1973) pp. 434-452; F. Black, "Studies of Stock Price Volatility Changes," Proceeding of the 1976 Meetings of the Business and Economics Statistics Section, American Statistical Association (1976) pp. 177-181; A. Christie, "The Stochastic Behavior of Common Stock Variances: Value, Leverage and Interest Rate Effects," *Journal of Financial Economics* 10 (1976) pp. 407-432; R. Merton, "On Estimating the Expected Return on the Market: An Exploratory Investigation," *Journal of Financial Economics* 8 (1980) pp. 323-361; R. Pindyck, "Risk, Inflation, and the Stock Market," *American Economic Review* 76 (1986) pp. 1142-1151; K. French, G. Schwert, and R. Stambaugh, "Expected Stock Return and Volatility," *Journal of Financial Economics* 19 (1987); T. Bollerslev, R. Engles and M. Wooldridge, "A Capital Asset Pricing Model with Time Varying Covariances," *Econometrica* 55 (1987); G. Gennottee and T. Marsh, "Variations in Ex-ante Risk Premiums on Capital Assets," unpublished manuscript, University of California at Berkeley (1987); A. Abel, "Stock Prices under Time-Varying Dividend Risk: An Exact Solution in an Infinite-Horizon General Equilibrium Model," unpublished manuscript, University of Pennsylvania (1987).

⁶ G. W. Schwert, "Why Does Stock Market Volatility Change Over Time?" unpublished (1987) p. 1.

Since the crash, considerable attention has been devoted to the effect of futures trading on stock market volatility, and in particular, to the effect of certain trading strategies such as portfolio insurance, program trading, and index arbitrage. (Historical evidence does not support the view that the introduction of futures trading on equity indexes in 1982 increased stock price volatility.)' The SEC's report adopts this position when it says:

“ . . . the availability of the futures market has spawned institutional trading strategies that have greatly increased the velocity and concentration of stock trading.

. . . we believe that the increased concentration and velocity of futures-related trading and resultant increases in stock market volatility can have long term, profound impacts on the participation of individual investors in the stock market.”⁸

Work on the connection between various kinds of trading and market volatility, however, has just begun, and it is too early to draw firm conclusions.⁹ At present we have no empirical evidence to link particular trading strategies to volatility.

Proposed remedies

Notwithstanding our poor understanding of the causes of stock market volatility, a number of measures have been proposed (or are being discussed) that would, according to their supporters, dampen price volatility. I classify these as falling into three categories:

⁷ Franklin Edwards, *op. cir.*

⁸ SEC Report, p. XIV.

⁹ See e.g., Ronald Anderson and Mehmet Tutuncu, “The Simple Price Dynamics of Portfolio Insurance and Program Trading,” Columbia Futures Center Working Paper #173 (June 1988).

- Regulations to curb certain **kinds** of trading activities;
- Institutional arrangements designed to enable the existing **market-making** systems to cope better with the current needs and trading strategies; and
- Proposals for substantial changes in the existing market-making system that would arguably enhance market liquidity and lessen volatility.

It is, of course, difficult to appraise the potential for these proposals to reduce volatility without understanding what is causing the volatility in the first place. Some things can be said, nevertheless, which may help to clarify the debate and to elucidate the pros and cons of the proposals.

Curbs on portfolio insurance and program trading

None of the studies of the stock market crash recommends direct curbs on program trading, portfolio insurance, or index arbitrage. Further, all of them conclude “. . . that derivative index markets provide valuable hedging and market timing benefits to institutions . . . ”¹⁰ There have, nevertheless, been calls to curb or even to ban entirely portfolio insurance and index arbitrage. Under pressure from large corporate clients, a few large brokerage firms have “voluntarily” stopped doing index arbitrage for their own accounts.

There are five arguments against restricting these types of trading. First, it is not clear that they do, in fact, increase volatility. They may or may not. We do not know. Second, with the development and increasing dominance of institutional trading, and of index fund management, there are benefits to being able to trade the entire market (or to do “basket” trades). It is, for one thing, cheaper, and therefore beneficial to the owners or beneficiaries of institutional funds. Curbing such trading may impose greater costs on society than the possible gain from lessened volatility. Third, if the cause of instability is port-

¹⁰ See e.g., the SEC Report, p. XIV.

folio insurance trading, curbing such trading in futures markets is unlikely to have much effect. Portfolio insurance strategies can be (and are) implemented in the cash market as well, with the same potential effects." Fourth, the volume of portfolio insurance done prior to October 19 may have been "excessive," in that users overestimated its benefits. The experience of last October is likely to result in a reappraisal of these benefits, so that the volume of portfolio insurance in the future may not be large enough to cause instability. Finally, there are other ways to curb volatility, without having to sacrifice the benefits of either derivative markets or the new trading strategies. One way is to develop market-making systems that can provide the necessary market liquidity to support institutional trading.¹²

Regulations to bolster the present system

Higher futures margins. Both the SEC and the Brady Commission reports call for higher margins on index futures and options. In its report, the SEC says:

“ . . . low margins contribute to increased speculative trading that, in normal market conditions, contribute to the illusion of almost unlimited liquidity in the futures market. During a market break, however, that liquidity disappears at a rate geometrically larger than does liquidity in the lower-leveraged stock market. For these reasons, the **Division** believes that relatively low margins may contribute to increased concentrated institutional trading and resulting greater price volatility.”¹³

¹¹ Ronald Anderson and Mehmet Tutuncu, *op. cit.*

¹² The NYSE and the CME are already considering joint arrangements that would facilitate trading large baskets of stocks. See e.g., "Steps to Aid Big Trades Weighed," *The New York Times* (June 10, 1988) p. D1, col. 3.

¹³ Katzenbach, N., "An Overview of Program Trading and Its Impact on Current Market Practices," A Study Commissioned by the New York Stock Exchange, December 21, 1987. The report also calls for higher futures margins. The studies of the General Accounting Office, the Commodity Futures Trading Commission, and the Chicago Mercantile Exchange do not recommend raising margins.

The Brady Commission says:

"All margin requirements have one aspect in common: margins are collateral and control the effective economic leverage achievable in any **financial** instrument . . .

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

. . . low futures margins allow investors to control large positions with low initial investments. The clear **implication** is that margin requirements affect intermarket risk and are not **the** private concern of a single market place . . .

To protect the intermarket system, margins on stock index futures need to be consistent with margins for professional market participants in the stock **market**."¹⁴

The debate about whether higher margins should be imposed on stock index futures is not a debate about whether current margin levels in futures markets are sufficient to maintain market integrity. Futures margins are security deposits, whose purpose is to insure that futures traders honor their contractual obligations. In the event of a trader default, Futures **Commission** Merchants (FCMs) and futures clearing associations are protected by their holding of margin deposits. Margins on futures do not involve extensions of credit, as they do in securities markets.

Futures margins are now established by FCMs and clearing associations, and not by government. Margins are different for different

¹⁴ "Report of The Presidential Task Force on Market Mechanisms," The Brady Commission (January 1988) p. 65. This suggests that futures margins should be raised to 20 to 25 percent.

commodities, for different types and sizes of transactions, and can be changed at any time. Their levels are related to the risk associated with specific commodities and transactions. customers' positions are marked-to-market daily and additional "variation" margin is called for daily (or even intra-day) if a customer incurs trading losses.

The events of October 1987 showed this system to be remarkably sound. Although substantial margin calls were issued (\$3 billion by futures and option exchanges on both October 19 and 20), there were few defaults. Despite an historic market drop, futures markets came through almost unscathed. There were no major FCM defaults, and no clearing association defaults. Whether this system might have cracked had prices continued to fall, and at what point, we do not know. That it did not break in October is testimony to its strength.

The SEC and Brady Commission recommendations to raise margins on futures contracts to levels consistent with those imposed on stock trading is based upon a belief that higher margins *reduce speculative activity* and, as a consequence, *increase market stability*. These recommendations, however, do not appear to be based on the events of October 19 and 20. Higher margins on those days would not have made a difference. The selling in futures markets that the reports point to as particularly harmful was by pension funds, trusts, and other large institutions. These institutions do not operate with leverage, and would not have been constrained by higher margin requirements. They could easily have borrowed against their stock positions to meet initial margin requirements, and, in any case, exchanges require only "hedger" margins of these institutions, which are much lower than "speculator" margins.¹⁵ Thus, at least with respect to the market plunge on October 19 and 20, higher futures margins would not have

¹⁵ In a recent speech echoing the SEC Report, SEC Chairman Ruder said that increased velocity and concentration of trading volume in the stock and futures markets and between those markets had increased stock price volatility and that this was partly due to the lower levels of margins in futures markets (*Investors Daily*, February 24, 1988) p. 5. Ruder contends that the growing concentration of trading in the hands of a "few" institutions is causing greater price volatility. It is difficult to see the connection between this argument and the one that says low margins cause greater price volatility. In addition, it is important to recognize that institutions such as portfolio insurers and mutual funds may be acting in response to decisions of individual investors and fund managers. The mutual fund sales that occurred on October 19, in particular, were the result of hundreds of independent decisions by investors to redeem their fund shares.

prevented what happened.¹⁶

More likely, the impact of higher futures margins would have fallen most heavily on speculators. On October 19 and 20 both large and small speculators were net buyers, offsetting rather than reinforcing the sell-order imbalance. If higher margins had been in place during the crash, the result could very well have been worse. Speculators might have been deterred from playing the stabilizing role that they did.

The argument for higher futures margins rests not on a factual basis but on two propositions: first, that higher margins reduce speculative activity; and, second, that by reducing speculative activity, prices will be more stable because excessive price fluctuations will be eliminated. While it is possible that higher margins will reduce speculative activity (as well as other trading), it is not clear that less speculative trading will diminish the magnitude of price movements in either direction. Speculation is as likely to be stabilizing as destabilizing.¹⁷

Our experience with the dramatic increase in silver prices during 1979-80 is not reassuring. As silver prices rose, exchanges substantially increased margins. The effect, however, was not to deter the long speculators but to make participation in the market by both short hedgers and short speculators more expensive. Many of the shorts exited the market, causing prices to rise even further. Thus, the effects of higher margin levels are more subtle and less obvious than intuition might suggest. Their impact can fall on either longs or shorts, or both, with unpredictable volatility effects.

Stock and other asset prices may also be determined more by the

¹⁶ It also is a strained argument to contend that low futures margins were the cause of the 30 percent increase (from January to August of 1987) in stock prices leading up to the crash. On October 15, the open position in the S&P 500 futures contract was less than 1 percent of the value of stocks listed on the NYSE. Could this position be held responsible for a 30 percent increase in the value of stocks?

¹⁷ There has been a long and inconclusive academic debate about whether speculative activity is on net stabilizing or destabilizing. The results of theoretical models depend critically upon the underlying assumptions that are used. It also has proven difficult to test empirically the effects of speculation. See e.g., M. Friedman, "The Case for Flexible Exchange Rates," in *Essays in Positive Economics*, University of Chicago Press (1953); A. Beja and B. Goldman, "On the Dynamic Behavior of Prices in Disequilibrium" *Journal of Finance* (May 1980) pp. 235-248; and O. Blanchard, "Bubbles, Rationale Expectations, and Financial Markets," *Crises in the Economic and Financial Structure*, Paul Wachtel, ed., Lexington Books (1982) pp. 295-315.

expectations of asset holders than by trading activity. Asset prices can change sharply with little trading. There need be no systematic relationship between the volume of trading and the magnitude of a commodity's price change. The value of real estate, for example, often changes substantially with few transactions, or even with no transactions. Stock and futures markets are no different. Higher futures margins, which work by increasing trading costs and reducing trading activity, need have no predictable or appreciable impact on either price levels or price volatility. Lower trading volume does not necessarily mean either lower prices or less volatility.

Higher futures margins are not without cost. They increase the costs to futures market participants, and, in particular, to speculators. This will reduce both the volume of trading and open interest, and market liquidity. The result will be higher transaction costs (commissions, etc.), and possibly, greater price volatility. In addition, hedgers' costs may rise because of increased basis risk and because the risk premium they pay may increase. Thus, the argument that higher margins on futures contracts will be beneficial because they costlessly curb speculative excesses is highly questionable.

In a recent empirical study of the effects of changes in futures margins, Michael Hartzmark examines trading in wheat, treasury bonds, pork bellies, and feeder cattle over several years. He finds that higher margin levels reduce open interest and trading volume, but that there is not “. . . a statistically significant relationship between margin changes and price volatility.”¹⁸ He acknowledges that it is not clear what the effects on price volatility would be if margins were to be increased substantially. (He could only observe small changes in margins.) He suggests, however, that “. . . certain trader groups would be driven from the market, making the market **thinner**, . . . with the result being less stable futures **prices**.”¹⁹

This issue has been studied extensively in the context of the stock market as well. In general, past studies have been unable to con-

¹⁸ Michael L. Hartzmark, "The Effects of Changing Margin Levels on Futures Market Activity, the Composition of Traders in the Market, and Price Performance," *Journal of Business*, Vol. 59, No. 2, part 2 (1986), S. 147, pp. S151-S180.

¹⁹ *Op. cit.*, p. S178. See also Geoffrey Heal, "Margin Levels as a Regulatory Tool," Columbia Futures Center Working Paper #100, Columbia University (1984).

clude that lower stock margins are related to price volatility.²⁰ In a recent Federal Reserve study, "A Review and Evaluation of Federal Margin Regulations," the Federal Reserve Board also investigates the question of whether low margins are the cause of instability in stock prices or of temporary speculative bubbles.²¹ It concludes:

"The evidence and arguments reviewed . . . do not indicate a need for margin regulation to curb short-term speculation . . . (p. 152); and

The behavior of stock prices since the enactment of margin regulation also does not support the argument that controlled margin trading will tend to reduce stock volatility. Despite the relatively high federal margin levels and the very low levels of margin credit since the early 1930s . . . stock prices have continued to be about as volatile as they were in the 50 years preceding margin regulation." (p. 167)

There is, therefore, no reason to believe that higher margins will reduce price instability in either the stock or futures markets. The only certainty is that they will impose higher costs on investors and traders, and reduce trading volume and liquidity.

Trading halts. Trading halts, or the stopping of trading when certain pre-determined conditions occur, were first proposed in principle by the Brady Commission. Months later, the Administration's study group (the "Gould" Committee) endorsed them in the form

²⁰ See e.g., R. Grube, O. Joy, and D. Panton, "Market Responses to Federal Reserve Changes in the Initial Margin Requirements," *Journal of Finance* (June 1979) pp. 659-675; T. Moore, "Stock Market Margin Requirements," *Journal of Political Economy* (April 1966) pp. 158-167; G. W. Douglas, "Risk in the Equity Markets: An Empirical Appraisal of Market Efficiency," *Yale Economic Essays* (Spring 1969) pp. 3-45; W.L. Eckards and D.L. Rogoff, "100 Percent Margins Revisited," *Journal of Finance* (June 1976) pp. 995-1000; J.A. Largay, "100 Percent Margins: Combatting Speculation in Individual Security Issues," *Journal of Finance* (September 1973) pp. 973-986; J.A. Largay and R.R. West, "Margin Changes and Stock Price Behavior," *Journal of Political Economy* (March/April 1973) pp. 328-339; R. Officer, *op. cit.*

²¹ The Federal Reserve Board, "A Review and Evaluation of Federal Margin Regulations" (1984).

of price limits. The Gould Committee recommended closing the market for one hour if the Dow Jones index moves by 250 points, and for two hours if the index moves by 400 points. In addition, subsequent to October 1987, the Chicago Mercantile Exchange (CME) and the Chicago Board of Trade (CBOT) both voluntarily imposed price limits on their stock index contracts. More recently, the New York Stock Exchange (NYSE) joined with the CME in adopting common price limits. They agreed that when the S&P 500 index falls 12 points (equivalent to 96 points on the Dow Jones index), the futures price would be limited, and futures trades could thereafter take place only at the "limit" price or higher for the next half-hour. (No limits would be set for increases in stock prices.) In addition, once this limit is triggered, the New York Stock Exchange would automatically segregate index arbitrage and asset allocation trades and attempt to resolve separately large order imbalances for these institutional traders.

The Brady Commission cites three benefits of "circuit breakers."

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

Finally, circuit breaker mechanisms counter the illusion of liquidity by formalizing the economic fact of life, so apparent in October, that markets have a limited capacity to absorb massive one-sided volume. Making circuit breakers part of the contractual landscape makes it far more difficult for some market participants—pension portfolio insurers, aggressive mutual funds—to mislead themselves into believing that it is possible to sell huge amounts in short time periods. This makes it less likely in the future that flawed trading strategies will be pursued to the point of disrupting markets and threatening the financial system.²²

²² *Op. cit.*, p. 66.

Trading halts can take many different forms and be triggered by different pre-determined conditions: price movements, volume limits, order imbalances, prescribed times of the day, and so forth. The Brady Commission did not recommend a specific type of circuit breaker, only that such mechanisms be coordinated among exchanges and “ . . . be formulated and implemented . . . ”²³

Neither the SEC nor the NYSE reports embrace price limits as a solution to volatility. The SEC says:

“ . . . we do not believe, as a general matter, that price limits should be imposed on stock trading, although brief trading halts based on pre-set standards may warrant further consideration. The automatic closure of stock trading for the remainder of the day, in our view, imposes unacceptable burdens on those market participants who wish to liquidate their positions and increases the potential that a volatile market situation can slide into panic.”

Similarly, the NYSE report concludes that “ . . . the institution of either position limits or price limits will not solve the problems that exist . . . ”²⁴

There are several arguments against price limits. First, if new information requires a price change larger than the allowable price range, trading halts will delay the determination of equilibrium prices. This may result in trading taking place at disequilibrium prices (off the exchange), causing injury to some traders. It also interferes with the price discovery function of markets, since quoted prices no longer reflect existing economic information.

Second, if markets are closed, traders are deprived of their use at the very time they would want to use them the most: when new information dictates a substantial change in prices. At such times, hedgers may want to put on new hedges or to “lift” prior hedges. Price limits can both lock them out and in. The inability to trade at these times could be a serious deterrent to the use of futures markets by potential hedgers. The prospect of being locked-in is an anathema

²³ *Op. cit.*, p. VII.

²⁴ *Op. cit.*

to speculators as well, as it prevents them from getting out when they need to the most. Discouraging speculation can result in less market liquidity.

It is also possible that, if market participants know that trading will be halted when prices reach a certain price level, price limits may become self-fulfilling. Traders may buy or sell frantically to beat the closing of the market so that they are not locked in. In doing so they will insure that the limits are hit.

The argument in favor of price limits rests upon the notion that large price movements may be the result of excessive (or irrational) speculation. In this case there may be a reason to slow things down, since market prices are "wrong" to begin with. However, even in this case it is not clear that trading halts will hasten the return to correct prices. Preventing prices from changing may increase the response time of rational traders to disequilibrium prices, slowing the return to more rational prices. Further, at times price limits may have the opposite effect from what we expect: they may increase uncertainty and cause even greater irrational market activity.

The dramatic rise and fall of silver prices from September 1979 to March 1980 again provides some evidence on how trading halts due to daily price limits worked in a situation of substantial price instability. During this period practically every day was a "limit-price" day—trading halted when prices moved up or down by the allowable daily range. On most days after a price limit halt, prices did not return to previous levels but continued rising or falling. The limits did not appear to dampen overall price movements in silver. Silver prices rose from about \$8 to almost \$55 an ounce, and then fell to almost \$10. Trading halts did delay these price movements, but whether that was, on net, beneficial is not clear. The inability to trade clearly imposed costs on some traders, and probably had harmful market effects for some time afterward.

Another argument is that price limits are useful in slowing down large price movements which otherwise might inflict severe damage on the financial structure because of institutional rigidities. This argument raises two questions. First, would artificially slowing down price adjustments successfully insulate an institutional structure in the face of "true" changes in equilibrium prices? Second, if large price changes are due to infrequent speculative excesses, do the social benefits of curbing these infrequent episodes outweigh the social costs

of interfering with markets on a regular basis? If speculative excesses are rare, the costs of having restrictive price limits may outweigh their benefits.

Price limits are only one of the many possible types of trading halts. Another that might be employed is to stop trading when large buy or sell order imbalances occur. Market-makers could, for example, delay changing prices for a pre-determined amount of time—say five or 10 minutes—to see if counterbalancing orders might arise during this time interval. Presumably, the existence and magnitude of the order imbalance would be disclosed to a broad range of traders, or even to the entire public. In this case, the market would remain open for trading at the quoted (or last) price, in contrast to the usual procedure for daily price limits. If the order imbalance were to persist, market-makers might then change prices according to a **pre-determined** schedule, waiting for a short time at each new price for new orders to surface. At all times, however, the market would remain open for counterbalancing orders.

Exchanges might also hold "single-price auctions" one or more times a day, where participants would be advised of order imbalances and where all buy and sell orders would be filled at one time and one price. If order imbalances were known, new bids might be forthcoming which would balance the market. In this system, markets could clear without specialists or market-makers having to risk their own capital. It is difficult, however, to endorse a general recommendation for trading halts until the institutional details of how and when such halts will be used are specified. Various types of trading halts have been employed for years in some foreign equity and futures markets. It would be useful to study how these have worked.

Whatever type of circuit breaker mechanisms are adopted, it is clear that such mechanisms should be imposed on the underlying stock markets as well as on the derivative markets. If only one market is closed, the natural trading links between the two will result in trading pressures and order imbalances being transferred to the market that is still **open**.²⁵ This distortion will exacerbate market pressures, which

²⁵ This possibility also exists internationally. For example, when the CBOT T-bond futures market hit its price limit on October 20 and was closed, trading shifted to London, where the volume of trading in U.S T-bond futures rose eightfold.

is precisely what happened on October 19 when arbitrage between the futures and cash markets became impossible because of chaotic conditions on the NYSE.

Short sale restrictions. While the SEC report rejects the general extension of short sale restrictions (or the “**uptick**”) rules to derivative markets, it suggests that it *may* be beneficial to eliminate the limited exemption to this rule that in the past it has granted to some short selling involving index arbitrage transactions. The SEC report says:

“The absence of short sale restrictions in the derivative markets, coupled with the greater leverage of futures, arguably presents the potential for greater speculative selling than could occur in the stock market. Moreover, through index arbitrage, that selling activity can be transferred to the stock market, often without being subject to Rule 10a-1 under the Securities Exchange Act of 1934 (“Exchange Act”), the short sale rule. Accordingly, the Division believes the Commission should review whether reducing price volatility should remain a goal of the short sale rule and, if so, whether steps should be taken to increase its effectiveness.”²⁶

The SEC concludes, however, that “. . . it does not believe that the extension of short sale restrictions to the derivative markets is operationally feasible.”²⁷ But in a somewhat cryptic statement, the SEC continues that it is concerned that “. . . the ability of institutions to engage in index arbitrage substitution activity without being subject to the short sale rule in combination with exchange for physical **stock/futures** transactions effected in London has impacted the effectiveness that rule may have had in reducing stock market volatility.”²⁸

²⁶ *Op. cit.*, pp. 3-25. The SEC’s is the only report on the crash that discusses this issue.

²⁷ *Ibid.*, pp. 3-26. The SEC does not provide its rationale for this statement. A possible rationale is that much “short selling” of futures is hedging: the seller holds a related long position in another market or commodity. Applying the existing short-selling restrictions to futures markets would inhibit this intermarket arbitrage. For a discussion of this point, see John C. Coffee, Jr., “Trading Systems: Comment,” *After the Crash*, American Enterprise Institute (1988) pp. 65-71.

Short selling has been a favorite target for centuries. More than three centuries ago, the Dutch banned short selling and subjected it to special taxation. Napoleon attacked the practice in 1802. In the United States a New York statute of 1813 prohibited short sales on stock and government bonds. None of these prohibitions lasted long. New York, for example, modified its 1813 statute in 1830 and repealed it entirely in 1858.²⁹

It was not until 1938 that we adopted our present restrictions on short selling. The SEC's short sale rule, Rule 10a-1 under the Exchange Act, prohibits persons from selling stocks short at a price below the last sale price ("minus tick") or when the last trade involving a change in price was a minus tick ("zero-minus tick").³⁰ Supporters of restrictions on short selling assert that short selling unsettles the market, forces liquidation, depresses prices, accelerates declines, and has no economic value or justification.³¹

It is difficult to appreciate the logic behind these assertions. Restricting either selling or buying in any market places an artificial constraint on the determination of prices. To place restrictions only on selling (but not on buying) would seem to distort equilibrium prices. We have chosen not to impose such asymmetrical restraints with other regulations. For example, margin requirements are the same for both longs and shorts, and capital gains taxes are the same for short-selling gains as for gains from price appreciation. Short-selling restrictions also reduce market liquidity.

It is not obvious how short-selling restrictions reduce price volatility. To the extent that they are effective in curbing selling activity, they make the market more vulnerable to upward price pressures. Volatility arises from upward as well as downward price movements. It is also doubtful, in today's (and tomorrow's) world of global financial markets, that "uptick" rules can be effective in restricting short sell-

²⁹ See Louis Loss, *Fundamentals of Securities Regulation*, Boston: Little Brown & Co. (1983) pp. 711-717.

³⁰ See SEC report, *op. cit.*, pp. 3-25.

³¹ Stock Exchange Practices, Report of the Senate Committee on Banking and Currency, Senate Report NO. 1455, 73rd Congress, 2nd Session (1934) 50.

ing. If you are restricted in one market but not in another, business will flow to the unrestricted market.

Finally, since there is little reason to believe that short-selling restrictions dampen volatility in general, there is no reason to eliminate the current exemptions to the uptick rule for certain liquidations of index arbitrage **positions**.³² To do so would only inhibit arbitrage and by doing so disconnect the futures and cash equity markets (just the opposite of what the Brady Commission thought our goal should be). If anything, short sale restrictions should be abolished.

Evidence from international markets

An international comparison of stock market volatility provides some evidence about the effectiveness of regulations aimed at curbing volatility. Both the United States and Japan impose margins of 50 percent or greater on stock transactions, while the United Kingdom has no margin requirements. There is, however, no evidence to suggest that daily volatility is greater in London than in New York or Tokyo (see Table 2). Similarly, of the three countries, only Japan has trading halts in the form of pre-set price limits. In the 1986-88 period, however, the Japanese stock market generally was not less volatile than the others (see Table 2). Thus, a simple international comparison of volatility does not reveal any obvious relationship between volatility and regulation.

Further, the volume and importance of futures trading in equity indexes is much greater in New York than in either London or Tokyo. There is little portfolio insurance and index arbitrage futures trading in London, and virtually none in Tokyo. Volatility in London and Tokyo, however, generally is not less than it is in the United States.

These conclusions are supported by a recent study of stock markets in **23** countries. Richard Roll examines *monthly* percentage changes

³² The **SEC** has permitted the unwinding of existing index arbitrage positions involving long baskets of stock and short index futures or **options** without aggregating short positions in these stocks with other proprietary accounts if those short positions are fully hedged. See SEC Report, pp. 3-25.

in stock indexes in each of these countries during the period February 1981 to September 1987.³³ Among other tests, Roll estimates the following regression for each market:

$$R_{j,t} = a_j + b_j R_{m,t} + e_{j,t}$$

where $R_{j,t}$ is the monthly percentage change in the index of country j for month t , $R_{m,t}$ is the world market index monthly percentage change for month t , $e_{j,t}$ is an unexplained residual, and a_j and b_j are fitted coefficients. The estimated "beta," or b_j , therefore, is a measure of each market's relative volatility.

To determine the impact of various institutional and regulatory differences across countries, Roll estimates a cross-sectional regression using the estimated "betas" from the above equation as the dependent variable. The explanatory variables in this equation are the various institutional and regulatory characteristics (which take the form of **zero/one** variables) in each of the 23 countries. The estimates show, among other things, no relationship between relative stock volatility and either margins or price limits.³⁴ There also is no **relationship** between volatility and either futures or options trading.³⁵ Finally, if just the standard deviation of monthly percentage changes from February 1981 to September 1987 is compared (a **standard** measure of stock market volatility), the United States has the **lowest level of volatility**.³⁶ Thus, an international comparison of volatility does not provide support for the belief that stock market volatility can be reduced by imposing various institutional rigidities on markets.³⁷

³³ R. Roll, "The International Crash of October, 1987," (April 5, 1988) unpublished.

³⁴ *Ibid.*, Table 5

³⁵ There is one institutional characteristic that shows marginal significance: the existence of continuous auction markets. *Ibid.*, p. 17.

³⁶ *Ibid.*, Table A-1.

³⁷ It should also be recognized that stock prices in different markets are not as highly related as is sometimes believed. For example, the correlation between monthly percentage changes in stock indexes is only .326 for the U.S. and Japan, and .513 between the U.S. and the UK. *Ibid.*, Table 2.

Present and future market-making systems: Implications for policy proposals

Despite thousands of pages of analyses of the crash, and six lengthy reports, there has been little discussion of the adequacy of the existing market-making systems in securities, futures, and options markets. The steady growth of institutional trading, and of "basket" or "program" trading, has changed the character of equity markets, and raises the issue of whether the present institutional structure is appropriate for the future.

Large institutions now hold equity portfolios with a value equal to about 40 percent of all NYSE listed stocks, and they account for about 80 percent of the trading volume on the NYSE. Block transactions, or trades of 10,000 or more shares of a single **firm**, account for about 50 percent of NYSE volume. Further, in the last few years the value of "indexed" assets under management has grown to about \$200 billion, which has resulted in an increase in program trading. Currently, as much as 25 percent of institutional trading may be in the form of program trades.

Stock index futures have become the "markets of choice" for these institutions. Trading volume in **S&P** 500 index futures alone has exceeded trading on the New York Stock Exchange. Institutions prefer futures markets because they provide greater liquidity and lower transaction costs. As a consequence, futures and cash equity markets have become inextricably linked. They are driven by the same economic fundamentals; pressures in one market are quickly **transmitted** to the other and their prices are tied together by index arbitrage.

Would changing the institutional structure of our market-making systems in these markets result in less volatility? Should, for example, a specialist on the New York Stock Exchange have responsibility for maintaining an orderly market (or stabilizing prices) in the face of huge institutional buying or selling? Is this realistic? Or, can an auction market where "locals" have little capital be expected to make a market for large institutions? Is there a problem with having one kind of market-making system for the cash market (a specialist system) and another kind for the futures markets (an open-outcry auction market)? The reports on the crash do not deal with these issues. It seems apparent that we need new trading systems capable of providing liquidity for the institutional trading of "baskets" of stock.

In addition, the internationalization of equity and futures markets is still in its infancy, but it will not be long before the most important U.S. instruments are traded on foreign markets and *vice versa*. Capital will move freely to the most liquid, least costly, and safest markets, wherever they are. Internationalization is likely to increase the institutionalization of markets, and perhaps, the role of the largest institutions as well.

In this world can each country have different regulations and expect them to be effective? I doubt it. Take, for example, price limits. The Chicago Board of Trade is, by far, the world's largest market in U.S. treasury bond futures. On October 19, trading was halted in U.S. treasury bond futures on the Chicago Board of Trade because bond prices hit their "limit up." The next day the volume of trading on the London International Financial Futures Exchange in *U.S. treasury bond contracts* was eight times the previous day's volume in *Chicago*. Restricted by a regulation in Chicago, traders simply shifted their business to London where there is no such regulation. Measures to curb stock market volatility must obviously be considered in the context of internationally competitive global capital markets.

A global movement toward the development of electronic, automated, auction markets is under way. The first totally electronic automated futures and options market just opened in Switzerland; and Toronto, London, and Tokyo are all well along in their plans to have 24-hour electronic "screen-trading." Last September, the Chicago Mercantile Exchange and Reuters entered into an agreement to create a global electronic automated-trading system (known as "GLOBEX", Global Electronic Exchange). Recently, Telerate, another giant in financial-information services, announced an agreement with Bermuda-based INTEX Holdings to market that exchange's automated-trading system. While it is too early to be certain, it seems inevitable that we will have fully automated screen-trading at some point in the future.³⁸

³⁸ For a discussion of electronic trading, see Moms Mendelson, Julius Peake, and R. Williams, Jr., "Toward a Modern Exchange: The Peake-Mendelson-Williams Proposal for an Electronically Assisted Auction Market," in *Impending Changes for Securities Markets: What Role for the Exchanges?* ed. by E. Block and R. Schwartz, Greenwich, Conn.: JAI Press, Inc. (1979) pp. 53-74.

Adherents of these systems claim that they will result in less price volatility than we have now, by providing better information about order flows and disseminating this information to a wider group of investors and traders. Market liquidity, it is argued, will increase, resulting in greater price stability.

It is my view that focusing on recent stock market volatility is not a constructive approach to the future. Our goal should be to provide an institutional and regulatory framework that facilitates the development of efficient and liquid international capital markets: in equity, futures, and options markets, as well as other financial markets. We must adopt a global perspective, especially with respect to our regulatory framework. International competition will be a driving force in the future, whether or not we like it. The key issue for the future is to determine what kinds of global institutional arrangements can best facilitate the development of liquid, efficient, and competitive international securities markets. Attempting to curb stock market volatility in New York with improvised regulations is both myopic and dangerous.

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