# Introduction

***Stuart E. Weiner***

The stock market crash of 1987 sent shock waves through the world's financial markets. Stock exchanges in New York, Chicago, London, Tokyo, Frankfurt, and a host of other cities suffered major declines. In response, credit markets, commodity markets, and foreign exchange markets registered sharp swings. Not since the Great Depression had the world seen such turmoil in financial markets.

But, dramatic as it was, the crash of 1987 was not the first hint that something was amiss. For several years, there had been a perception that financial market volatility was rising. The crash only served to bolster that perception.

In an effort to learn more about the volatility of markets, the Federal Reserve Bank of Kansas City sponsored a symposium titled "Financial Market Volatility," held at Jackson Hole, Wyoming, August 17-19, 1988. The symposium brought together distinguished academics, industry representatives, and policymakers. Three basic questions were posed. First, what are the sources of financial market volatility? Second, what impact does it have on domestic and international economies? And third, what public policies should be adopted in response? The view of most of the participants at the symposium was that too little is known about the causes and consequences of financial market volatility to have much confidence in any particular policy response.

This article summarizes the papers and commentary presented at

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the symposium. The first section examines the sources of financial market volatility. The second section explores the consequences of financial market volatility. The third section evaluates possible policy responses. The final section summarizes the remarks of an overview panel.

## Sources of volatility

Robert Shiller and Frederic Mishkin led off the symposium with an examination of the sources of financial market volatility. They agreed the sources are difficult to identify.

In his paper "Causes of Changing Financial Market Volatility," Robert Shiller noted that recent financial market volatility is not unique. Throughout the postwar period, stock markets, commodity markets, bond markets, and foreign exchange markets have recorded sharp movements. And while it is true these markets exhibited considerable volatility in 1987, volatility does not appear to be trending upward.

Shiller stressed that very little is known about the determinants of financial market volatility. Economists and other researchers simply do not have a proven theory of financial fluctuations. The theories that do exist are often unconvincing.

As an example, Shiller pointed to the efficient markets explanation of financial market volatility. This theory argues that changes in financial market prices reflect changes in underlying economic variables. The data do not appear to support this theory, however, because financial market volatility shows little relation to the volatility of such variables as industrial production, short-term interest rates, or the price level.

Nor do technological innovations provide an adequate explanation of financial market volatility. Narrowing his focus to the stock market, Shiller argued that stock index futures, arbitrage program trading, and portfolio insurance probably did not play a fundamental role in the October 1987 stock market crash. He noted that the stock market has been quite volatile in the past, when such innovations did not exist. Consequently, proposals that would limit or otherwise alter these innovations are likely to be ineffective or even counterproductive. These proposals include trading halts or "circuit breakers,"

increased margin requirements on futures contracts, limitations on index arbitrage, and the abolishment of portfolio insurance.

One explanation of financial market volatility that does have some merit, according to Shiller, is market psychology. Investors sometimes appear to react to each other rather than to some fundamental event, and this process can set into motionlarge market swings. Shiller contended that market psychology was a key factor behind the stock market crash of 1987. As evidence, he pointed to an investor survey that he took immediately after the crash: The survey suggests that, on the day of the crash, investors were not responding to any specific news item but to the news of the crash itself.

In discussing Shiller's paper, Frederic Mishkin agreed that stock market volatility is difficult to explain. And although he was somewhat skeptical about Shiller's survey evidence, he too believed that factors other than underlying economic fundamentals might have played a role in the stock market crash of 1987.

Mishkin pointed out that most of the recent proposals to reduce stock market volatility would make markets less efficient. Markets would become less liquid, respond more slowly to new information, or reveal less about trading pressures. So even if such proposals reduced volatility—and it is not clear that they would—they would have a detrimental impact on market efficiency.

Mishkin also addressed the role of monetary policy in the face of financial market volatility. Monetary policymakers have two options when confronted with financial market volatility. They can attempt to reduce this volatility by intervening in markets, or they can stay out of the markets but stand ready to function as lender of last resort in the event of a financial crisis. Mishkin indicated a preference for the latter. He cited the Federal Reserve's responses to the Penn Central crisis of 1970 and the stock market crash of 1987 as successful applications of this approach.

## Consequences of volatility

Volatility in financial markets could have far-reaching ramifications. Symposium participants suggested that such volatility could disrupt domestic economic activity, unsettle international asset flows, and place strains on global supervisory efforts.

### *Domestic impact*

In their paper "Financial Factors in Business Fluctuations," Mark Gertler and R. Glenn Hubbard examined the impact of financial market fluctuations on business fluctuations. Through what channels, they asked, can financial market disruptions affect the real economy?

Gertler and Hubbard noted that economists have long thought there could be an important link between the financial and real sectors of the economy. The Great Depression has always seemed an obvious example. Recently, economists have developed models that examine this link formally. These models usually apply to capital investment, but they can often be applied to consumer spending and hiring decisions as well.

According to these theories, financial market fluctuations can affect the real economy through two channels: fluctuations in the internal net worth of firms and fluctuations in the availability of bank credit. In the first case, a faltering economy or a redistribution of wealth from debtors to creditors lowers the collateralizable net worth of firms, making it more difficult for those firms to borrow. Consequently, capital investment declines. In the second case, a financial disruption, such as a bank failure, reduces the flow of bank credit to borrowing firms, also causing investment to decline. In both cases, changes in the financial sector lead to changes in the real sector.

Gertler and Hubbard claimed that evidence supports these theories. Econometric studies and historical events strongly suggest that financial market fluctuations can have an impact on the investment of firms, particularly small firms. Consequently, financial market fluctuations can have an impact on the macroeconomy.

Gertler and Hubbard also offered an explanation for why the stock market crash of 1987 had such little effect on the economy. While stock prices did show considerable variability in 1987, they did not show exceptional changes from the beginning of the year to the end of the year. Therefore, to the extent that changes in stock prices mirror changes in firms' collateralizable net worth (which is not directly observable), the net worth of firms did not change substantially for the year as a whole. Consequently, one would not have expected much effect on investment and, hence, on the overall economy. Moreover, it is not clear that changes in stock prices actually mirror changes in a firm's net worth. And finally, Gertler and Hubbard noted that

the crash of 1987—unlike the crash of 1929—did not cause a severe restriction of bank credit, because the Federal Reserve aggressively stepped in to provide adequate liquidity.

In discussing the Gertler-Hubbard paper, Robert Hall agreed that financial market fluctuations can affect the real economy through the two channels identified by Gertler and Hubbard. Hall noted that the model they presented—with its emphasis on the firm's internal net worth—was an example of what he calls the "back-to-the-wall" theory of finance. This theory holds that an effective arrangement for shareholders and managers is for shareholders to receive payments that resemble fixed debt, not variable dividends, and for managers to retain exceptional profits but also be liable for exceptional losses. In this sense, managers' backs are to the wall. Hall asserted that many financial arrangements in the real world take this form. Hall agreed with Gertler and Hubbard that the 1987 stock market crash was fundamentally different from the 1929 crash and that its effects were therefore quite different as well.

### *International impact*

Charles Goodhart, in his paper "The International Transmission of Asset Price Volatility," examined the links throughout the world's financial markets. He asked whether financial markets, especially equity markets, have become more interdependent. Specifically, is volatility in one market now more likely to be transmitted to other markets?

Goodhart reported that recent research with a colleague suggests that financial markets have not become more interdependent. According to this study, volatilities in various domestic markets showed no tendency over the 1967-to-1985 period to become more highly correlated internationally. Thus, Goodhart argued, one must be cautious in adopting the view that financial market interdependence is on the rise.

Goodhart stressed, however, that international transmission mechanisms can still play a major role on certain key occasions. And the stock market crash of 1987 appears to have been such an occasion. Research by other colleagues of Goodhart suggests that developments before and after the crash are consistent with the view that a normal

"contagion" relationship among markets turned into a panicky "cross-infection" relationship.

Goodhart explained that there is nothing abnormal about movements in one stock market being affected by movements in another. Indeed, it is rational for domestic analysts to take their cue partly from movements overseas—in effect, allowing foreign analysts to evaluate foreign news for them. But, Goodhart added, such contagion can escalate into cross-infection when domestic analysts ignore fundamentals and pay excessive attention to the prices set by others. Econometric studies of the London, Tokyo, and New York stock markets indicate that contagion did, in fact, escalate after the crash. And this escalation would help explain one of the puzzling features of the crash, the nearly universal decline of stock markets worldwide despite different institutional frameworks and different economic outlooks.

Goodhart also presented some results of a study he currently has under way, which examines the relationship between stock market movements and foreign exchange movements. To the extent that foreign exchange movements are a good proxy for fundamental news, incorporating such movements in econometric studies should allow the researcher to get a better handle on contagion and cross-infection effects in stock markets. Unfortunately, Goodhart's preliminary results suggest that foreign exchange movements are not a good proxy for fundamental news. Nevertheless, Goodhart has been able to draw two tentative conclusions from his work. First, among the three stock markets, London, Tokyo, and New York, the Tokyo market appears to be the most immune to international developments, while the London market appears to be the most vulnerable. And second, in the wake of the October 1987 crash, the New York market appears to have become more vulnerable.

In commenting on the Goodhart paper, Brian Quinn agreed that the London, Tokyo, and New York stock markets are quite different in structure, and thus one would expect differing degrees of international sensitivity. Quinn concurred that the London market is probably the most open of the three.

Quinn emphasized that it is important to determine whether the 1987 crash represented a special, isolated case or the arrival of a new era of heightened volatility. Quinn's view, in contrast to Goodhart's, was that financial markets have become more volatile

and interdependent. As evidence, Quinn pointed to the sweeping, global nature of the 1987 crash and, more narrowly, to the growing importance of foreign activity on the London stock exchange. Quinn stressed that this growing integration of the world's financial markets will put heavy demands on industry supervisors and regulators.

Michael Mussa, in his discussion of the Goodhart paper, echoed the view that international transmission was very much in evidence during the stock market crash of 1987. Fundamentals—a deterioration in the U.S. trade account, a rise in U.S. and other interest rates, and a possible policy dispute between the United States and West Germany—were probably responsible for the initial decline in the U.S. stock market on the morning of October 19. The 300-point decline over a two-hour period in midday, however, was probably due to psychological factors. Whatever the reasons for the decline, the collapse of the U.S. market fueled collapses in the Tokyo and London markets, and the situation did not improve until the U.S. market stabilized the next day.

### *Supervisory impact*

In his luncheon address, "Globalization of Financial Markets: International Supervisory and Regulatory Issues," Alexandre Lamfalussy examined the role of bank supervisors and securities market supervisors in today's world of highly integrated markets. He offered several comments on the rationale for supervision as well as some thoughts on the October 1987 stock market crash.

Lamfalussy noted that the principal rationale for supervising financial institutions, especially banks, is to ensure stability of the financial system. He also noted that this rationale has been challenged in recent years. Some analysts believe bank supervision is unnecessary to achieve financial stability. They argue that deposit insurance, by preventing bank runs, has made banking crises obsolete. Other analysts believe bank supervision can actually impair financial stability. They argue that supervision reduces the efficiency of the banking system and weakens market discipline.

While acknowledging that supervision has its costs, Lamfalussy contended that the benefits of supervision outweigh these costs. In his view, deposit insurance has not eliminated the risk of systemic

runs on banks. Moreover, the risks in banking have been rising as a result of greater competition and major imbalances in the world economy, the latter generating disruptive swings in financial markets. Consequently, Lamfalussy stated, "I do think that in order to preserve the stability of the banking system . . . bank management needs the support of the restraining influence of supervision—even at the cost of some loss of efficiency, whatever the definition of efficiency may be." As to who should do the supervising, Lamfalussy responded, "It is obvious that in today's globalized banking market, supervision has to be as far as possible globalized, both in the geographical and in the inter-industry sense of the term." Lamfalussy pointed to the recent G-10 agreement on bank capital standards as a concrete example of globalized supervision.

Turning to the stock market crash of 1987, Lamfalussy reported that he was quite struck by the speed with which it circled the globe. The crash left no doubt in his mind that the world's financial markets had become more integrated. Lamfalussy was also impressed by the resilience of markets after the crash. Actions by the Federal Reserve and other central banks to provide ample liquidity played a key role in stabilizing markets, Lamfalussy asserted. And finally, Lamfalussy reiterated his call for globalized supervision, noting that the crash "alerted bank supervisors and securities market supervisors to the necessity of cooperating with one another both nationally and internationally."

## Policy response

The recent turmoil in financial markets has generated numerous proposals for reform. Major reforms have been proposed for stock markets and foreign exchange markets. Symposium participants had differing views on the merits of such proposals.

### *Stock market proposals*

In his paper "Policies to Curb Stock Market Volatility," Franklin Edwards examined recent proposals to reduce stock market volatility. He asserted that these efforts are misplaced and counterproductive.

In developing his argument, Edwards first noted that the causes of stock market volatility have not been clearly identified. However, disagreement about its causes has not prevented a proliferation of proposals to reduce this volatility. Proposed remedies include curbs on program trading, portfolio insurance, and index arbitrage; higher margin requirements on index futures and options; and the imposition of trading halts, or circuit breakers, in markets. Edwards sees problems with virtually all of these proposals.

Edwards reported that he is not convinced that program trading, portfolio insurance, and index arbitrage have increased stock market volatility. As a result, he is not convinced that restricting these types of trading would be beneficial. Indeed, Edwards argued, such restrictions could prove costly to society.

Higher margin requirements on index futures and options also make little sense, according to Edwards. Higher margins may reduce speculation in markets, but less speculation would not necessarily lead to less volatility in these markets. Speculation can be stabilizing as well as destabilizing. As an example, Edwards pointed to the October 1987 crash. On October 19 and 20, speculators were net buyers of stocks, not net sellers. Had higher margins been in place at the time, these speculators and their stabilizing influence may well have been absent.

Edwards argued that circuit breakers are also problematic. Under a circuit breaker scheme, trading would be stopped when certain predetermined conditions occurred—for example, when prices fell too low or volume rose too high. The fundamental problem with circuit breakers is that they do not allow markets to adjust fully to new information. If the breaker is activated, the determination of equilibrium prices is interrupted. An additional objection to circuit breakers is that they may foster the kind of panic selling or buying they are intended to prevent. Fearing they may be locked into undesirable positions, traders may buy or sell frantically as the breaker threshold approaches.

Edwards contended that, rather than focusing narrowly on limiting volatility in domestic equity markets, policymakers should direct their attention to the far-reaching developments in international financial markets. The financial world is rapidly becoming a single, global market, and policymakers need to take steps to ensure that this global market is as liquid and efficient as possible.

In commenting on the Edwards paper, Lawrence Summers indicated

he would not rule out remedial intervention in stock markets. He is not convinced that unbridled volatility and a hands-off policy stance yield benefits to the real economy.

Summers identified two types of trading strategies that investors pursue: negative feedback strategies and positive feedback strategies. Under negative feedback strategies, investors buy when the market declines. Under positive feedback strategies, investors sell when the market declines. Because positive feedback strategies are self-reinforcing—that is, declines in the market lead to further declines in the market—they are likely to increase volatility. Thus, Summers argued, in evaluating proposals to reduce stock market volatility, one should consider whether they would discourage positive feedback strategies.

Summers suspects that low margin requirements encourage positive feedback strategies. Indeed, Summers believes that greater liquidity in futures markets in general probably encourages positive feedback strategies more than negative feedback strategies. Thus, Summers reported, he is not averse to making markets less liquid, to "throwing some sand in the wheels."

David Hale, in his discussion of the Edwards paper, suggested the stock market crash of 1987 was something of a blessing. One should not necessarily view it as a problem, he argued, but rather as a solution to other problems. Specifically, the crash lowered inflation fears and reduced upward pressure on interest rates, thus strengthening the U.S. economy in 1988. Hale agreed with Edwards that higher margin requirements on futures contracts would probably not have cushioned the crash. And, also like Edwards, Hale asserted that policymakers need to think seriously about how the financial system is evolving. Technology, securitization, and globalization are transforming the financial landscape.

### *Foreign exchange market proposals*

In their paper "Exchange Rate Volatility and Misalignment: Evaluating Some Proposals for Reform," Jacob Frenkel and Morris Goldstein examined recent proposals for reducing volatility and misalignment of exchange rates. These proposals include target zones, restrictions on international capital flows, and enhanced international

coordination. Frenkel and Goldstein did not advocate one proposal over the others, but rather highlighted the relevant issues involved in all three.

Frenkel and Goldstein stressed that there is an important distinction between exchange rate volatility and exchange rate misalignment. Exchange rate volatility refers to short-term fluctuations of exchange rates around their long-term trends. Exchange rate misalignment refers to significant deviations in exchange rates from their long-term equilibrium levels. Some analysts believe exchange rates have been both excessively volatile and misaligned in recent years.

Frenkel and Goldstein noted that exchange rate volatility has been much higher in the floating-rate period than in the Bretton Woods period. Moreover, this volatility has shown no tendency to subside as the floating-rate period has worn on. However, in the post-Bretton Woods era, exchange rates have been less volatile than interest rates, stock prices, and commodity prices. Are today's exchange rates excessively volatile? Are they seriously misaligned? Frenkel and Goldstein asserted that the answers are not obvious.

Turning their focus to proposed remedies, Frenkel and Goldstein first examined target zones. Under a system of target zones, nations agree to try to keep their currencies within certain bands. The width of the bands, the frequency with which the bands are revised, and the authorities' commitment to the bands are crucial features of a target-zone agreement. The principal advantage of target zones is they may force discipline on a nation's fiscal policy. Had target zones been in place in the early 1980s, for example, the United States might have been dissuaded from running huge federal budget deficits for fear of running up the value of the dollar. The principal disadvantage of target zones is they may force monetary policy to pursue conflicting goals—for example, fighting inflation ***and*** discouraging an appreciating currency.

Restricting international capital flows, either directly or through taxation, is another proposal for reducing exchange rate volatility. Such proposals are based on the notion that speculation in exchange markets causes excessive volatility. The problem with this view, according to Frenkel and Goldstein, is that speculation can be stabilizing as well as destabilizing. So capital restrictions could be counterproductive. In addition, there is the possibility of "regulatory arbitrage," of capital restrictions in one country simply leading to more

speculation and more volatility in another country.

Enhanced international coordination is a third proposal for reducing exchange rate volatility. Related to (and perhaps incorporating) target zones, enhanced coordination would require major countries to modify their macroeconomic policies more willingly to ensure consistent policies across countries. As Frenkel and Goldstein pointed out, several questions arise in considering coordination proposals. For example, should coordination be conducted continuously or only at times of crisis? How many nations should be involved? And are the gains from enhanced coordination ultimately worth the effort?

In discussing the Frenkel-Goldstein paper, Paul Krugman contended that exchange rates are excessively volatile. He believes financial markets in general, and foreign exchange markets in particular, are often irrational in the sense that trading is not always based on fundamentals. And in the case of exchange rates, at least, the resulting volatility is deleterious because it can impair the ability of firms to make sound decisions. Because such firms are unable to distinguish fundamental developments from speculative bubbles, their location and sourcing decisions suffer.

Krugman advocated a return to some type of fixed exchange rate system. He argued that such systems have worked effectively in the past. Krugman was less enthusiastic about policy coordination, feeling the prospects are not as encouraging.

Robert Hormats, in his discussion of the Frenkel-Goldstein paper, argued that target zones and policy coordination could be effective in reducing market volatility. Hormats believes foreign exchange markets in recent years have been driven by expectations. And expectations of central bank policies have been particularly important. According to Hormats, if the leading nations of the world decided to move to a "hard"[7] target-zone system, one with narrow and infrequently revised currency bands, central bank policies would become even more critical. In particular, one or more central banks would have to emerge—as the Bundesbank has emerged in the European Monetary System—as the anchor around which other central banks could converge.

## Panel overview

Three participants—Louis Margolis, Robert Roosa, and James

Tobin—provided an overview of the issues raised at the symposium. Margolis and Roosa focused on the stock market and foreign exchange market, respectively, while Tobin addressed his comments more generally.

Louis Margolis contended that U.S. equity markets are in the midst of an evolutionary process. That process began in 1975, when deregulation eliminated fixed commission rates on secondary market trading. This switch to fully negotiated rates has squeezed the profits of the commission brokerage business, especially the profits of specialists and block traders. It is no coincidence, Margolis asserted, that full-service firms have shifted resources away from secondary market trading and toward the more profitable areas of new security issuance, mergers and acquisition, and leveraged buyouts.

Margolis continued that, with their profit margins reduced, specialists and block traders can no longer provide adequate liquidity to the market in times of stress. They simply do not have the financial resources to make bids that would stabilize the market. At old commission levels they had the necessary funds to provide liquidity, but at current levels they do not. The October 1987 crash is a case in point. Insufficient liquidity was one reason why the crash was so abrupt.

Margolis emphasized, however, that equity markets are developing alternative sources of liquidity. These sources include options, futures, electronic screen-based trading, and portfolio trading. In other words, equity markets are being transformed. The appropriate policy response, according to Margolis, is to encourage this transformation, to remove any obstacles that could trigger another crash.

Robert Roosa, in his remarks, suggested that the volatility of today's financial markets can be traced to two basic sources. The first is the unprecedented integration of these markets and the related appearance of new instruments and new trading techniques. This integration has permitted individual and institutional investors to respond more quickly and more effectively to profit opportunities. The second source of today's volatility is long-term, underlying cycles in the real economy. These cycles cause prices of financial assets, particularly foreign exchange rates, to follow sustained paths for a time, then to stall, then suddenly to decline or rise to new sustained paths. The result is significant asset price volatility.

Roosa believes that growth with stability is the proper objective

of economic policy. Accordingly, he strongly endorses the recent efforts by the G-5 countries (United States, Japan, West Germany, Great Britain, France) to achieve that stability. Roosa reported that he has been quite encouraged by the coordination the G-5 countries have displayed since the Plaza Agreement of September 1985. In particular, he has been encouraged by the system of target zones that has emerged. These target zones represent a step back toward fixed exchange rates, which Roosa believes were partially responsible for the "remarkable" worldwide growth of the Bretton Woods era. The world economy has pressing imbalances, Roosa argued, and enhanced coordination among the world's leading countries appears a promising way to address those imbalances.

James Tobin, in his comments, argued that financial markets should be made less liquid. Asset prices are not driven solely by fundamentals—indeed, prices often appear to be driven by sheer speculation. Such speculation, Tobin asserted, wastes productive resources, especially human resources.

Tobin emphasized that economists and other researchers do not have a good theory of volatility. For example, it is not clear how volatility should be measured. Should it be measured over a day, over a month, or over a year? Nor is it clear how volatility is related to volume. Does volatility rise when transactions volume rises? Or does the opposite occur? Researchers do not know.

One thing that Tobin is confident about is that asset prices do not always reflect fundamentals. Herd behavior—in which traders react to each other rather than to some fundamental development—is responsible for much market movement, Tobin claimed. Related to this is the preoccupation of traders with seemingly minor news stories, statistical releases, and policymaker statements. It is hard to believe, Tobin asserted, that all of these items represent fundamental news.

To reduce financial market volatility, Tobin advocated a tax on the volume of transactions in stock markets, foreign exchange markets, and perhaps other markets. The purpose of this tax would be to discourage short-term speculation and encourage portfolio decisions based on long-term fundamentals. A tax of 1 percent, on both buying and selling, might be reasonable. In addition, Tobin would change the capital gains tax, introducing a sliding scale of tax rates linked to holding periods. For example, the capital gain on a financial asset held less than one year would be subject to full taxation,

while the gain on an asset held 30 years would be subject to no taxation. Like the transactions tax, this measure would presumably lengthen the horizon for portfolio decisions. It is Tobin's view that financial markets would benefit from such "sand in the wheels."

The stock market crash of 1987 emphasized how turbulent financial markets can become. It also provided the impetus for much new research on financial market volatility. The issues have proved to be quite complex.

The experts brought together at the Federal Reserve Bank of Kansas City's 1988 symposium concurred that financial market volatility is not well understood. Symposium participants did not reach a consensus on the sources of volatility. Nor did they reach a consensus on the consequences of volatility. A point they did agree on was that financial market volatility largely remains a mystery. And in light of this, most participants felt policymakers should proceed very cautiously before adopting any particular policy response.