

This PDF is a selection from an out-of-print volume from the National Bureau of Economic Research

Volume Title: The Risk of Economic Crisis

Volume Author/Editor: Martin Feldstein, editor

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-24090-8

Volume URL: <http://www.nber.org/books/feld91-2>

Conference Date: October 17, 1989

Publication Date: January 1991

Chapter Title: The Risks of Financial Crises

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Chapter URL: <http://www.nber.org/chapters/c6229>

Chapter pages in book: (p. 19 - 83)

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The Risks of Financial Crises

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1. Benjamin M. Friedman

Views on the Likelihood of Financial Crisis

Financial crises have traditionally attracted a peculiar fascination. It is difficult to specify with precision just what a financial crisis is, but most people in the business and financial world apparently sense that they would recognize one if they experienced it. More important, the fear of financial crisis is often a key motivation underlying actions in both the private and public policy spheres.

Concern about the likelihood of a financial crisis in the United States has become more widespread in recent years for several reasons. First, the wave of restructurings and reorganizations that has affected much of U.S. corporate business in the 1980s has, in one way or another, typically involved the substitution of debt for equity capitalization. As a result, the corporate sector's interest burden has risen sharply compared to its earnings, thereby prompting questions about the ability of more heavily indebted firms to meet their obligations in the event of a general slowdown in nonfinancial economic activity. This substitution of debt for equity has not merely involved a few individual transactions large enough to attract attention under any circumstances—\$25 billion for RJR Nabisco, for example—but has also reached a scale that is hard to ignore at the aggregate level. During the six years between 1984 and 1989, the volume of equity that U.S. firms in nonfinancial lines of business retired, through various restructuring transactions, exceeded the gross proceeds of nonfinancial firms' new equity issues by \$575 billion.

The author is grateful to Thierry Wizman for research assistance; to Charles Kindleberger for helpful comments on an earlier draft; and to the National Science Foundation, the General Electric Foundation, and the Harvard Program for Financial Research for research support.

Second, the actual record of failures of both nonfinancial firms and financial intermediaries has been extraordinary in the 1980s. The business expansion following the severe 1981–82 recession was the first on record in which the failure rate among nonfinancial businesses continued to rise long after the recession ended, rather than dropping back to pre-recession levels. Moreover, on inspection it is clear that this phenomenon has not been merely the natural counterpart of an unusually large number of new business start-ups. (Contrary to popular impressions, the 1980s has not been an unusually fertile period for new business formation activity in the United States.) Within the financial intermediary system, both the actual failure experience and the perceived threat of further failures have been unprecedented since the 1930s. More than 1,000 commercial banks failed during 1981–89—including 206 in 1989 alone—versus only 79 during the 1970s and just 91 from the end of World War II through 1970. Hundreds of savings and loan institutions became insolvent in the 1980s, yet continued to operate anyway because the FSLIC (unlike the FDIC) lacked the resources to close them; in 1989 Congress voted a bailout plan for the thrift industry that will cost far in excess of \$100 billion.

Yet a third reason for the increased worry about a financial crisis is the shock of the October 1987 stock market crash. Unlike many previous dramatic declines in stock prices, the drop of 23% in one day (or 33% compared to the peak two months earlier) led to neither a financial crisis nor a business recession. But the crash vividly demonstrated that the vulnerability of values already experienced in recent years in the markets for more specialized assets—for example, farm land, oil reserves, and loans to developing countries—also extended to so general a class of assets as ownership claims on all of American business. Further, the manifest failure of various “portfolio insurance” schemes to serve their intended purpose cured many institutional investors of the illusion that even if a financial crisis did bring a broadly based decline in asset values, their own holdings would somehow be insulated.

These developments notwithstanding, prevailing attitudes toward the possibility of financial crisis are neither unanimous nor unambiguous. The most familiar concern is that some contractionary disturbance to business activity could result in a cumulative inability of debtors to meet their obligations, possibly leading to some form of rupture in the financial system that in turn might further depress the nonfinancial economy. But no one (to my knowledge) has clearly indicated what set of circumstances would lead to such an outcome, much less suggested how probable those circumstances now are. In addition, there are some arguments for discounting the importance of the changes that have taken place in this regard in the 1980s. For example, some observers have argued that most of the substitution of debt for equity in recent years has occurred in the context of reorganizations that are likely to promote business efficiency and hence provide the higher earnings with which to service the added debt; also, that these transactions are explicitly designed to minimize conventional bankruptcy problems in the event that the anticipated higher

earnings do not materialize. Others have pointed out that even after the refinancings of the 1980s, U.S. corporations on average remain much less highly levered than their counterparts abroad.

Whether or not they are valid under today's specific circumstances, concerns about the likelihood of a financial crisis do reflect a long history of such events playing a major role in the most visible and memorable business fluctuations. The most severe business downturns that have occurred in the United States—for example, those commonly called “depressions”—have in every case been either preceded or accompanied by a recognizable financial crisis. Moreover, while each financial crisis is idiosyncratic in some respects, according to at least some lines of thinking the role of financial crises in this context is not accidental but fundamental to economic behavior in an investment-oriented private enterprise system. At the same time, there is widespread recognition that the likelihood that such a system will experience a financial crisis under any given set of circumstances also depends on institutional safeguards and other factors subject at least in part to influence by public policy.

The object of this paper is to review some of the major lines of thinking about the likelihood of a financial crisis that have emerged in response to the events of the 1980s. Section 1.1 briefly sets this review in context by referring to the long-standing tradition of emphasis on financial crises and their real economic consequences. Section 1.2 outlines the view that the large-scale substitution of debt for equity by U.S. nonfinancial corporations during the 1980s reduced the economy's ability to sustain fluctuations in business activity without borrowers' defaulting on their obligations in unusually great numbers and volume. By contrast, section 1.3 examines several different arguments for rejecting concerns about borrowers' ability to meet their obligations. Section 1.4 shifts the focus from borrowers to lenders and considers the ability of both commercial banks and thrift institutions to withstand a default experience of major proportion. Section 1.5 summarizes the paper's principal conclusions.

1.1 Financial Crises in Historical Perspective

Few students of economics or business are not familiar with some of the major episodes in the past that are easily recognizable as financial crises. The bursting of the “tulip mania” in 1636 and of the “South Sea Bubble” in 1720, the East Indian Company crisis in 1772, the collapse of the railway boom in 1846, the failure of Union Generale in 1881 and of Baring Brothers in 1890, the U.S. banking panics of 1873, 1893, and 1907, the failure of the Creditanstalt in 1931 and the worldwide bank collapse of the next two years, and, of course, Black Thursday in October 1929: all this is standard lore, typically related nowadays with substantial color and even sometimes a hint of nostal-

gia.¹ In fact, although financial crises as such are more difficult to recognize in more primitive institutional environments, the history of such episodes is substantially more ancient.²

The typical features of these events include, in Minsky's classic description, "large-scale defaults by both financial and nonfinancial units, as well as sharply falling incomes and prices" (1963, 101). Beyond that, however, it is difficult to generalize. Some financial crises have been the inevitable (at least in retrospect) end product of speculative excesses that carried asset prices to levels far beyond any plausible relationship to the corresponding fundamental values. Others—especially those that have followed the onset of war or other major political events—have themselves presumably resulted from sudden reassessments of fundamental values. Still others have resulted from foolish decisions, or bad luck, at specific financial institutions that were large enough and central enough to impair the system as a whole when they failed to honor their commitments. Yet another entire range of influences, not mutually exclusive with any of the above, has typically arisen from the nonfinancial economy. Incomes can and do decline for reasons other than financial crisis. And when they do, on a sufficient scale, the ensuing defaults have at times led to crises in the financial system.

While events in the nonfinancial economy may or may not be the proximate cause of financial crises, the main reason why financial crises are of such great interest from a public policy perspective is presumably the impact that they in turn exert on nonfinancial economic activity. The idea of influences running in this direction is also well known, even if the substantive nature of the behavioral mechanisms involved is not. Of the six U.S. economic downturns during 1867–1960 considered by Friedman and Schwartz (1963) to have been severe, banking crises either preceded or accompanied the onset of four—those beginning in 1873, 1893, 1907, and 1929.³ The bank panic of 1837 also apparently played a major role in accounting for the severe economic downturn that began in that year (Temin 1969). Sharp declines in stock prices also occurred in each of these five years. Among U.S. economic downturns of lesser magnitude, banking panics occurred in conjunction with (although not necessarily at the inception of) those beginning in 1857, 1882, 1899 and 1902.

It is not surprising that growing awareness of the effect of financial crises on the nonfinancial economy has often prompted a policy response. The two leading examples in the United States within the twentieth century are the

1. The best general reference is Kindleberger (1978). Sprague (1910) and Friedman and Schwartz (1963) provide useful chronologies for the United States. Galbraith's (1954) account of the 1929 stock market crash and its aftermath is a jewel.

2. See, e.g., Gibbon's ([1776] 1932) discussion of financial developments in the later Roman period.

3. The two exceptions were the recessions beginning in 1920 and 1937. See the useful tables in Schwert (1989, 102, 105).

establishment of the Federal Reserve System in the aftermath of the panic of 1907 and the severe recession of 1907–8, and the separation and reform of the banking and securities industries after the 1929–33 depression. Minsky's (1963, 102) interpretation of the post-Depression banking changes is especially apt: "As the institutions were reformed at a time when the lack of effectiveness and perhaps even the perverse behavior of the Federal Reserve System during the great downswing was obvious, the changes created special institutions, such as the various deposit and mortgage insurance schemes, which both made some of the initial lender of last resort functions automatic and removed their administration from the Federal Reserve System."

Despite the general agreement on the desirability of shielding the nonfinancial economy from effects due to financial crises, the way in which these effects operate remains unclear. Friedman and Schwartz (1963) emphasized the role of financial crises in creating sudden reductions in the quantity of money held by the public, especially during episodes involving widespread bank failures or (as in the panics of both 1893 and 1907) suspensions of convertibility of deposits into currency. By contrast, Fisher's (1933) notion of "debt deflation" focused on the market for credit rather than money. More recently, Bernanke (1983) and Mankiw (1986) have further developed Fisher's idea by making explicit the role of banks as specialized institutions able to allocate credit on the basis of their superior ability to collect and process relevant information about would-be borrowers and their prospects. By compromising banks' (and perhaps other specialized lenders') ability to serve this function, a financial crisis therefore removes a necessary ingredient to many spending decisions.

Not everyone has regarded the nonfinancial consequences of occasional financial crises as wholly bad, however. Schumpeter (1934), for example, focused on the role of severe business downturns in freeing economic resources to move to more productive uses. Without a fairly severe downturn from time to time, the varied relationships and habits that make up the fabric of everyday business dealings would tend to lock both people and capital in place, even if technology and other conditions determining the best allocation of the society's resources were changing over time. According to Schumpeter the positive role of occasional financial crises, including especially the widespread abrogation of contracts, is to provide enough pressure to break through these rigidities.

Finally, under any of these notions of how financial crises affect nonfinancial economic activity—the money-destruction view of Friedman and Schwartz, or Fisher's debt-deflation alternative, or even Schumpeter's more benign perspective—there remains the question of whether financial crises themselves occur in a purely random fashion or more systematically. The most intriguing idea advanced along these lines, and the one that bears most directly on the current situation in the United States, is Minsky's "financial instability hypothesis," according to which as time passes since the last financial

crisis, the relevant behavior changes in such a way as to increase the likelihood of the next crisis.⁴ In particular, either borrowers take on more debt relative to their earnings, or they (and perhaps lenders too) hold relatively less liquidity, or both. But, for a shock of any given size to the typical borrower's earnings, the probability of experiencing defaults on a scale sufficient to impair the functioning of the system as a whole depends both on the volume of debt to be serviced and on the reserve of liquidity behind it. For a given distribution of shocks to which the economy is subject in the ordinary course of events, therefore, the likelihood of a financial crisis rises over time as the memory of the last such crisis fades. Whether the specific changes in the behavior of borrowers and lenders that have attracted so much attention during the 1980s correspond well or poorly to Minsky's hypothesis remains an open question.

1.2 Concerns about Corporate Indebtedness

The phenomenon of the 1980s that has accounted for the greatest part of the spreading concern about the U.S. economy's vulnerability to financial crisis is the leveraging of the nonfinancial corporate business sector. As Kaufman (1986a, 1986b) and Friedman (1986, 1988) (among others) have emphasized, corporate borrowing in the last decade has differed from prior experience both in scale and in purpose. U.S. businesses have not only borrowed in far greater volume than in the past, but have used a much greater share of the proceeds of that borrowing to pay down their own and other companies' equity rather than to put in place new earning assets. As a result, the share of earnings, or cash flow, that the typical company needs to devote to keeping current on its debt service has risen to record levels.

Figure 1.1 documents this increased interest drain at the aggregate level by showing the ratio of interest payments to available earnings before interest and taxes, since World War II, for corporate and noncorporate firms engaged in nonfinancial lines of business in the United States. For purposes of comparison, the figure also shows the ratio of personal interest payments to pretax personal income.

Especially for the corporate sector, the deterioration of interest coverage since 1980 has been dramatic. On average during the 1950s and 1960s, it took 16¢ of every dollar of pretax (and pre-interest) earnings to pay corporations' interest bills. The corresponding average for the 1970s was 33¢. Thus far in the 1980s it has been 55¢. In no year since 1981 has the interest share of earnings been below 50¢ on the dollar.

Indeed, the corporate sector's experience in this regard since 1981 vividly

4. See Minsky (1963, 1964, 1972, 1977). The rationale motivating the behavioral changes that drive the "financial instability hypothesis" is not fully specified in Minsky's work; see Friedman and Laibson (1989) for one possible explicit rendering.

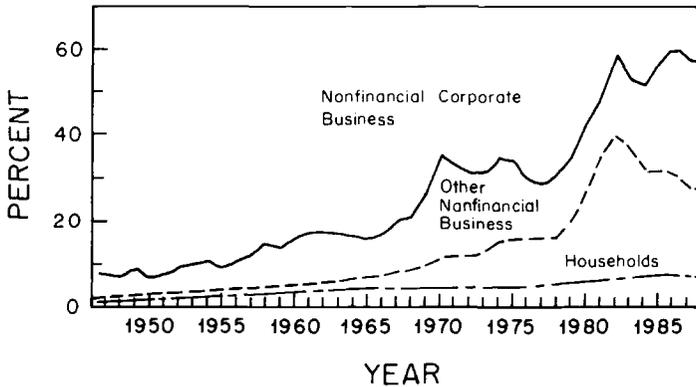


Fig. 1.1 Interest payments as a share of available earnings, 1946–88

Source: Bureau of Economic Analysis.

demonstrates the impact of continued massive borrowing for purposes of equity substitution rather than asset creation. In 1982, at the bottom of the most severe business downturn since the 1930s, aggregate pretax corporate earnings (before interest payments) were depressed by 11% from year-earlier levels, and the interest rate on short-term business borrowing reached a record 16.66% (in May). Not surprisingly, the share of corporations' earnings required to meet their interest bills also rose to a record level, 59¢ out of every dollar. By 1986 earnings had rebounded by 25%, and the average short-term borrowing rate was down to 6.39%. But by then corporations had taken on so much additional debt that, in 1986, interest payments were up to 60¢ of every dollar of earnings, yet a new record. By 1989 earnings had risen still further, to 42% above the 1986 level, and the average short-term borrowing rate was 8.80%. But with the further borrowing that had taken place, interest payments still stood at 57¢ of every dollar of earnings.

The experience of unincorporated businesses resembled that of corporations until the 1980s, but since then it has differed sharply. Mirroring the corporate sector's interest-to-earnings ratio, the noncorporate sector's interest payments rose from only 6¢ of every dollar of pretax (and pre-interest) earnings on average in the 1950s and 1960s to 17¢ on average in the 1970s, and 33¢ in the 1980s. But after peaking at 40¢ on the dollar in 1982—to recall, the bottom of the recession—interest payments as a share of earnings dropped to only 30¢ on the dollar by 1989.

In contrast to corporations or unincorporated businesses, the trend of household-sector interest payments in the 1980s has shown no noticeable break with prior experience. Personal interest payments averaged 4¢ of every dollar of pretax (and pre-interest) personal income in the 1950s and 1960s, and 5¢ in the 1970s. Thus far in the 1980s the average has been 8¢. As of 1989 the ratio had been essentially unchanged for half a decade, with the value

for every year during 1984–89 falling within the narrow range of 7.6¢–8.0¢ on the dollar.

Finally, figure 1.2 presents an alternative perspective on business borrowers' ability to meet their current obligations by showing, separately for the corporate and noncorporate sectors, the ratio of interest payments to cash flow including earnings (as in fig. 1.1) plus depreciation. Interest payments look smaller compared to this expanded measure of ability to pay, of course, but the overall trends are roughly the same as those shown in figure 1.1. Most important, the corporate sector's ratio of interest payments to cash flow also rose dramatically during the late 1970s and the back-to-back recessions of 1980 and 1981–82, and, despite the strong recovery of cash flow and the general fall in interest rates, as of 1988 it had shown no improvement whatever from the bottom of the last recession.

The basic reasons underlying the disparate patterns of interest payments compared to earnings (or cash flow) among corporations, unincorporated businesses and households are readily apparent from table 1.1, which summarizes the changes in these three sectors' respective balance sheets between 1980 and 1989 (scaled in each case relative to gross national product). Not surprisingly, since all three sectors have borrowed in record volumes during the 1980s, the heart of the issue in the resulting comparisons is their differing use of the proceeds of borrowing.

Between 1980 and 1989 the corporate sector increased its overall debt by nearly one-fourth and its market debt by more than one-third, relative to the size of the economy. By contrast, with investment unusually weak during the 1980s (presumably as a result, at least in part, of the extraordinarily large federal budget deficit, which persisted long after the economy had recovered from the recession that began the decade), total corporate asset holdings declined by about one-tenth compared to the size of the economy, and corporate

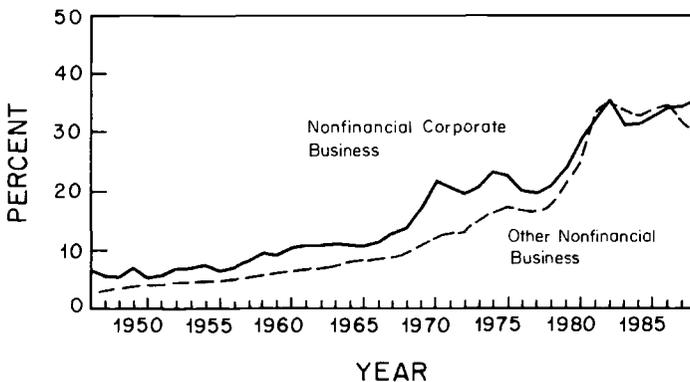


Fig. 1.2 Interest payments as a share of cash flow, 1946–88

Source: Bureau of Economic Analysis.

Table 1.1 Balance Sheet Changes, 1980–89

	1980	1989	Change	% Change
Corporate sector:				
Assets	140.5	126.3	-14.2	-10.1
Tangible	104.9	91.4	-13.5	-12.9
Financial	35.6	34.9	-.7	-2.0
Liabilities	45.1	56.3	11.2	24.8
Market	29.1	39.3	10.2	35.1
Other	16.0	17.0	1.0	6.2
Net worth	95.4	70.0	-25.4	-26.6
Noncorporate sector:				
Assets	60.9	63.4	2.5	4.1
Tangible	55.7	55.0	-.7	-1.3
Financial	5.2	8.5	3.3	63.5
Liabilities	18.2	27.5	9.3	51.1
Market	15.7	23.7	8.0	51.0
Other	2.5	1.3	-1.2	-48.0
Net Worth	42.7	35.9	-6.8	-15.9
Households:				
Assets	365.9	388.6	22.7	6.2
Tangible	136.0	132.1	-3.9	-2.9
Financial	229.9	256.5	26.6	11.6
Liabilities	52.3	66.5	14.2	27.2
Home mortgages	33.1	43.8	10.7	32.3
Other	19.2	22.7	3.5	18.2
Net Worth	313.6	322.1	8.5	2.7

Source: Board of Governors of the Federal Reserve System.

Note: Data (except for % changes in final column) are year-end values expressed as percentages of fourth-quarter GNP (at seasonally adjusted annual rates). Tangible assets are measured at reproduction cost for reproducible assets, and market value for land. Financial assets are measured at book value for debt and deposits, and market value for equities. Detail may not add to totals because of rounding.

holdings of tangible assets declined by somewhat more. In short, corporations were borrowing not to invest but to finance transactions—including mergers, acquisitions, stock repurchases, and leveraged buy outs (LBOs)—that merely paid down their own or other corporations' equity. As a result, the corporate sector's aggregate net worth declined by more than one-fourth compared to the size of the economy.

Both the noncorporate business sector and the household sector likewise increased their respective debt levels faster than the economy grew, but in both cases this borrowing financed at least some relative increase in asset holding. Among unincorporated businesses the increase in assets held (all of which was in financial assets) trailed well behind the increase in borrowing, so that net worth also declined substantially in relative terms—albeit not by anything like the comparable decline for corporations. Households also, at least in the

aggregate, used much of their record borrowing in this decade to finance increased holdings of financial assets, so that household-sector net worth modestly increased compared to the size of the economy.⁵

It is always possible, of course, that because balance-sheet data like those summarized in table 1.1 value reproducible tangible assets at reproduction cost and exclude intangible assets ("goodwill") altogether, they understate the true earning power of assets in general and corporate assets in particular. If so, then despite the sharp rise in interest payments as a share of corporate earnings and cash flow in the recent past, earnings in the near future may increase rapidly enough to reverse the worrisome trends shown in figures 1.1 and 1.2. Investigating this possibility is far from straightforward because of the obvious difficulty of measuring assets' prospective earning power. (Standard book values are irrelevant for this purpose.) Nevertheless, the possibility of undermeasurement of assets in this way is sufficiently important to warrant making at least some attempt to grapple with the issue.

The stock market, where prices in principle reflect market participants' collective judgment about future earnings, provides one way of doing so for the corporate sector. Figure 1.3 plots the ratio of the book value of debt to the market value of equity for the aggregate of U.S. nonfarm nonfinancial business corporations, for year-end values since World War II and two other selected dates: 25 August 1987 (the stock market peak), and 19 October 1987 (the market crash).⁶ The results of this calculation shed little new light on the issue at hand, however. As of year-end 1989, the corporate sector's market-value leverage remained well below the postwar record level (above 1.0) set in 1974, when firms borrowed heavily and then the stock market crashed. But it likewise remained substantially above the average level that prevailed before then. Viewed from another perspective, aggregate leverage at year-end 1989 stood about where it did at year-end 1980, or at the end of the 1981–82 recession, despite that fact that by December 1989 stock prices had fully regained the record level previously reached in August 1987.

It is also always possible that the impression given by the sector-aggregate data in figures 1.1–1.3, or in table 1.1, may not correspond to the reality of borrowing and asset accumulation by individual firms and families. The fact that the household sector as a whole has accumulated substantial assets to match its record issuance of debt in the 1980s would be of limited help in the event of an economic downturn if the families who had bought the assets had little or no overlap with the families that had issued the debt. For analogous

5. Moreover, the additional financial assets taken on by households included not only equities but large amounts of deposits, government securities, and other credit market debt instruments.

6. Year-end values are taken directly from the Federal Reserve System's Flow of Funds Accounts. Values for other dates are based on interpolation or extrapolation of the corporate borrowing data in the Flow of Funds Accounts, in conjunction with a simple equation that relates the Standard & Poor's stock price index to the Flow of Funds estimate of the market value of equity for the entire nonfarm nonfinancial corporate business sector.

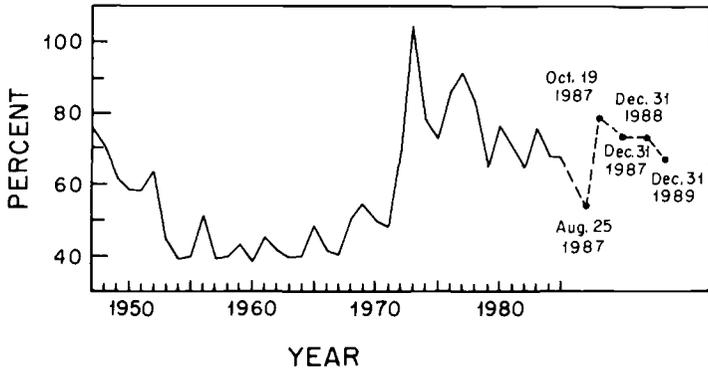


Fig. 1.3 Debt-equity ratio, U.S. nonfarm nonfinancial corporate business sector, 1948–86, and selected dates, 1987–89

Sources: Board of Governors of the Federal Reserve System, Flow of Funds Accounts, and author's calculations.

reasons, the fact that the corporate sector as a whole has borrowed far in excess of its creation of new assets in the 1980s would not increase the economy's financial fragility if the firms that had done the borrowing were mostly ones that had had only little debt, or excess liquidity, to begin with. Investigating the possibility of such a divergence between the aggregate data and the disaggregated reality is difficult for the household sector because of the paucity of available information on individual families' holdings.⁷ By contrast, disaggregated data on the corporate sector are readily available, at least for the larger firms.

Bernanke and Campbell (1988) and Bernanke et al. (1990) used data from the Compustat files to study the detailed balance sheet and earnings record of some 1,400 U.S. corporations for years beginning in 1969. On the whole, their findings from these disaggregated data reinforce rather than contradict the impressions drawn above on the basis of aggregate data. For the median firm in their sample, interest expense rose from 13¢ of every dollar of cash flow in 1969 to 22¢ in 1988. For firms in the 90th percentile for this ratio, however, interest expense rose from 34¢ of every dollar of earnings in 1969 to \$1.86 in 1988. (In other words, by 1988 more than one firm in 10 was not earning its interest due.) Nor did this sharp deterioration reflect merely the vagaries of one year's earnings. Compared to a trailing three-year average of earnings, interest expense for firms in the 90th percentile rose from 44¢ on the dollar of earnings in 1971 to \$1.48 in 1988.

An especially interesting exercise carried out by Bernanke et al. was to "replay" the 1981–82 recession in the sense of considering the implications of

7. See Friedman (1986) for a brief examination of the Federal Reserve's 1983 Survey of Consumer Finances from this perspective.

the actual 1981–82 percentage decline in firms' earnings in the context of the typically higher debt levels taken on by 1988. The results indicated that, in the absence of some offsetting factor, default levels in such an event would have substantially exceeded those experienced during the 1981–82 recession itself. By the second year of the recession, for example, firms in the 90th percentile of indebtedness would have had negative cash flow, and firms in the 75th percentile would have had interest due equal to 72¢ of every dollar of cash flow.

These results are all the more striking in that firms in the Compustat sample apparently did much less borrowing than the average U.S. corporation and likewise accounted for a disproportionately small share of equity repurchases. In 1988, for example, firms in Bernanke et al.'s sample raised just \$41 billion from debt issues (net of repayments) versus \$198 billion for the nonfarm non-financial corporate business sector as a whole (as measured by the Flow of Funds accounts). Similarly, firms in their sample repurchased only \$26 billion of equity in 1988 versus \$131 billion for the nonfinancial corporate sector overall.

In sum, the concerns raised by Kaufman and Friedman on the basis of sector-aggregate data for balance sheets as well as interest expense compared to earnings (or cash flow) appear to stand up not only against correction for market value of firms' equity but also against the use of individual firm data.

1.3 Contrasting Viewpoints

Public discussion of the developments summarized in section 1.2 has not reflected a one-sided conclusion that these trends represent any threat to the U.S. economy, however. Both academic researchers and financial practitioners have advanced a series of arguments to the effect that the increasing reliance on debt by U.S. business corporations in the 1980s has not yet exposed the economy to any significant risk of financial fragility and is not likely to do so in the foreseeable future.

1.3.1 Perspectives on Debt Aggregates

To begin, Summers (1986, 1989) has emphasized the fact that the increasing aggregate indebtedness of both business and household borrowers in the 1980s has represented no more than a continuation of trends that had already prevailed over most of the post–World War II period. Figure 1.4 shows the total outstanding indebtedness of all U.S. borrowers other than financial intermediaries, scaled in relation to gross national product, for year-end values since the end of the Korean War. The behavior of the economy's *total* debt ratio was certainly extraordinary in the 1980s. Until the last decade, one of the most striking features of U.S. postwar financial behavior had been the stable relationship between debt and economic activity. The debt ratio measured in this way fluctuated within a very narrow range, with no evident trend

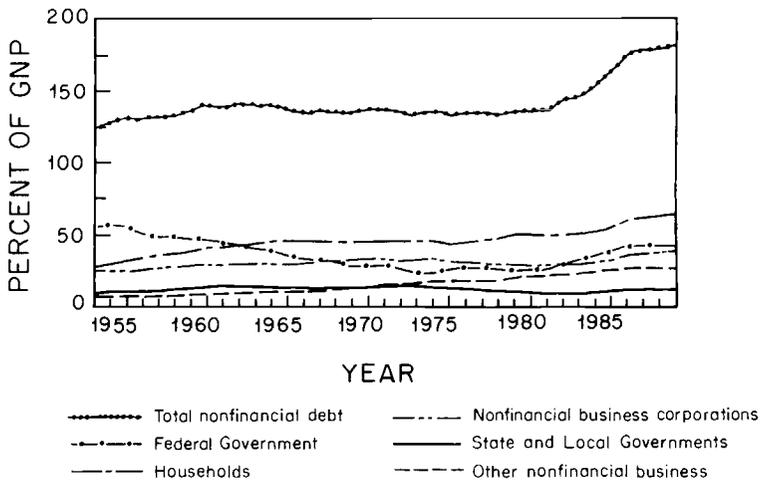


Fig. 1.4 Outstanding debt of U.S. nonfinancial borrowers, 1953-89

Source: Board of Governors of the Federal Reserve System.

either up or down. By contrast, since 1980 outstanding debt has risen by one-third compared to the size of the economy.⁸ But as table 1.2 shows, a rising ratio of debt to income is not new for private borrowers. The outstanding debt of unincorporated businesses has risen, relative to the size of the economy, in every decade since World War II. So has that of households. Corporate debt has risen relative to gross national product in each postwar decade except the 1970s. For each of these three borrowing sectors, therefore, it is difficult to look at figure 1.4 and identify the 1980s as a clear departure from prior postwar experience.

Instead, what stands out in this regard is primarily the extraordinary behavior of the federal government's debt ratio. Not only in the postwar period but in the entire history of the United States, back to 1789, the only sustained increases in the outstanding federal debt compared to the size of the economy took place during major wars and during the depression of the 1930s (when the economy itself was shrinking). With the huge budget deficit that the government ran throughout the 1980s, however—notwithstanding the absence of either war or depression—the federal debt ratio increased sharply in every year from 1981 through 1986, and then held roughly steady through 1989. This extraordinary fiscal imbalance has probably affected the U.S. economy in a variety of ways, but increasing the likelihood of financial crisis is presumably not one of them. Even after the increase of the 1980s, the federal debt ratio is still just back to where it was (on the way down, after World War II) in

8. The mean debt ratio during 1953-80 was \$135.70 of debt for every dollar of income, with standard deviation (based on annual data) of only \$2.90. At year-end 1980 the ratio was \$137.10. At year-end 1989 it was \$183.60.

Table 1.2 Debt Ratios for Private-Sector Borrowers, 1928–89

	Nonfarm Nonfinancial Business Corporations	Other Nonfarm Nonfinancial Businesses	Households
1928	.45	.34	.24
1945	.20	.06	.13
1950	.23	.07	.24
1960	.30	.09	.43
1970	.34	.14	.47
1980	.29	.16	.50
1989	.39	.24	.64

Sources: U.S. Department of Commerce and Board of Governors of the Federal Reserve System.
Note: Values shown are ratios of year-end debt outstanding to fourth-quarter GNP (at seasonally adjusted annual rates).

1962, and to date no one has voiced serious concern over the government's ability to meet its obligations.

Taggart (1985) has pointed out that, among private borrowers, sector-aggregate debt ratios in the 1980s have reached record levels for households but not for businesses. Precise comparisons to the prewar (and pre-Depression) experience are difficult to draw for several reasons, of which the most immediate in this context is that a greater fraction of the nation's business activity is now conducted via corporations than was the case 60 years ago. As table 1.2 shows, however, the combined debt of corporations and unincorporated businesses is still well below the relative level that prevailed during the 1920s.

Just what to make of these comparisons is unclear. Summers's interpretation of the 1980s as mostly a continuation of prior postwar trends is, in the end, un reassuring because of the lack of any benchmark for judging how high is up. Carried to its logical conclusion, this argument implies that no level of debt compared to income would be worrisome as long as borrowers got there by increasing their indebtedness along a continuation of their respective postwar trend lines. Nor is Taggart's comparison to the 1920s ultimately persuasive in light of the debt default experience of the 1930s.

1.3.2 Perspectives on Firm Behavior

In contrast to these arguments on the basis of aggregate data, Jensen (1984, 1986, 1988, 1989a, 1989b) has developed a series of arguments about the behavior of individual firms, all to the effect that the nature of the transactions by which U.S. corporations have substituted debt for equity in the 1980s is such as to minimize, or even alleviate altogether, the risks that have normally been attendant on high indebtedness in the past.

First, Jensen has argued that the “value” created for investors in leveraged buy outs and other forms of corporate acquisitions—value that is apparent in the typically large premium paid over the previously prevailing market price of the acquired firm’s stock—is a reflection of prospective gains in operating efficiency. In the case of leveraged buy outs in particular, Jensen has argued that these gains in efficiency are due to the replacement of an inferior organizational form of management, the conventional large (and often diversified) corporate structure, with the superior organizational form represented by the “LBO association.” Further, even apart from changes in organizational form, Jensen’s “free cash flow” theory of corporate behavior holds that a higher debt level increases managers’ incentive to achieve operating efficiencies: “Debt creation, *without retention of proceeds of the issue*, enables managers to bond their promise to pay out future cash flows. . . . The exchange of debt for stock helps managers overcome the normal organizational resistance to retrenchment that the payout of free cash flow often requires. The threat of failure to make debt-service payments serves as a strong motivating force to make such organizations more efficient” (Jensen 1988, 29–30; emphasis in original.)

While this first argument implies that increased earnings are likely to be forthcoming to support firms’ newly increased leverage, Jensen has also presented a second argument to the effect that the highly levered capital structure itself reduces creditors’ incentive to force liquidation of the firm in the event that the anticipated efficiency gains and consequent higher earnings do not materialize. The heart of this claim is that higher leverage also increases the value at risk in any bankruptcy proceeding, which in turn “provides larger incentives to bring about private reorganization outside of the courts” (Jensen 1989a, 413). Hence even if the firm fails to achieve greater efficiency and faster earnings growth, and therefore cannot meet the increased debt-service payments promised, the outcome is unlikely to be a traditional default and bankruptcy of the kind that in the past has resulted in workers laid off, orders to suppliers canceled, and losses recorded on creditors’ balance sheets.

Third, Jensen has also argued that several recent advances in financing technology have further reduced the likelihood of a bankruptcy that would result in any of these undesired outcomes. One example is the use of “strip financing,” in which each participant in a reorganization purchases an identical set of (inseparable) claims against the firm, ranging from secured debt to senior unsecured debt to junior unsecured debt to equity. The object of strip financing, from this perspective, is to make the creditors senior to any possible dividing line identical to those junior to it and thereby to preclude the emergence of an adversarial situation that could lead to one party’s putting the firm into bankruptcy. Examples of other financial innovations that reduce the ordinary risks attendant on high debt-service ratios are the purchase of interest rate “caps,” which limit the potential increase in payments that a firm is obligated to make, and “swaps,” which in effect convert nominally floating rate debt into fixed-rate debt.

Roach (1989) has advanced an additional argument that further buttresses Jensen's confidence that the corporations that have greatly increased their leverage in the 1980s have, for the most part, done so under specific circumstances that do not represent greater financial fragility. According to Roach's data, firms involved in leveraged buy outs have been disproportionately engaged in lines of business typically subject to smaller than average fluctuation of earnings over the course of ordinary business cycles. Food and tobacco companies, for example, accounted for more than 20% of all LBO transactions effected during 1978–88 (measured by dollar size), and companies in retail trade accounted for nearly another 19%. By contrast, such cyclically sensitive industries as mining, construction, and manufacturing of most durable goods have experienced relatively less LBO activity. As a result, the exposure of the newly leveraged firms to potential inability to meet their debt-service payments in the event of recession should be smaller than if these firms had been uniformly distributed throughout the U.S. corporate business sector.

Once again, it is difficult to know what confidence to place in these arguments. As of the time of writing, it appears as if new patterns of LBO activity are beginning to deviate from the concentration on noncyclical industries emphasized by Roach.⁹ (The two most recent large transactions both involve airlines.) Because Jensen's arguments are strictly forward-looking, however, they are much more difficult to evaluate.

1.3.3 International Comparisons

Finally, yet another line of argument downplaying the significance of the great increase in business indebtedness in the 1980s has emphasized the fact that, even today, most U.S. corporations remain less highly leveraged than their European or Japanese counterparts.¹⁰ If businesses elsewhere can sustain much greater debt burdens, the reasoning goes, why cannot ours?

Simple comparisons between corporate capital structures here and abroad fail to take into account differences in the institutional, legal, and philosophical environment that are potentially of great significance in this context. Foreign financial markets and financial institutions are typically structured very differently than those in the United States. Ownership of corporate debt and equity securities is typically more highly concentrated than it is here, and—unlike the case in the United States—major lenders are also often major equity holders in the businesses to which they lend. As a result, the entire relationship between the financial sector and nonfinancial industry has a sharply different character.

9. Fox (1990) has shown that firms undergoing leveraged buy outs before around 1986 differed in this and other respects from those that have done so since then.

10. As French and Poterba (1989) have shown, however, because of the great increase in Japanese equity prices in the 1980s, since 1986 the market-value debt-equity ratio of the average corporation has been *lower* in Japan than in the United States.

At the same time, foreign attitudes toward competition versus cooperation (or even cartelization) within industry have traditionally differed from attitudes in the United States. So have attitudes toward the relationship between the private sector as a whole and the government, including, in particular, the willingness of both financial institutions and nonfinancial firms to accede to various forms of governmental guidance. In some cases, a close corollary of this willingness has been a different set of presumptions about the government's readiness to intervene, if necessary, to rescue distressed private firms.

No one knows just how important any or all of these differences have been in accounting for the historically higher leverage of European and Japanese firms. Much systematic research needs to be done on such questions. The findings of that research may indicate, for example, that specific changes in U.S. legal and institutional structures would be useful, in that they would then permit corporations to adopt, with safety, debt burdens more nearly comparable to those abroad. In the absence of such changes, however—indeed, in the absence even of knowledge about just which differences between institutions here and abroad are most important in this regard—the simple fact that U.S. corporations' debt burdens have not yet risen as high as those of foreign firms is also not reassuring.

1.3.4 Bankruptcies and Defaults in the 1980s

Given the uncertainty surrounding each of these disparate sets of arguments, the actual record of bankruptcy and default by U.S. businesses in the 1980s may be instructive. As figure 1.5 shows, this experience has already been beyond all prior comparable experience since World War II, despite the sustained economic expansion that began in 1983. Bankruptcies and defaults have usually increased during and immediately after business recessions, but in prior postwar experience both had then fallen back to pre-recession levels not long after the recession ended. After the 1981–82 recession, however, both bankruptcies and defaults continued to rise for four years during the ensuing expansion, and even by 1988 the bankruptcy and default rates remained far above any previous postwar level.¹¹ (By contrast, neither the level nor the persistence of delinquencies on consumer loans was at all out of the ordinary during or following the 1981–82 recession.)

The fact that not only the business failure rate but the default rate too have been extraordinary in the 1980s is of particular significance. Popular discussion of the increase in business bankruptcies has sometimes suggested—erroneously—that this phenomenon is merely the reflection of an especially fertile climate for new business start-ups created by tax reduction and deregulation since 1980. Since new start-ups are much more likely to fail than

11. The data shown are the number of bankruptcies per 10,000 concerns, and the dollar volume of liabilities in business failures expressed as a percentage of gross national product. Data are from Dun and Bradstreet. I have adjusted values plotted for 1984–88 for a series break after 1983.

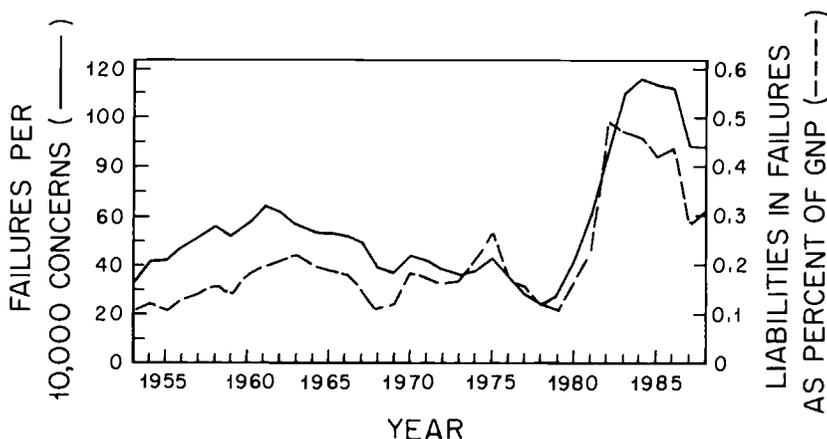


Fig. 1.5 Bankruptcy rates and default rates, 1953–88

Source: Dun and Bradstreet; coverage does not include all industry sectors.

going concerns, any period in which start-ups increase rapidly will also be a period in which failures increase rapidly, and hence the higher failure rate in the 1980s is supposedly a healthy sign rather than a danger signal. If all that were true, however, the failure rate would be high but not the default rate. New start-ups typically do not have large amounts of liabilities. (Moreover, popular impressions notwithstanding, it is also not true that the pace of business start-ups was unusually rapid in the 1980s. The number of new businesses incorporated each year rose at just 2.7% per annum on average during 1980–89, vs. 6.0% per annum during 1950–80.)¹²

The specific default experience of the high-yield unsecured debt (“junk bonds”) typically issued in the course of leveraged buy outs and other corporate acquisitions has in particular been subject to substantial debate. Most researchers have agreed that the overall default rate on such securities has been modest.¹³ By contrast, Asquith et al. (1989) have shown that this finding hinges on the great increase in the volume of such securities issued in recent years, together with the tendency for most defaults to occur only several years after the time of issue. Although the default rate for high-yield bonds that have been outstanding for several years or more is high, the “universe” of bonds outstanding at any point in time consists disproportionately of bonds issued only recently, and therefore exhibits only the familiar modest default rate *overall*.

Table 1.3, reproduced from Asquith et al. (1989, table 2), shows that the cumulative default rate, measured for bonds issued *in each year* rises from

12. The data are from Dun and Bradstreet.

13. See, e.g., Altman and Nammacher (1985) and subsequent annual issues.

Table 1.3 Aged Defaults for High-Yield Bonds Grouped by Year of Issue

Issue Year	1st	2d	3d	4th	5th	6th	7th	8th	9th	10th	11th	12th	Total
<i>Panel A: % of Par Amount Defaulted in nth Year After Issue:</i>													
1977	.00	.00	.00	.00	.00	.00	.00	7.71	3.63	19.27	3.30	.00 ^a	33.92
1978	.00	8.32	.00	1.39	.00	7.91	4.85	3.12	5.55	1.39	1.73 ^a		34.26
1979	.00	.00	5.54	1.11	2.38	6.73	1.98	.00	5.78	1.19 ^a			24.70
1980	.00	.57	2.45	.00	.00	13.90	6.30	1.88	2.45 ^a				27.56
1981	.00	6.05	.00	8.06	6.85	.00	.00	.00 ^a					20.97
1982	1.00	2.41	1.61	11.49	.00	9.44	.00 ^a						25.94
1983	.00	.00	6.08	7.83	4.80	.50 ^a							19.21
1984	2.29	1.99	2.03	3.06	.00 ^a								9.38
1985	.00	.80	2.28	.45 ^a									3.53
1986	2.73	3.84	1.57 ^a										8.14
<i>Panel B: Cumulated % of Par Amount Defaulted for x Years After Issue:</i>													
1977	.00	.00	.00	.00	.00	.00	.00	7.71	11.34	30.62	33.92	33.92 ^a	33.92
1978	.00	8.32	8.32	9.71	9.71	17.61	22.47	25.59	31.14	32.52	34.26 ^a		34.26
1979	.00	.00	5.54	6.65	9.03	15.76	17.74	17.74	23.52	24.70 ^a			24.70
1980	.00	.57	3.03	3.03	3.03	16.93	23.22	25.10	27.56 ^a				27.56
1981	.00	6.05	6.05	14.11	20.97	20.97	20.97	20.97 ^a					20.97
1982	1.00	3.41	5.02	16.51	16.51	25.95	25.94 ^a						25.94
1983	.00	.00	6.08	13.91	18.71	19.21 ^a							19.21
1984	2.29	4.28	6.32	9.38	9.38 ^a								9.38
1985	.00	.80	3.08	3.53 ^a									3.53
1986	2.73	6.57	8.14 ^a										8.14

Source: Asquith et al. (1989).

Note: In this table an n th year default is defined as a default within $n \times 365$ days of the issue date. High-yield bonds are all bonds rated below investment grade at issue date by Moody's and Standard & Poor (S&P). Defaults are defined as a declaration of default by the bond's trustee, filing of bankruptcy by the firm, or assignment of a D rating by S&P for a missed coupon payment.

^aMay be incomplete, i.e., entire sample may not have been outstanding for x years.

only 3%–8% after three years to 25%–33% after 10 years. Nevertheless, with \$31 billion of junk bonds issued in 1986 and \$13 billion per annum on average in 1984–85 versus only \$1 billion per annum on average during 1977–82, the overall default rate for all bonds issued during 1977–86 remains just 8%. No doubt the patterns shown in table 1.3 reflect not just the passage of time per se but also the fact that firms issuing bonds since 1983 have not had to face the burden of meeting debt-service payments during a recession. At least until the next recession occurs, however, separating out these two factors will remain difficult if not impossible.

1.4 Focus on the Banks

The evidence and arguments presented in sections 1.2 and 1.3 bear entirely on the question of whether, and under what circumstances, the borrowers that have taken on greatly enlarged debt-service burdens in the 1980s may be unable to meet their commitments. In some contexts—for example, setting the right price on junk bond portfolios or evaluating the prospects for specific borrowers or even specific industries—this is all that matters. From the broader perspective of assessing the likelihood of financial crisis, however, the ability of *lenders* to absorb portfolio losses is also crucial. Given the history of financial crises, the strength of those lenders that also function as financial intermediaries is of particular importance in this regard.

Financial crises in the past have invariably involved not just debt defaults by nonfinancial borrowers but either the threat or the actuality of a rupture of the financial system. Indeed, as long as financial intermediaries continue both to create deposits and to extend credit, the economy as a whole is likely to remain insulated from a cumulative default experience capable of sharply curtailing nonfinancial economic activity. After all, that is why the “lender of last resort” policies of central banks (and, occasionally, other governmental agencies) usually focus on avoiding the failure of financial institutions, even though their underlying public policy objective is far broader. Although the solvency of the U.S. financial intermediary system has already received enormous attention elsewhere—banks, primarily, in the context of loans to developing countries, thrift institutions in the context of the recent plague of insolvencies and the subsequent multihundred billion dollar bailout—the issue is important enough to warrant at least some attention here as well.

Table 1.4, adapted from Brumbaugh et al. (1989), shows how the \$2.9 trillion of assets—and hence deposits—held as of September 1988 at all U.S. commercial banks of size greater than \$50 million was distributed among banks according to each bank’s ratio of risk-adjusted capital to total assets.¹⁴

14. See Brumbaugh et al. (1989), table 5. “Risk-adjusted capital” is defined as equity plus perpetual preferred stock plus subordinated debt and limited preferred stock, minus investments in unconsolidated subsidiaries.

Table 1.4 Distribution of Bank Assets by Capital-Asset Ratio

Ratio of Risk-adjusted Capital to Total Assets	Number of Banks	Assets (\$)
Negative	28	22.5
0%–3%	48	43.4
3%–6%	150	926.0
6% +	5,094	1,894.5
Total	5,320	2,886.4

Source: Brumbaugh et al. (1989).

Note: Asset figures are in billions of dollars. Data are for September 1988.

Almost \$1 trillion of this total was held at banks with capital-asset ratios below 6%, and, in some cases, far below that percentage even with all bank assets counted at full book value.

What makes this situation either more or less likely to lead to a potential problem, depending on one's perspective, is the extreme concentration of this \$1 trillion of assets among the nation's largest banks. Individual banks' year-end data for fiscal years ending in 1988 showed a total of \$833 billion of assets—well over a quarter of the \$2.9 trillion shown in table 1.4—held by the largest 15 banks. Again with all bank assets counted at full book value, these banks had capital-asset ratios ranging from 1.49% (NCNB of Texas) to 6.89% (Morgan Guaranty Trust Co.). The average capital-asset ratio for all 15 banks, weighted by assets, was 4.34%. But merely assuming a reserve for LDC loan losses equal to 50% of each bank's exposure reduced the average capital-asset ratio for the group to 3.17%, and for the more exposed banks the erosion consequent on allowing a 50% reserve against LDC loans was even greater. For Manufacturers Hanover, for example, allowing this reserve reduced the capital-asset ratio from 5.31% to 1.44%. Doing so for Bank of America reduced its ratio from 3.71% to 1.48%.¹⁵

Further, these same banks are also among the most heavily committed to financing leveraged buy outs. As of the most recent available data, 12 of the nation's 15 largest banks each had more than \$1 billion in LBO exposure, including loans already outstanding plus unfunded commitments. Total exposure among these 12 amounted to \$37 billion—more than their combined total capital, even including all LDC loans at full book value. Manufacturers Hanover, for example, which had \$3.3 billion of capital as reported, or only \$900 million after allowing a 50% reserve against LDC loans, had \$5.1 billion in LBO exposure including \$3.5 billion of loans already outstanding. Bankers Trust, which had \$2.6 billion of reported capital, or \$1.5 billion after a 50% reserve against LDC loans, had \$5.0 billion of total LBO exposure including \$3.6 billion in loans already outstanding.¹⁶

15. Data described here are from Brumbaugh et al. (1989), table 6.

16. Data described here are from Quint (1989).

In sum, the largest U.S. banks' holdings of debt issued in the course of leveraged buy outs alone—not to mention other corporate reorganizations also involving the substitution of debt for equity capitalization—already bulks large compared to these banks' thin margins of capital. Because other lenders (e.g., life insurance companies) have also participated heavily in financing corporate reorganizations, while most developing countries have been able to borrow only from banks, banks' total LBO exposure remains well below their total LDC exposure (see Krugman in this volume). Nevertheless, exposure to risk via LBO debt and other high-leverage corporate situations has grown to a magnitude that also represents a potential problem in the event of any systemic default experience. Moreover, the circumstances under which large numbers of highly levered U.S. corporations would be unable to meet their obligations—a severe business recession, for example—overlap considerably with circumstances under which many developing countries would find servicing their debts even more problematic than is already the case.

By contrast, debt securities issued in corporate reorganizations are apparently less of a factor in the current troubled situation of U.S. thrift institutions. The Garn–St. Germain Depository Institutions Act of 1982 authorized federally chartered thrift institutions to hold up to 11% of their assets in junk bonds, and state-chartered institutions have faced more generous limitations in some cases. California, for example, in principle imposes a 15% limit (although one large California institution had 29% of its consolidated assets in junk bonds as of March 1988). Nevertheless, as of September 1988 only 161 of the more than 3,000 FSLIC-insured thrift institutions owned any junk bonds at all, and among those that did, in most cases their holdings were well within these limits.

Thrifts that became insolvent in 1987, for example, held only 0.2% of their combined total assets in junk bonds, and only 1.9% in commercial loans of all kinds (see Brumbaugh et al. 1989, table 13). As of September 1988, all thrift institutions combined held only \$13 billion of junk bonds, or about 5% of the universe of junk bonds outstanding. These holdings were highly concentrated, with 76% of the thrift industry total held at just 10 institutions and 91% at 25 institutions. Although this concentration pattern raises questions about the few institutions that do have junk bond holdings, a recent GAO inspection found no apparently greater risk of insolvency at these institutions on that account (see General Accounting Office 1989). Indeed, some of the 10 thrift institutions with the largest junk bond holdings have been unusually profitable.

1.5 Summary of Conclusions

The evidence and arguments reviewed in this paper support several specific conclusions. First, financial crises have historically had a major role in large fluctuations in business activity. A financial crisis has occurred either just

prior to, or at the inception of, each of the half dozen or so most severe recorded declines in U.S. economic activity. Before World War II financial crises occurred in conjunction with most other business downturns as well.

Second, the proclivity of private borrowers to take on debt in the 1980s has been extraordinary by postwar standards. Among business borrowers, including especially corporations, much of the proceeds of this surge in debt issuance has gone to pay down equity (either the borrower's or another company's) rather than to put in place new earning assets. As a result, interest payments have risen dramatically compared to either earnings or cash flow. The corporate business sector's debt-service burden, relative to either earnings or cash flow, rose to record highs in the early 1980s and has remained at record levels despite sharp declines in nominal interest rates and a sustained expansion of business profits.

Although there are arguments both for and against the view that this increase in business leverage raises the prospective threat of widespread default in the event of a generalized decline in earnings, as would presumably occur during a major recession, a third conclusion that is clear from the record to date is that the rate at which U.S. businesses have gone bankrupt and defaulted on their liabilities in the 1980s is already far out of line with any experience since the 1930s. The business failure rate not only rose to a postwar record level during the 1981–82 recession but—in contradiction to prior cyclical patterns—continued to rise through the first four years of the ensuing recovery. The volume of defaulted liabilities, measured relative to the size of the economy, behaved in a parallel way (thereby contradicting the notion that the businesses that failed were primarily new start-ups, of a small enough size not to matter much from the perspective of systemic risk).

Fourth, the largest U.S. banks' exposure to debt issued in the course of leveraged buy outs or other transactions substituting debt for equity capitalization now exceeds their risk-adjusted capital, even with all bank assets (including loans to developing countries) counted at book value. Although this exposure is not (yet) as large as that due to banks' LDC loans, the two sets of risks are not independent.

The implications of these developments for public policy in the United States are, at least potentially, profound. If these trends of the 1980s together constitute an increase in the economy's financial fragility, they increase not only the likelihood that the government will have to act in its capacity as lender of last resort but also the likely magnitude of lender-of-last-resort action should such be necessary. The responsibility for such actions has been decentralized since the 1930s, however, and some of the responsible governmental agencies are themselves less secure than used to be the case. For example, the gross insufficiency of the FSLIC's resources has already necessitated a multihundred billion dollar bailout of insolvent and potentially insolvent thrift institutions, a bailout which is to be financed in large part by new federal government borrowing. And in both 1988 and 1989, the FDIC

experienced losses—in other words, had to draw down its capital—for the first time since its inception in 1934. Responding to a renewed insolvency problem in the thrift industry, or, even more so, to a proportionately equivalent problem in the commercial banking system, would therefore be extremely challenging.

At the same time, the Federal Reserve System also retains some responsibility to act in a lender-of-last-resort capacity. Indeed, the basic rationale for the system's creation, stated clearly in the 1913 Federal Reserve Act, was "to provide an elastic currency"—precisely so as to avoid financial crises. Should the exercise of this responsibility become necessary, doing so in a fashion consistent with other Federal Reserve objectives, like maintaining price stability, will also be challenging to say the least.

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2. *E. Gerald Corrigan*

The Risk of a Financial Crisis

I am delighted to contribute to this important volume if for no other reason than to find that I am not alone in my worries about the vulnerabilities of the economic and financial system. I should also say at the outset that the three background papers prepared by Ben Friedman, Paul Krugman, and Larry Summers have bolstered my confidence in the work being done by academic economists. All three papers are first rate; they are readable, coherent, institutionally sensitive but, most of all, they offer pragmatic guidance to someone like me who must bridge the gap between theory and practice. What is also striking about these three papers is that none dismisses the possibility that a serious financial disruption could occur, although each comes to that view from a somewhat different vantage point.

Overview

My task, as I understand it, is to add something of my own personal perspective to the discussion as a whole. With that in mind, let me start with several general comments.

First, all three of the background papers grapple with the definition of “crisis,” and to varying degrees they attempt to distinguish between types of crises. While I have great difficulty coming up with neat definitions in this area, some useful distinctions can be made. For example, “financial disruptions” can be distinguished from “financial crises” by means of the extent of the damage they inflict on the real economy. That is, the term “crises” should be reserved for those episodes that cause clear and significant damage to the real economy. However, even that distinction may be misleading in that it may ignore or unduly play down the extent to which a financial disruption has the potential to inflict serious damage on the real economy if left unattended or if handled irresponsibly.

Second, with the above distinction in mind, my personal perspective is one that is tempered by direct experience in dealing with quite a few financial disruptions but no financial crises since even the 1987 stock market disruption seems to have had little or no effect on the real economy. However, as suggested above, the line between “disruption” and “crisis” can be fine indeed since it is not at all difficult to imagine circumstances in which specific “disruptions” of the past 10 or 15 years could have tripped into the category of “crises.” Indeed, I can readily think of a number of examples of “financial

Due to the press of events, E. Gerald Corrigan was not able to attend the October 1989 conference. This paper was submitted subsequently for inclusion in the published record of the conference.

disruptions” that clearly had at least the potential for causing serious if not systemic damage.

Some might feel that this is an exaggeration. Perhaps so, but the hard fact is that when the phone rings, informed judgments have to be made and often they have to be made very quickly in the face of limited and conflicting information. Those initial judgments almost always center on an assessment of whether a given situation has systemic implications and, if so, the nature and extent of such implications. Those initial assessments are also always made in a context in which you know that losses and even failures provide a necessary element of discipline to the system. Thus, efforts to protect the system should not protect those whose miscalculations or misdeeds caused the problem in the first instance.

Third, as I see it, the past 15 years have witnessed a greater number of financial disruptions with potential systemic implications than was the case over the postwar period before 1974. And, if we divide the 1974–89 period roughly in half, the latter half of that interval has seen more disruptions than the former, especially in a context in which the last seven years have been characterized by uninterrupted economic expansion—a point Ben Friedman stresses above. At the risk of oversimplification I believe there are three reasons why the past 15 years have seen such a high incidence of financial disruptions: first, macroeconomic policies and performance—perhaps especially the tacit acceptance of deficits, debt, and inflation—have contributed both directly and indirectly to elements of volatility and risk taking in financial markets and in other elements of economic activity; second, financial innovation and technological advances in financial markets are two-edged swords. These developments clearly provide important new choices and benefits to savers and investors alike, but they are also the source of new elements of risk and volatility; finally, there is far, far too much emphasis on short-term returns and rewards, surely here in the United States, but elsewhere as well.

The *last* general point I would make is that I believe that, looking forward, the risks of financial crises—as distinct from financial disruptions, which are sure to occur—are something more than zero. Since that may be interpreted as a provocative statement, I will elaborate. It is probably fair to say that automatic stabilizers and other institutional changes have—as suggested in all three background papers—reduced the statistical probabilities of a financial disruption turning into a crisis. But, and this is a very big but, if a crisis were to develop, I believe its capacity to generate major damage to the real economy may be greater today than it was in the past. The fundamental reason for this is the nature, speed, and complexity of the operational, liquidity, and credit interdependencies that bind together all major financial institutions and markets in the world. In Bagehot’s day, and long before, the first precept in banking and finance was, “Know your counterparty.” Today, that is not nearly good enough. Indeed, in Bagehot’s day, the managers of financial institutions understood very well the nature of the transactions that were generating in-

come and profits; today that is often not the case. That, of course, raises the question of whether financial management has fully caught up with today's incredibly complex financial marketplace.

Some Diagnostics of Recent Financial Disruptions

Against that general background let me now turn to some diagnostics of the financial disruptions to which I have had some direct exposure over the past 15 years to see what common denominators—if any—may be present. Such an exercise may be helpful in identifying approaches and policies that, at the very least, can help check problems when they arise but maybe—just maybe—also help in the formulation of approaches that can reduce the incidence of such disruptions.

I have already touched on the first factor I want to cite in this regard; that, of course, is macroeconomic policy and performance. There is no question in my mind that the seeds of many of the financial disruptions we have seen in recent years were sown in the decade between 1969 and 1979, when attitudes about inflation were all too sanguine. More recently we have made the implicit decision that we can live with huge internal and external deficits and corresponding high levels of public and private debt. Directly and indirectly, the resulting economic and financial environment produces patterns of behavior and expectations that surely work to increase risk and fragility in the financial system.

The second factor I would note is concentrations of activities or exposures by financial institutions. Concentrations take many forms: exposures to a single borrower, exposures to a single industry, exposures to a single instrument, exposures to a single class of borrower, or exposures to a single commodity. However defined, I am hard-pressed to think of a single episode of financial disruption in recent years that did not entail some element of concentration on the part of the institution or institutions that got into trouble.

A third factor is what Paul Krugman calls the “bandwagon” effect. Beyond its obvious forms, there is a curious twist on this phenomenon. Namely, financial innovations (new instruments, trading strategies, etc.) that initially produce high rates of return for the innovator tend to be very short-lived in the financial sector because they are so easy to duplicate. However, the bandwagon effect, reinforced by the illusion of permanent high rates of returns, tends to draw relatively unsophisticated players into such activities at just the wrong time. As a further extension of the bandwagon effect, there is another phenomenon which I call the “illusion of liquidity.” That is, the belief—obviously unfounded—held by many market participants that they are that much smarter, that much quicker, or that their stop-loss strategy is that much better, that they will be able to take profits and get out when markets turn while others take the losses.

A fourth factor that has been present in most financial disruptions of the past 15 years is the threat of dislocation in payment, settlement, or clearing systems. This has been reasonably well documented in the case of the stock market crash, but very difficult and potentially very serious problems with payment and settlement systems have also been encountered in other episodes over the past 15 years. For example, both the Herstatt situation in 1974 and the silver market disruption in 1980 presented major problems of this nature. Needless to say, payment and settlement systems are of special importance because such systems can be the vehicle through which a localized problem can very quickly be transmitted to others, thereby taking on systemic implications.

A fifth factor I would cite, but with some trepidation, is the possibility that financial markets—or at least some segments of financial markets—may be characterized by a condition of overcrowding such that spreads and returns do not fully compensate for risks. In saying this, I know full well that the textbooks would say this condition cannot exist for long. The textbooks would also say that the solution to overcrowding is exit—graceful or otherwise. That is of course, one of the things I worry about. Namely, if the overcrowding hypothesis is correct, can the implied shrinkage and consolidation occur in an orderly way, when we recognize the fact that financial institutions are not gas stations?

A sixth factor that must be mentioned is plain old-fashioned greed, which in all too many cases has given rise to fraud and other elements of criminal activity. Indeed, we have seen cases in which widespread violations of criminal statutes have occurred; there are numerous other examples of reckless and irresponsible behavior that I find utterly shocking. Needless to say, the problem of blatantly excessive risk taking is more likely to be a problem in the case of thinly capitalized institutions since the owners have so little to lose if things go sour.

A seventh and final factor that must be cited relates to supervisory gaps or, even worse, breakdowns in the supervisory process. The worst example of this, by far, is to be found in the thrift industry situation, which saw not only a breakdown in the supervisory process but a public sector “bailout” of incredible proportions. However, the silver market disruption, the Ohio thrift problem, and the stock market crash all revealed at least some troubling elements of supervisory gaps or shortcomings in the supervisory process itself. Even today, I regard the absence of any form of consolidated oversight of major securities companies as a defect in the supervisory framework in the United States.

In this context, I am mindful that questions have also been raised about the effectiveness of the bank supervisory process in cases such as that of Continental Illinois and the major Texas bank failures. More specifically, the question is often asked as to why the bank supervisors were not able to identify

and stop the patterns of behavior that gave rise to these problems before they reached the proportions that ultimately caused failures and large costs to the deposit insurance fund.

While each of the financial disruptions of the past 15 years is very distinct, every episode I can think of had elements of most of the seven factors listed above associated with it. Having said that, I wish to stress that the diagnostics of financial disruption are useful only up to a point. What may be even more important are the traits of firms or markets that have generally avoided problems or the patterns of behavior that have permitted firms to overcome problems without reliance on public funds or other forms of public support. Here it is clear that comfortable margins of capital and liquidity, combined with diversification of activities and exposures and strong management and control systems, are the keys to success in avoiding problems and overcoming them when they arise.

Some Myths about Financial Disruptions

Having shed some light on common denominators that have been present in most if not all of the financial disruptions of the past 15 years, I would now like to turn my attention to several of what I regard as popular myths that tend to be associated with the folklore of financial disruptions. I will cite seven such myths.

First, there is the view that systemic concerns are uniquely associated with large financial institutions or, more particularly, large banks. That is simply not true on two counts: first, large securities houses present many of the same systemic issues that arise with large banks; and second, troubled institutions need not be large *or* be banks to raise systemic concerns. The best illustration of this is to be found in the chain of events triggered in 1985 by the failure of E.S.M., a small government securities firm in Florida. That seemingly inconsequential failure triggered the Ohio and Maryland thrift problems and the failure of B.B.S. (a small government securities dealer in New Jersey), placed in jeopardy several insurance companies, and came very close to producing full-scale gridlock in the entire mortgage-backed securities market. This sequence of events produced headlines in newspapers throughout the world, uncovered hundreds of millions of dollars in losses for the affected institutions, and resulted in a number of individuals being convicted of criminal violations. However, none of the institutions involved was “large,” none was a bank, and none had federal deposit insurance. Yet by any definition, the sequence of events had the clear potential to produce systemic damage.

The second myth I want to touch on is the bank “bailout” myth in general and more specifically the “too-big-to-fail” myth. For these purposes I want to draw a sharp distinction between banks and thrifts because I believe it important that the banking sector not be penalized unjustly by virtue of the problems

in the thrift industry and the extraordinary blend of circumstances that gave rise to those problems.

In banking, as historically defined, the term “bailout” is a misnomer, and I believe there is more to the distinction than semantics. In point of fact, banks—including large banks—have failed, and, in the process, the shareholders and management have not been bailed out. To be sure, the process of closing, merging, and/or recapitalizing problem or failed banks has cost money, but the funds used for these purposes have, virtually without exception, been provided out of the deposit insurance fund, which is funded by the banking industry itself.

Having said that, there is no question that large, financially troubled institutions present special difficulties simply because they, by definition, carry with them greater systemic risks and greater threats to public confidence. For these reasons, governments at all times and in all places have been reluctant to run the risks of the sudden and uncontrolled failure of large depository institutions—a pattern we see even in countries that have no formal deposit insurance system. The problem, however, is not so much that large institutions are too large to fail, for large institutions have failed. Rather, the problem is that authorities are reluctant to tolerate the sudden and uncontrolled failure of large institutions and therefore generally opt for managed shrinkage, merger, or recapitalization in a context in which shareholders and management are generally wiped out.

Viewed in that light, neither equity holders nor senior managers of failed institutions—including large institutions—have any reason to believe they will be “bailed out.” Yet, we are all acutely sensitive to the so-called moral hazard problem which, in effect, postulates that banking and financial market participants take on undue elements of risk in the belief that public authorities will somehow protect them from the risks of loss and/or failure.

There can be no doubt that the moral hazard problem is quite real, just as there can be no doubt that the failure of large institutions presents special problems for the authorities. However, neither of these considerations need imply that any institution is too large to fail or that owners and managers—at the least—of such institutions will not be severely penalized by virtue of such failures. Perhaps the balance of risks and rewards is somewhat out of kilter—at least at the margin—but even if this is true, it does not justify the all too widely held view that the authorities in this country—to say nothing about other countries—systematically and irresponsibly bailout financial institutions, small or large. That is not to say, however, that there is not greater room in the process for market discipline, for surely there is.

The third myth I want to comment on is the one that says disclosure—or more disclosure—is something of a panacea that can solve the market discipline problem. While I am obviously all in favor of disclosure, I think it is sheer fantasy to assume that individual investors and depositors—and perhaps even large and relatively sophisticated investors and depositors—can make

truly informed credit judgments about highly complex financial instruments and institutions. Even now, we may have a condition of information overload in a setting in which even the professional rating agencies have their problems. Continental Illinois and the major Texas banks were investment-grade rated during the time interval in which they were acquiring the assets and the concentrations that led to their demise. Once again, this is not to say that disclosure or better forms of disclosure cannot play a useful and constructive role in helping the market discipline process along, but only to suggest that the benefits of even the most optimal forms of disclosure are not as great as is assumed by many commentators.

Fourth, there is the view that fire walls are fail-safe and can fully insulate the insured depository or the registered broker-dealer from the misfortunes of its parent or affiliated companies. Not only is that view highly questionable in practice but, in the extreme, fire walls can increase risk rather than contain it. That is if we depend excessively on legislative or regulatory fire walls we may encourage riskier types of behavior or we may construct barriers that stand in the way of prudent intracompany flows of liquidity or capital that can, in particular circumstances, help to minimize problems. Because of this, I believe strongly in the principle of consolidated supervision, and I resist the combinations of banking and commercial firms. Finally, while fire walls may work the wrong way on safety and soundness grounds, I do believe they play a very necessary and useful role in limiting conflicts of interest and unfair competition.

While on the subject of fire walls, I should also acknowledge that in the eyes of many practitioners the presence of complex regulatory fire walls in the context of the bank holding-company structure places U.S. firms at a significant competitive disadvantage in relation to their international competitors. While there is something to this view, it is very difficult to judge how important this factor may be in competitive terms. What is clear, however, is that the differences in structure do introduce political tensions in the application of national treatment principles to banking and securities firms operating in foreign markets.

Fifth, there is a myth that market participants, or even the central bank, can readily distinguish liquidity problems from terminal financial problems in the very short run. This is simply not always the case. This reality has enormous implications for the way market participants will behave in the face of uncertainty. For example, had it been clear from the outset that the stock market crash of 1987 would not result in any solvency problems of consequence, the near-gridlock conditions that prevailed in financial markets at times in the days after October 19 would not have occurred. However, in the face of uncertainty, market participants may tend to hold back on credit extensions, delay payments, or hold back on the delivery of securities or collateral, such as suggested in Larry Summers' October 1991 scenario. Unfortunately, in these circumstances what may start out as a liquidity problem can all too easily

become a far more serious problem, ultimately giving rise to the risk of failures or insolvencies.

The inability to distinguish liquidity from solvency problems in the very short run can also have implications for the supervisors and the lender of last resort. For the supervisor, the problem can be the legal and policy ramifications of closing or taking over a troubled institution in a context in which it may be clearly capital deficient but not so clearly insolvent. For the lender of last resort, there is the danger of violating Bagehot's first principle of "never lending to unsound people." I might add in this context that the problem of distinguishing between liquidity and solvency becomes all the more difficult in a globally integrated financial system in which large institutions may have dozens, if not hundreds, of branches, subsidiaries, and affiliates scattered throughout the world.

The sixth myth I want to discuss is the view that there is something fatally and irreversibly flawed with the U.S. system of deposit insurance that, in turn, seriously complicates the moral hazard problem. Here again, I want to focus particularly on commercial bank deposit insurance. The argument is rather straightforward: namely, the mere presence of a system of officially supported deposit insurance—but especially one that has gravitated toward full insurance of all deposits—largely eliminates market discipline and promotes excessive risk taking.

It seems to me that, at least in its extreme form, this argument can be challenged on several grounds: first, in a number of other countries even where there is no system of deposit insurance, the authorities are generally no more willing to allow depositors to incur losses than they are in this country, and, if anything, in many cases they may tend to be more cautious insofar as their willingness to permit banks or other financial firms to fail in a disorderly manner; second, in every case of a severely troubled bank—including those that have overcome problems—we have seen significant deposit outflows. This, of course, suggests that at least some depositors—typically large and/or overseas depositors—do not fully accept the notion of full insurance; finally, as noted earlier, shareholders and managers of failed banks have, in fact, been systematically and seriously penalized for their mistakes.

These remarks should not be construed to imply that I believe that there are no constructive opportunities to strengthen the workings of the deposit insurance system. Rather, the point is that we should be careful in approaching the task of reform. For example, the suggestion of subjecting offshore deposits in branches of U.S. banks to insurance premiums—whatever its merits on other grounds—runs the clear risk of further broadening the appearance of de facto full insurance, thereby changing the behavior of the one class of depositor that clearly exerts a powerful element of market discipline on major banks. I have similar reservations about risk-based deposit insurance premiums on the grounds that they may simply be viewed by some as a license to be even more prone to take risks in their activities.

On the other hand, proposals to deal with the obvious abuses of the brokered deposit market, to find faster and surer ways to merge, close or take over seriously troubled institutions, and to strengthen both the amount and structure of capital, all warrant careful study in a context in which the 1989 Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA) has already put in place a number of constructive reforms. At the end of the day, however, the keys are the factors I cited earlier: abundant amounts of capital—especially equity-like and unencumbered debt capital—and a strong yet flexible supervisory apparatus.

The seventh and final myth I want to mention is the idea that central banks can “solve” financial disruptions simply by providing individual institutions or the market at large with ample liquidity. Before going into this subject further, it is important to recognize that the contemporary central bank can provide liquidity in *at least* two ways; one is the traditional lender-of-last-resort function via the discount window and a second is through open market operations. Depending on the nature and source of the disruption either or both may be appropriate and either or both can provide important elements of flexibility. However, in the face of major uncertainties—especially relating to the credit worthiness of major institutions—there is no guarantee that even the provision of generous amounts of central bank liquidity can necessarily prevent a “disruption” from becoming a “crisis.” Larry Summers’s paper makes it plain that others recognize this possibility when he raises questions about the extent of moral suasion (arm twisting) on major banks in the wake of the October 1987 market break. You will understand why I object to phrases like “arm twisting” but I hope that you will also understand my conviction that in times of stress the central bank must be prepared to provide not just liquidity but also leadership—consistent, of course, with the exercise of individual credit and business judgments by particular institutions in the marketplace. But, for observers and practitioners to assume that central banks have a magic wand of liquidity and moral suasion that can overcome each and every problem is simply wrong and, even worse, dangerous.

Having said all of that, there is another side to the lender of last resort issue which is raised by both Friedman and Krugman. Specifically, Friedman raises the specter that the central bank will have to “cave” on inflation in order to avoid financial disorder, while Krugman suggests the possibility that the process of providing liquidity to contain a financial disruption could trigger an international run on the dollar. These dangers are very real, but I believe it is possible to provide needed amounts of liquidity in the short run without necessarily having to compromise the basic thrust of monetary policy, and I believe that the events of October 1987 can be looked at in precisely that light. Needless to say, however, if a “disruption” tilts into a crisis, the balancing act becomes all the more difficult, although in those circumstances, immediate concerns about current and prospective inflation would be significantly dampened, if not eliminated.

Conclusion

The focus of this paper is diagnostic rather than remedial. Therefore, I will not, at this time, attempt to outline a long or short list of public or private initiatives that could reduce elements of fragility and volatility in financial markets. Nevertheless, throughout the text there are numerous comments that point in the directions in which I believe public policy should be moving. The first would be the importance of sound overall macroeconomic and structural policies, keeping in mind that the roots of many of the financial problems we have seen can be traced to the policy fundamentals—fundamentals that include the need to reform and modernize the structure of the financial system. The second would be that we not lose sight of the fact that the primary burden of securing the safety and integrity of financial institutions and markets lies not with the authorities but with financial market practitioners and, most especially, the directors and senior management of individual firms.

3. *Irvine H. Sprague*

Financial Risks and Crises

First, I would like to congratulate Benjamin Friedman for his concise, lucid, very readable exposition of where we have been, where we are now, and how we got here.

I am particularly pleased to see Hyman Minsky on the program. He and I spoke two weeks ago at a somewhat similar conference of economists at Terni, Italy. To me it was most revealing. After those of us on the panel presented our papers, the moderator would ask for questions from the audience. Someone would come up to the microphone and give a short speech and sit down. Then the moderator asked for another “question,” and so on. Sometimes the speeches related to what we were talking about. I am more used to speaking in the United States where audiences are not reluctant to challenge the speaker or at least to ask a question. I see no shrinking violets in this gathering.

When Martin Feldstein invited me to this conference he said to leave the scholarly research papers to the economists—“just talk about your judgments based on your personal experience,” he said. That I will do.

We all have thought a great deal about where we should go with regulation, supervision, and insurance for the financial industry. I perceive that opinions as they have jelled so far range from reregulation to complete deregulation and from removing all insurance protection to allow “market discipline” to police the system to those who would extend the insurance to 100 percent

coverage for all. I take the middle ground. Leave things as they are for the time being.

There are two hazards in seeking any change, and they are formidable.

My proposal certainly is not what I expected to come up with when I began to think seriously about the process after Congress enacted the thrift bailout legislation this summer. It is a particularly unusual theory coming from one who proudly worked in the White House and who spent more than a quarter century in various positions serving Congress.

My thesis is that the two principal hazards are the president and Congress, and we should avoid any situation that would give them an invitation to meddle. I can illustrate my meaning with two examples.

In 1970, during the days of Regulation Q, we regulators removed all interest rate ceilings on deposits of \$100,000 and up. This was in response to the Penn Central collapse.¹

No problem. This deregulation stayed on the books for a decade with no noticeable adverse impact. Then, in 1980, Congress got involved—disastrously.

Deposit insurance had increased in increments from \$2,500 to \$5,000 to \$10,000 to \$20,000 to \$40,000 over the years. This time, Congress jumped it all the way to \$100,000 in a precipitous and irresponsible move. At the time I proposed an increase to \$70,000 to keep abreast of inflation. The House supported this position, but the Senate was taken in by the savings and loan lobbyists who wanted a vehicle to draw in funds by the billions to their institutions.

We all know what happened. The juxtaposition of \$100,000 insurance coverage and no interest rate restrictions at \$100,000 created an irresistible invitation to speculators and outright crooks. As we know, all interest rate restrictions were lifted during the 1980s, but the damage was done. Sharpies and get-rich-quick operators, as well as serious investors, were already drawn into the savings and loan web, where they would remain until the final disintegration.

After the 1980 legislation, money brokers could put together \$100,000 deposit packages and in all honesty say: “Not to worry—if anything goes wrong the government will be the patsy.” How right they were.

The money brokers did not limit their sales efforts to savings at home. Many banks were closed after money brokers swelled their deposit base. Penn Square, a good example, grew from a \$30 million shopping center bank to a \$500 million disaster.

Greed, of course, was the driving force, but raising the insurance coverage was only step one by Congress. The thrifts now had a vehicle for drawing in

1. To my knowledge this was the only time ever that all 13 regulators have gathered in one room. Federal Reserve Chairman Arthur Burns called us together—seven Fed members, the Comptroller, two others from the FDIC, and three from the Bank Board. We acted unanimously.

deposits; they did not have complete freedom to spend the money they were accumulating.

No problem. Congress obliged in the 1980 law—the one that gave us \$100,000 insurance—with a slight crack in the door for thrifts to expand their horizons, and they opened the door wide and threw away the key two years later in the Garn–St. Germain Act. Now the thrifts could embark on a frenzy of speculation and fraud, gambling with and stealing from depositors' money. Many did.

One line I particularly enjoyed in the Senate committee report on the 1982 bill was a statement that the experience of the deregulated thrifts in Texas was so rewarding that “these benefits” should be extended to all thrifts, state and national chartered alike. Texas as a role model—unbelievable. So much for Congress; now the president.

Drawing up a rescue plan for the thrifts was difficult enough, but it was just about impossible to do it legitimately because of the president's obsession with his ill-conceived campaign pledge of “no new taxes.”

Prior to the 1988 election you economists knew the thrifts were in trouble, but the public could not tell this fact from the administration's silence. The White House managers were terrified at the thought that the true situation would be revealed before the election. Then—surprise—just a week after the election the White House discovered there indeed was a problem and it would cost the taxpayers billions of dollars. How many billions became a moving target as the administration gingerly started with a lowball figure and then scaled the numbers in increments. Today I believe their fantasy is that it can be handled with \$167 billion. Don't you believe it.

When the Financial Institutions Reform, Recovery and Enforcement Act of 1989 was drafted, the president insisted that none of the rescue funds come from taxes that could be *immediately identified* and that none of the cost be counted against the Gramm-Rudman budget ceilings. We were going to spend a great deal of money and pretend it did not happen.

The president's insistence that all the costs be hidden off-budget is already causing problems and will continue to do so. One telling effect is that the taxpayers will be stuck with an unnecessarily large bill, payable, of course, in later administrations. It is too early to know with precision how much the non-tax pledge is going to cost the taxpayers. Certainly plenty.

Knowledgeable people like Dan Rostenkowski and Leon Panetta tried to derail this maneuver, but the bill was being considered on the last day before the August recess and nothing will deter a congressman from catching his plane home for a recess. While running the White House office, I coined the phrase “District work period” for these recesses, so I guess we all resort to deception from time to time.

A “compromise” was adopted. Twenty billion dollars would be on-budget and raised by Treasury. The catch was that all of the money would have to be spent prior to October 1 so it would not count in the Gramm-Rudman compu-

tations. The other \$30 billion would be off-budget and here again it would not count against Gramm-Rudman. How is that for open and honest accounting?

Another provision to dupe the public is allowing the Resolution Trust Corporation (RTC) to borrow on up to 85 percent of the market value of the assets it holds. This allows administration witnesses to testify as they already have, with tongue in cheek, that they have no idea of the true cost of the bail out and will not know until the assets are finally disposed of. Translation: we will not have to confirm the true cost until the next election.

Even more damaging is the provision that chips away at the traditional independence of the FDIC. Treasury now controls two of the five seats on the expanded board, and with the president signaling who will be chairman, the administration gains a heavy hand.

Worse yet, the Office of Management and the Budget (OMB) finally gets some kind of a handle on the Federal Deposit Insurance Corporation (FDIC). For as long as I can remember OMB has tried to squeeze the FDIC, demanding to pre-clear testimony, asking that the number of field examiners be cut back just at the time the banking crisis of the 1980s was unfolding, and generally pecking away at the corporation's independence. We always stopped their efforts, but the financial structuring of the RTC may give them the opening they so long have yearned for.

The FDIC is used to acting quickly, handling as many as six bank failures over a weekend. The RTC already is delaying the process, probably to establish the fact that it is the boss.

An independent FDIC is crucial. The principal reason for the shocking difference between the FDIC and the Home Loan Bank Board was that the FDIC, operating with nonappropriated funds and acting at arm's length from the banking industry, has been able to withstand pressures from Congress, the White House, and the industry they regulated.²

Already the fancy White House maneuvering is coming unraveled. Seeking to meet the October 1 spending deadline for the first \$20 billion, Bill Seidman of the FDIC loaned the \$8 billion he had not yet committed to five thrifts on September 30, just beating the deadline.

The thrifts, selected because they were next in line to be unloaded by the RTC, were to get rid of high cost CDs and buy government securities, which the RTC was to hold as collateral. The deal held for about 24 hours when Treasury Secretary Nicholas Brady ruled that Federal law makes it illegal to invest appropriated funds in interest bearing instruments. This created an acute embarrassment.

Another problem occurs because, in their efforts to hold down the admitted cost of the rescue, Congress and the president did not make any provision for

2. Efforts to crack the FDIC independence recur like clockwork. Don Regan was particularly aggressive in the Interest Rate Deregulation Committee and during the Continental Illinois travails. It was not a party matter. I withstood extraordinary Democratic White House pressure when they wanted to name my general counsel—the person who selects law firms throughout the nation for the very, very lucrative business of representing the FDIC.

working capital. The RTC projections might possibly be accurate, but they do not take into account the fact that the RTC must pay for illiquid assets up front. The asset disposition takes time. Under the FDIC guidelines, now being used by the RTC, an asset is not considered “dumped” if it is marketed for up to six months. Already pressures are building to force the FDIC to hang on to distressed properties for a much longer period.

Seidman told Congress last week that he will need at least \$25 billion in working capital above the amounts provided for in the legislation.

A further problem is created by the fact that Danny Wall’s pumpkin deals in the final hours of the year are coming unraveled and many will probably have to be rerescued at a cost nobody knows. As we all know, a pumpkin deal must be done before midnight or you will turn into a pumpkin.

We always had a rule of thumb when I was with the FDIC—the situation at a failed institution would turn out to be worse than anticipated when you got inside the door for a good look at the books. With nearly 300 thrifts already turned over the RTC and another 300 likely to appear in the near future, there will be a bountiful harvest of surprises.

So we have the threats from two sides—Congress and the president. If any legislation begins to move there is no telling how it would be embellished by these two.

The only sensible solution is to sit back and not support any legislation now. Let the dust settle and see how the situation unwinds. Perhaps we need a radical restructuring of the system, perhaps not. I know the urge to “do something” is in all of us. The hardest task of all is to sit tight.

A final note. Keep criticizing the regulators. It is good for their soul.

In that context I give you a story to think about. After the events surrounding the Continental failure, I was talking with someone who is here today and was told that we should have let Continental close its doors, an opinion shared by many economists. He said: “It would be a great intellectual exercise. We could finally know whether or not the domino theory is true and whether the collapse of a money-center bank really would destroy the economy of the nation.”

4. *Norman Strunk*

The Savings and Loan Story

Even casual readers of the daily newspapers know a lot about the savings and loan problems of the past five years. Much has been written and said with respect to the origins of the problems and the resulting costs both to the thrift system and to the American taxpayer.

Some years ago, I coauthored a book with Fred Case, professor emeritus of

real estate at the University of California in Los Angeles, titled *Where Deregulation Went Wrong—a Look at the Causes behind the Savings and Loan Failures in the 1980s* (Chicago: U.S. League of Savings Institutions, 1988). In this book we listed 15 different reasons for these failures. Today I will certainly not review this written record, but for what lessons it might have for us within the theme of this conference I will offer a five-minute summary of what, in my view, were the major reasons for this cataclysmic decade in the history of our specialized institutions.

I begin by pointing out that the savings and loan business was structured for a different period in our economic history—one not characterized by high and volatile interest rates and downward sloping yield curves. It was created for the special purpose of providing an assured source of reasonably priced housing credit for American families when upgrading our nation's housing standard of living was considered an appropriate public policy objective.

It did well in a simpler economy without today's technology with respect to systems of communication and the use of computers in the conduct of the banking business, a fact that has, for example, permitted the securitization of the mortgage market.

Unfortunately, the savings and loan business did not change with the times. For this there were many reasons. The Hunt Commission, which functioned during the first term of the Nixon administration, advocated major changes, including a phase-out of Regulation Q. This general prescription for change was rejected by the business, which felt very comfortable with the status quo. It was rejected by the Realtors of America and the home builders, groups that wished to preserve our institutions as a captive source of credit. It was rejected by the Congress, which also was concerned with preserving a certain source of credit for housing. It is quite clear that the business relied for too many years on Regulation Q and the one-quarter of 1% price advantage that this program gave to our institutions.

As a bit of history, you may be surprised to know that the U.S. League did not ask for or lobby for the imposition of Regulation Q when it was extended from the banking business to the thrift institutions in 1966. In fact, we requested the two-year sunset provision in the original law. Once our business had Regulation Q, of course, it did not want to give it up.

In the free-wheeling, deregulated environment of the 1980s, the business clearly had inadequate supervision, both in terms of the authority provided in the basic law and from a woefully inadequate supervisory and examination staff. The basic supervisory law was written by Congress in the Johnson administration. The law was not looked at as to its adequacy in the Reagan era of deregulation: the new permissive law of Garn–St. Germain and the very liberal lending and investment authority for state-chartered associations granted by many state legislatures, primarily California, Florida, Texas, and Arizona. Requests for a larger and better-paid examination and supervisory staff and revised supervisory law to give the supervisors what I have referred

to as a “fast whistle” did not come until 1984, during the chairmanship of Ed Gray. Chairman Gray’s requests for additional supervisory capability, both in terms of personnel and supervisory authority, did not receive support from the administration or the banking agencies, and Congress did not act on it. For the record, it should be noted that the savings and loan business, through the U.S. League, strongly supported Chairman Gray’s successful program to upgrade the examination and supervisory staff and endorsed a limited revision of the supervisory law to improve the ability of the board to use its cease-and-desist authority.

It is obvious that deregulation came first on the wrong side of the balance sheet. There has been much finger pointing as to whose fault this was, but the fact is that deposit rates were freed while the business was sitting with some 80% of its assets in fixed rate, long-term mortgage loans—all made when interest rates were much lower. This led to a decline in the *tangible* net worth of the business from \$32.2 billion at the end of 1980 to \$3.8 billion two years later. The business never really recovered from this destruction of its net worth. Many of the failures we have seen the last two years have come as a result of this earnings tragedy of the early 1980s and the inability of many institutions to take advantage of the breathing space provided by what I have called the creative accounting arrangements allowed by the Federal Home Loan Bank Board in the 1982–84 period. These were intended to avoid the type of financial crisis that we are discussing at this conference—a crisis as to the deposit insurance provided by the FSLIC, which could well have spread to the Federal Deposit Insurance Corporation (FDIC). This type of “forbearance” was similar in its intent to that provided by the State of New York in the early 1930s with respect to the book valuation of the assets of the state’s life insurance companies and savings banks.

There were many regulations issued by the Federal Home Loan Bank Board under Chairman Pratt in the early 1980s, most of them of a liberalizing nature, with two of them being particularly unwise. One permitted an unlimited amount of money solicited by the security brokers to be received under the cover of FSLIC insurance.

The other damaging regulation, less obvious to students of our history, reduced the minimum number of stockholders from 400 to one and canceled the rule that no one individual could own more than 25% of the stock. The board also eliminated the requirement that the boards of directors of these institutions be composed of a variety of individuals from the community or communities served by the institution.

To this very brief summary of the causes of savings and loan failures of the 1980s must added, of course, the precipitous decline in the price of oil and the collapse of the real estate economy in Texas, Louisiana, Arkansas, Colorado, and Arizona—which caused many bank failures—as well as the collapse of the savings and loan system in those states.

In the context of this discussion today and the background paper by Benja-

min Friedman, it is perhaps useful to note that the savings and loan crises of the 1980s did not stem from any one or a few unavoidable causes but, rather from many—most of which, with hindsight, were avoidable. It should also be noted that (as costly as it may eventually prove to be) the savings and loan failures did not spread to our financial system at large or, in fact, even cause a significant downturn in the real estate and home-building sector of our economy.

I ask the question whether this “non-event” as to our nation’s economy as a whole came from the fact that our financial institutions up to this point essentially have been compartmentalized into several different systems and from the public’s confidence in the integrity of the system of federal insurance of deposits. In both instances I think the answer is yes, which may have some lessons in our efforts to reduce the risk of financial crises.

I have been asked to express some views as to the effectiveness of the reforms of the thrift system enacted this past year by Congress. I would say that the reforms will certainly reduce the risk of any new wave of expensive failures in the savings and loan system. This is true in part because the reforms were significant; additionally, I am not sure how much of a savings and loan business will be in existence five years from now to pose a risk to our broader financial system.

Let me list quickly the reforms enacted by Congress this past year. First, there is now a separation of the function of insurance from the function of chartering and supervision. I really do not see how this reduces the risk of institution failure, but many think it does. The insurance function, as you know, is now provided by the FDIC. We hope it proves as good as its reputation. Supervision has been put into the Treasury under the Office of Thrift Supervision, which functions in a manner compatible to the Comptroller of the Currency.

The record of the Comptroller’s office over the years suggests this will be a risk-reducing agency rearrangement. The personnel of the Federal Home Loan Banks will no longer be involved in supervision, and the bank presidents will no longer be the chief supervisory officers in the field. There will, I believe, be more Treasury Department involvement in the Federal Home Loan Bank System, although the new law does not provide so specifically.

The supervisory law has been revised to provide at least a “faster whistle” in the use of cease-and-desist orders and orders to remove officers and directors. This has been provided to the bank supervisory establishment as well as to the Office of Thrift Supervision. Much of this new supervisory authority follows the changes asked for by Bank Board Chairman Gray for five years and unfortunately not given to him. There are, as you know, higher net worth standards, which, in effect, limit the authority of supervisory people to grant forbearance to those institutions that fall below reasonable minimums. The practical effect of this is yet to be seen. I think it will be very helpful. Few may remember that the savings and loan business for years had a 5% mini-

imum tangible net worth requirement, except for new institutions. In the late 1970s, and again in the Reagan era, this minimum was reduced as a pragmatic way to keep mortgage money flowing into the Sunbelt and to reduce the regulatory case load.

The laws have been tightened, wisely, with respect to the ability of institutions to make loans or investments for land development, to engage in home building, and to invest in junk bonds. Intelligent limits have been placed on loans to one borrower. The FDIC has been given authority, in effect, to override state laws with respect to the lending and investment activities of state-chartered savings and loans. One more reform is needed, and it can be accomplished by regulation. The use of money from brokers should be limited to, say, 5% of total deposits, the rule from 1963 to 1982.

In my view, the legislation enacted by Congress this year should substantially reduce the risk of savings and loan failures and any possible threat to our financial system. There is rightful concern, however, that we may have a case of "overkill." Reducing the investment flexibility may be harmful rather than helpful to the financial health of the remaining institutions. I am concerned about the effect of the higher limits on the percent of assets that must be invested in residential related assets, the so-called qualified thrift lender test.

The savings and loan problem may well be back before Congress, but not because of failures of institutions that today are alive and solvent. It will be back before Congress because of the inadequacy of the funding and the operations of the Resolution Trust Corporation.

I suggested earlier that this new law together with the events of the past few years in our financial system generally may well mean the disappearance of the savings institutions as a certain and specialized source of home mortgage credit for middle-class America. Opinions will differ whether this might, or might not, be a desirable result from the standpoint of the functioning of the free market in this country, but it will not be a good result from the standpoint of our nation's standard of living in housing.

From the broader standpoint of our financial system and the risks of financial crises, there will be increasing talk about deposit insurance reform. I personally do not think it is politically realistic to expect much of a change. I do not think Congress will lower the \$100,000 insurance limit. I do not think that a coinsurance system is politically feasible. I do not think it is practical to expect any administration to fail to provide de facto 100% deposit insurance for the large banks. When crunch time comes, I believe the government officials involved will conclude that some banks are, in fact, too large to fail.

I am concerned with the increasingly broad scope of commercial bank operations and the virtual collapse of Glass-Steagall. Things move too fast in banking these days for examiners and supervisors to detect and stop bad practices in time to prevent major losses. I have seen in the savings and loan system the effect of examiners and supervisors not understanding what is going

on and not dealing with problems in a timely manner. I fear the same thing can happen in our commercial banking system.

Further, let me say that the major banks in Texas did not survive the economy in that state of the 1980s. I am concerned as to what would happen if conditions, such as we have seen in Texas, became common in several parts of our economy at the same time or if we have that long-overdue major economic downturn.

As pointed out in the last chapter of the Strunk-Case book, major problems arose with respect to the system of deposit insurance operating in a deregulated environment. As I have said, I do not think that substantive changes in deposit insurance are politically possible. I hope that the alternative of effective supervision and qualified people in supervision will be able to avoid the problems that deregulation with deposit insurance created for the savings and loan system.

A "tough cop" mentality is needed in supervision. I personally think that there is still too much "due process" protection to owners and management built into the supervisory law. The call of the supervisory officials in the field should not be subject to an "instant replay" review by a panel of judges in the press box.

I also feel that much more use should be made of the powers granted the supervisory agencies by the Change in Control Law, and maybe that law needs to be strengthened, although it was revised just three years ago. Banking-type institutions should not be the plaything of takeover artists or speculators, nor should they be subject to leveraged buy outs. I have seen too many bad results from the wrong kind of owners of our savings and loan associations. The same thing must not be allowed to happen in commercial banking.

5. Joseph A. Grundfest

When Markets Crash: The Consequences of Information Failure in the Market for Liquidity

Few topics capture the public eye as effectively as a stock market "crash." Whenever stock prices drop sharply—even if only for a very short period of time—Congress, regulators, and the press quickly demand an explanation and begin a hunt for culprits who can be blamed for the market's woes. These

The views expressed in this paper are those of Commissioner Grundfest and do not necessarily reflect the views of the Securities and Exchange Commission, other commissioners, or the commission's staff. Commissioner Grundfest resigned from the commission on 18 January 1990.

efforts are invariably accompanied by calls for new regulatory safeguards to prevent crashes from ever happening again.

By now, the political minuet danced in the wake of a crash is well understood. The Securities and Exchange Commission (SEC) and the Commodity Futures Trading Commission (CFTC) are charged to provide studies of the crash. Self-regulatory organizations, such as the New York Stock Exchange (NYSE) and Chicago Mercantile Exchange, empanel commissions to analyze the crash and to propose remedies. Meanwhile, many traders busy themselves blaming other traders for the market's woes: traditional "fundamentalists" blame indexers, indexers blame specialists, specialists blame the futures markets, and everyone finds reason to blame Congress and the regulators.

Though this sequence of events is quite predictable, the political demand for an explanation of market volatility nonetheless repeatedly manages to create an intellectual vacuum in Washington, D.C. Inasmuch as nature abhors a vacuum, the demand for explanation is quickly filled by legions of Wall Streeters, academics, and journalists who supply a groaning smorgasbord of diagnoses. These diagnoses typically range from the hilariously implausible to the rigorously indecipherable. Indeed, with so many explanations to choose from, many policymakers have little trouble finding rationalizations that mesh with politically convenient predispositions.

Many of the explanations proffered in the wake of a crash are perfectly credible attempts to make sense of an infrequent, complex, short-lived, and turbulent phenomenon. Other explanations are, however, tinged with self-interest. In particular, it is clear that if the federal government can be persuaded that a particular group is responsible for market volatility, or that a specific form of intervention might cure the market's ills, then some traders' positions can be strengthened at the expense of others'. Rent-seeking behavior of this sort is hardly unusual, and the market volatility debate would surely set a record if all its participants were interested solely in the public good.

Reasons for Caution When Attempting to Explain Recent Market Volatility

The specter of self-interest is not, however, the only reason to approach the volatility debate with care. It is important to recognize that the very nature of the volatility that is the subject of the debate limits the degree of confidence that we can have in any explanation of the market's behavior. These limits on our ability to explain market behavior also limit the degree of confidence we can have in recommendations for market reform. By my count, there are at least five factors beyond the customary political machinations that counsel intellectual caution in the volatility debate.

First, despite the great attention devoted to recent market volatility, instances of sharp market declines remain few and far between. Since 1987,

stock market declines have drawn widespread public attention on fewer than 1 percent of all trading days. When these declines occur, they also tend to last for relatively short periods of time. Efforts to explain market crashes are thus constrained by a small-numbers problem caused by the infrequency of market crashes and by the brevity of the events sought to be explained.

Second, not all crashes are alike. Crashes happen for several different reasons and express themselves through several different mechanisms of action. Efforts to generalize about market behavior during periods of sharp, transitory decline can therefore overemphasize apparent similarities while brushing aside subtle but critical distinctions. More fundamentally, however, we must remember that markets learn as a result of crash experiences. For example, the market's behavior during the crash of 13 October 1989, was influenced by its experience of 19 October 1987. In this sense, crashes are fundamentally nonreplicable events. The market's inherent inability ever to suffer the same crash twice thus makes the task of explaining market volatility more difficult than it might otherwise be.

Third, recent history teaches that, even if the markets could experience the same crash twice, the government and self-regulatory organizations stand ready to prevent any repetition. In particular, following the October 1987 crash, the markets adopted a new set of trading-halt rules popularly known as "circuit breakers." The presence of these circuit breakers changed market behavior in October 1989 and introduced a level of noncomparability with the earlier 1987 experience. Following the October 1989 crash, circuit breakers were again modified to address perceived weaknesses in the level of intermarket coordination. Accordingly, it is already a sure bet that the regulatory environment accompanying the next crash will be different from the environment that existed during the October 1987 and October 1989 crashes.

It is also a safe bet that, if and when the next crash occurs, the rules of the game will once again be changed as a result of that crash experience. Efforts to explain market crashes will therefore inevitably become embroiled in debates over the extent to which changes in the regulatory process either exacerbated or ameliorated the market's woes.

This process of perpetual regulatory adjustment happens for perfectly understandable political reasons and is easily explained: to many policymakers, the unspoken objective of the regulatory process is to eliminate the possibility of a crash and not simply to assure that crashes are, in some sense, equitable, rational, efficient, or justifiable. Crashes are politically unacceptable. The fact that a crash has recurred is interpreted as evidence that the preexisting regulatory environment was somehow deficient. Accordingly, further regulatory tinkering is necessary to prevent a repetition of extreme market volatility. Thus, just as the market's internal learning process causes sequential crashes to be noncomparable (at least to some degree), the process of regulatory tinkering compounds the challenge of explaining market behavior.

Fourth, the variables most central to any explanation of market behavior

during a crash are extraordinarily difficult to quantify. Financial market behavior is fueled by expectations. Expectations, however, are not directly observable during the market's gyrations and are only imperfectly measured after the fact. Economic analyses of market crashes, therefore, generally rely on observable measures of price and volume that reflect the consequence of the interaction of underlying market expectations, and not the underlying expectations themselves.¹ Like physicists inferring the existence of subatomic particles from droplets in cloud chambers, economists are often forced to infer expectations structures from observable stock market price and volume data.

Physicists have, however, done quite credible work by tracking droplets in cloud chambers. Similarly, economists have made substantial contributions to the understanding of crashes by analyzing the path of prices and volumes during market declines. Although these analyses are quite useful in debunking many theories about market behavior, and although they can support powerful inferences about the forces that give rise to market crashes, there is a level of explanatory power that studies based on price and volume data are unlikely ever to achieve.

In particular, given the rapid pace at which expectations can change during market crashes and the extent to which individual expectations can be influenced by perceptions of the expectations held by others, there is a level of cause and effect that will be difficult if not impossible to divine from observable price and volume data. This inability to measure underlying expectations, combined with the difficulties encountered in conclusively demonstrating the mechanisms of action that define the observed path of market prices, leaves the door open for policymakers to rely extensively on anecdotal evidence. It also provides a basis for some policymakers to dismiss economic studies as not having come to grips with the forces of fear and greed that politicians often perceive as dominating market behavior during crashes. Put another way, it is easy for politicians to believe that "animal spirits" dominate the market during periods of sharp decline, and it can be difficult for economists to dissuade policymakers from these animist beliefs.

Finally, and perhaps most significantly, economists have reason to be cautious in their explanations of crash behavior because of the current state of the art in economics. Economics is simply not as advanced in explaining the adjustment process whereby markets move from one equilibrium to another as it is in many other areas. As Franklin Fisher observed, "Economic theory is pre-eminently a matter of equilibrium analysis. . . . We have no similarly elegant theory of what happens *out* of equilibrium, of how agents behave when their plans are frustrated. . . . Unless one robs words of their meaning and defines

1. It should be noted that not all economists limit their analyses to studies of price and volume data. For example, in the wake of the 13 October 1989 crash, Robert Shiller and William Feltus surveyed market participants to find out about the expectation structures that gave rise to their behavior. See R. J. Shiller and W. J. Feltus, "Fear of the Crash Caused the Crash," *New York Times* (29 October 1989, sec. 3, p. 3, col. 1).

every state of the world an ‘equilibrium’ in the sense that agents do what they do instead of doing something else, there is no disguising the fact that this is a major lacuna in economic analysis.”²

The fact that economics is not as advanced in explaining adjustment processes as it is in describing equilibria does not, however, justify intellectual nihilism. In particular, it does not mean that “anything goes” in the effort to explain market crashes, or that any explanation is as credible as any other explanation. It suggests, instead, that a certain degree of humility may well be appropriate for anyone who ventures into the difficult and highly contentious political arena in which the volatility debate is likely to be fought.

Why Crashes Happen: A Tentative and Partial Explanation

Having described five reasons for caution in any effort to explain market behavior during a crash, I will now ignore my own advice and attempt to offer an explanation for certain aspects of recent market volatility. In defense of this obviously impetuous decision, I can only point out that my call for caution is certain to be ignored widely in Washington and elsewhere. Thus, rather than be left totally out of the race to explain recent market volatility, I will suggest a tentative and partial explanation and then take comfort in the distinguished company I am sure to share when it comes time to name those who have been so bold as to attempt to explain the behavior of the stock market.

More seriously, however, the explanation I am about to offer differs from many others in at least three respects. First, the explanation is consciously tentative—unlike some other explanations, which are presented as powerful solutions to a great mystery, what I present is more in the nature of a hypothesis to be mulled than of a truth revealed. Indeed, I will not feel overly embarrassed if further analysis proves my explanation wide of the mark.

Second, the explanation is consciously partial—even if the explanation is eventually accepted as accurate, there is much still left unexplained and much work remains to be done in order to understand market behavior during crashes. Because the explanation is partial it is also not necessarily inconsistent with several other explanations that have already been offered for the market’s behavior. Nor is it necessarily inconsistent with explanations yet to be offered.

Third, the explanation is politically neutral in the sense that it points a finger neither at New York nor at Chicago as the source of the market’s problems. Instead, the explanation suggests that the conditions leading to recent market volatility could well be the result of more fundamental problems shared by the

2. F. M. Fisher, “Adjustment Processes and Stability,” in John Eatwell, Murray Milgate, and Peter Newman, eds., *The New Palgrave: General Equilibrium* (New York: Norton, 1989), 36; emphasis in original. Recently, some economists have explored the application of the chaos theory to instances of market volatility. It is, I believe, too soon to judge whether these efforts will bear meaningful fruit.

equities and futures markets alike. Effective remedies for the market's woes might therefore lie in measures that address broader questions of market structure and performance—particularly matters related to the availability of information regarding order flows during times of high volume and volatility. Measures of this sort do not, however, currently appear to be high on the list of remedies being considered in the policymaking process.

A Thumbnail Sketch of the Model

Simply put, I suggest that a large component of recent market volatility is the rational result of an “information failure” in the market for liquidity rather than the consequence of rapid and irrational changes in the market's assessment of the value of securities traded on America's stock exchanges. Information is the lifeblood of the market.³ In order to set stable prices, markets need information both about the business prospects of the companies whose shares are traded *and* about the demand for short-term trading services in the markets where those instruments are traded. The lack of information about *either* fundamental business prospects *or* about the magnitude and composition of an atypically large demand for immediate trading can be sufficient to induce substantial market volatility. Indeed, as I later demonstrate, even informationless trading can cause substantial price volatility, if the trading is sufficiently large and is of sufficiently uncertain magnitude and composition.⁴

During recent crashes, the markets have suffered from a serious lack of information about an anticipated spike in the demand for short-term trading activity.⁵ The markets have been uncertain about the magnitude of the expected demand, about the reasons why certain traders are selling, and about the price levels at which substantial buying interest might appear. This lack of information makes trading quite risky. In response to this quantitative and qualitative uncertainty over the anticipated demand for short-term liquidity, which is in the nature of a highly uncertain peak-load demand on traditional liquidity providers, the price of liquidity rises sharply—that is, it becomes quite expensive to purchase the immediate right to sell shares or futures. This sharp increase in the price of liquidity is reflected in a simultaneous widening of spreads and in a general price decline in the equities and futures market alike.⁶ Indeed, in an environment in which the cost of trading rises sharply, as does the perceived probability of having to trade more frequently, liquidity-

3. See, generally, R. Gilson and R. Kraakman, “The Mechanisms of Market Efficiency,” *Virginia Law Review* 70 (1984): 549–644.

4. See discussion of the “S&P 500 effect” and of volatility during “triple witching hours” in this text around nn. 12–13 and n. 17, respectively.

5. This spike in demand for trading can, of course, occur simultaneously with uncertainty over fundamental valuations, as discussed below.

6. In this regard, it may also be useful to observe that some economic models suggest that “traders' impatience” can affect the terms of trade, particularly in dynamic markets. See, e.g., R. B. Wilson, “Exchange,” in J. Eatwell, M. Milgate, and P. Newman, eds., *The New Palgrave: Allocation, Information, and Markets* (New York: Norton, 1989), 87.

related transactions costs can have significant effects on stock prices.⁷ Once sufficient information comes to the market describing expected short-term trading flows, and once the returns to providing liquidity become high enough, the peak-load nature of the demand subsides, the risk involved in trading is reduced, the price of liquidity declines, spreads narrow, and equity prices recover a large portion of their losses.

This explanation of market volatility, which relies on information failure in the market for short-term liquidity, is not inconsistent with the efficient market hypothesis (EMH). Among other assumptions, the EMH is based on the specific understanding that "(1) information be available to a 'sufficient' number of investors; [and] (2) that transactions costs be 'low.'"⁸ The uncertainty surrounding peak-load trading demands suggests that information relevant to setting the price of liquidity may not be available to a sufficient number of traders. It also suggests that transactions costs are not low because of the uncertainty generated by the information failure. Thus, if the information failure argument presented herein is correct, certain conditions necessary for the application of the EMH may not be satisfied during some sharp market declines. The information failure argument can thus be viewed as complementary to the traditional EMH, not as a challenge to or rejection of the EMH.

The need to analyze separately the structure of information flows about "fundamental" valuations and about liquidity demands is, I think, the critical link missing in many currently popular explanations of market behavior. Related observations have appeared in academic analyses of market volatility.⁹ Unfortunately, these analyses appear not to have made a substantial change in policymakers' approaches to the volatility debate beyond the somewhat simplistic and perhaps overly hopeful view that circuit breakers can slow trading sufficiently so as to allow more deliberate decision making to restore a semblance of equilibrium at prices reasonably close to those that prevailed prior to the market's dislocation.

The analysis presented herein suggests, however, that circuit breakers, in and of themselves, are not as important as the quality of information brought to the markets either while trading is halted or ongoing. Remember that the markets had a two-day trading halt between October 16 and October 19, 1987. That two-day halt, popularly known as a weekend, did little if anything to prevent the market's precipitous decline because, it is suggested, nothing was

7. See, e.g., Y. Amihud and H. Mendelson, "Liquidity and Cost of Capital: Implications for Corporate Management," *Journal of Applied Corporate Finance* 2 (Fall 1989): 65 (estimating that, at a turnover rate of once every two years, a 4 percent transaction cost reduces an asset's net present value by 28 percent).

8. James Lorie and Mary Hamilton, *The Stock Market: Theories and Evidence* (Homewood, Ill.: Irwin, 1973), 80.

9. See, e.g., Grossman, "Insurance Seen and Unseen: The Impact on Markets," *Journal of Portfolio Management* 14 (Summer 1988): 5-8; Gennotte and Leland, *Market Liquidity, Hedging, and Crashes* (School of Business Administration, University of California at Berkeley, May 1989).

done to address the huge uncertainties about the demand for short-term trading that had accumulated over the weekend. Indeed, from a broader perspective, the analysis presented herein suggests that many other frequently proposed solutions to the volatility problem are also likely to be ineffective unless they too address the information failure problems that can arise in the market for liquidity.

Crashes and Crashesettes

This thumbnail sketch of market behavior suggests a distinction that I have found useful in certain policy-related conversations: it is the difference between “crashes” and “crashesettes.” A “crash,” under my proposed nomenclature, reflects a sharp, fundamental downward reassessment of the intrinsic value of a financial instrument. Crashes can happen suddenly, but they are not transitory phenomena because asset prices are likely to remain depressed for substantial periods of time following the initial sharp decline. In contrast, “crashesettes” reflect transitory uncertainties and peak-load demands that result from failures in the trading systems in which financial assets are exchanged. A crashesette can come and go with prices returning to pre-crashesette levels in relatively short order.

Rapid changes in stock prices need not, however, be purely the result of a crash or crashesette. Changes in fundamental information are also often correlated with sudden liquidity spikes. Any given instance of market volatility can thus be viewed as a combination of crash and crashesette behavior, with the crashesette component having varying degrees of significance.

Theory aside, there is reason to believe that a significant portion of the market’s recent volatility is much better described as the result of a series of crashesettes rather than as the consequence of several market crashes. Obviously, the problems presented by crashes are quite different from those presented by crashesettes, and the policy process would be making a serious error if it sought to treat crashesettes with remedies that might be appropriate for crashes, and vice versa.

A Closer Look at Liquidity

In order for this information and liquidity-related explanation of recent market behavior to be credible, there must be some friction in the process by which liquidity is drawn into equity-related markets. If liquidity were freely and instantaneously available to respond to any level of short-term trading demand, then the notion of a sharp price decline due to uncertainty in the market for liquidity would lose much of its persuasive force.

This is neither an obvious nor noncontroversial proposition. To the average small investor, the whole notion of a market for liquidity is something of a cipher. The average investor who picks up the morning paper and reads the stock quotes sees lengthy tables depicting the prices at which individual stocks are traded. There are no tables describing the price of liquidity. Indeed,

the vast majority of small investors are largely unaware that whenever they buy or sell stock, futures, or options they are paying a price for liquidity.

Similarly, the traditional approach to market analysis incorporated in the capital asset pricing model, and other valuation models, does not address the possibility that sudden, large, and uncertain demands for trading, even when those demands are “informationless,” can so deeply influence the market’s infrastructure that prices are rapidly thrown out of equilibrium. The notion that uncertainty in the market for liquidity can cause rapid, transitory price disturbances is not inconsistent with accepted pricing models; rather it is a consideration complementary to and distinct from those models.

To explain the importance of liquidity in the equities and index-futures markets, it helps to revisit some basic principles and to consider a hypothetical situation in which the only factor influencing market pricing is a massive short-term change in the demand for liquidity. When attempting to explain the notion of liquidity to small investors, I often draw an analogy to the used car market. If I want to sell my car quickly, it is highly unlikely that I will know someone immediately interested in buying my car at a price anything close to the price I could get if I advertised for a couple of weeks. Under these circumstances, if I want to sell my car quickly, or if it simply is not worth my time to try to sell it on my own, I am likely to sell the car to a used car dealer who will hold it in inventory until he finds a suitable buyer. The used car dealer is providing a liquidity service by paying me immediately for the car that he holds in inventory until a buyer comes along to take it off his hands.

Used car dealerships are not, however, charitable institutions. They provide liquidity only for a fee. That fee is measured by the difference between the price at which they buy and sell the same car. This spread between buying and selling prices is never posted on a big sign at used car lots and is never advertised in the paper. However, the fact that the spread is not obvious does not mean that liquidity is free or that the size of the spread is immune to the forces of supply and demand. In particular, if used car dealers expect a sudden rush of immediate selling interest by owners of used cars they will likely respond by lowering the price they offer to sellers even though the quality of the used cars they acquire remains unchanged and even though they expect to remarket those cars within a relatively short period at preexisting prices.

Just as there are firms that specialize in providing liquidity to the used car market, there are firms that specialize in providing liquidity to the equity and futures markets. Thus, even if there is no “long-term” investor who immediately wants to buy the 500 shares of General Mills that I want to sell, there is a “used stock dealer” who, for a fee, will buy those shares and hold them in inventory until an interested buyer comes along.¹⁰

10. Accordingly, there is a sense in which the equities and futures markets cease to behave as “spot” markets during periods of extreme volatility because the size and risk of inventory rises quite sharply.

The amount of capital ready to provide liquidity in the equity and futures markets at any one point in time is, however, finite and is determined by the risk-adjusted rate of return provided to that activity. In addition, there is reason to believe that the total pool of liquidity capital, while large in absolute dollar terms, is actually quite small when measured as a percentage of the value of the assets traded in the equities and futures markets.

For example, the Brady Commission found that the total capitalization of specialists on the floor of the NYSE is approximately \$3 billion.¹¹ While \$3 billion is a lot of money by some measures, it is less than one-tenth of 1 percent of the outstanding value of equity investments.¹² No doubt, the liquidity provided by specialists is supplemented by locals in Chicago's pits, over-the-counter market makers, and upstairs block positioners. However, I strongly suspect that even if accurate data about the quantity of liquidity capital available from these sources were available, we would find that immediately available liquidity capital is only a small percentage of the total value of equity instruments, open futures interest, and open options interest that could be traded on the market.

In the vast majority of situations, the amount of capital available for liquidity purposes is adequate and the typical trader barely notices the price that is charged for the temporary use of the market's liquidity capital. However, when suppliers of liquidity capital have reason to believe that there will be a sudden and sharp increase in demand for transaction services, and when there is substantial uncertainty over the magnitude and qualitative contour of that demand, a totally different scenario emerges.

The Origins of Crashes

There is, by now, widespread agreement that instances of market volatility typically begin with one or more pieces of news that disturb preexisting price levels and suggest that some equity prices should be lower. Debate continues to rage, however, about whether these pieces of news are really powerful enough to cause multibillion dollar changes in valuation across the entire spectrum of equity investments traded in U.S. markets. This debate can, I think, be cut short if, instead of examining the effect of certain news items on the fundamental valuation of equity, futures, and options markets, we focus on the effect that news has on the demand for liquidity services.

Given current market structures, it is not difficult to conceive of situations in which news items suggest that relatively moderate changes in fundamental valuations might be accompanied by substantial short-term demands for liquidity. This may be particularly true under circumstances in which liquidity

11. Presidential Task Force, *Report of the Presidential Task Force on Market Mechanisms* (Washington, D.C.: Government Printing Office, 1988), VI-40.

12. The Wilshire Associates Equity Index, which measures the market value of NYSE, AMEX, and OTC issues, stood at \$3,419.879 billion as of 29 December 1989. See Market Indicators, *New York Times* (30 December 1989, p. 21, col. 3).

suppliers believe that (a) a significant percentage of asset holders intend to follow mechanistic trading rules that cause investors to sell as prices decline (stop-loss rules or portfolio insurance strategies would fit into this category) or (b) the need to meet margin requirements is so substantial that a meaningful amount of selling will ensue as a result of wealth constraints and leverage effects. Whether these beliefs are accurate is, in a sense, beside the point so long as the beliefs are widely held and acted upon.

The belief that risk arbitrageurs will quickly have to sell billions of dollars of stock to cover losses resulting from one "busted" deal is an example of a scenario that describes the latter situation. This scenario also fits many popular descriptions of market behavior at about the time of the October 13, 1989 market crash. The belief that portfolio insurance would swamp the market in October 1987 fits the former scenario and is also consistent with widespread press reports prevalent at that time.

It is interesting that the key variable in each of these scenarios is the *expected demand for short-term trading services*. It is not the actual demand for trading services as later observed in the market, or the aggregate anticipated price change based on "fundamentals" that is expected to result from the new information coming to market. This is a critical distinction that is supported by several collateral observations.

Studies have, for example, demonstrated that statistically significant price changes accompany the announcement that a particular issuer's shares are to be added to the Standard and Poor (S&P) 500 Index. Typically, the price of these shares increases for a relatively short period of time and then gradually declines. These price changes occur even though there is absolutely no change in the fundamental information describing the issuer's business. Instead, the short-lived price increase is generally ascribed to a transitory liquidity effect that results from a large demand by index funds for immediate possession of the issuer's shares so as to minimize the tracking error between their fund's behavior and the behavior of the S&P 500 Index.¹³

These studies have important implications for the analysis of market volatility because they demonstrate that "informationless" trading can induce stock price volatility provided that the trading creates a sufficiently unanticipated demand for liquidity. Indeed, this effect, which has been clearly demonstrated for a single issuer's shares, may well be generalizable to the entire market, as I now explain.

The Purest Crashette

The existence of a measurable stock price effect attributable solely to an informationless demand for liquidity suggests an interesting *Gedankenexperiment*. Suppose that, instead of changing one stock in the composition of the

13. See, e.g., Harris and Gurel, "Price and Volume Effects Associated with Changes in the S&P List," *Journal of Finance* 41 (1986): 815-29; C. Lamoureux and J. Wansley, *Market Effects of Changes in the S&P 500 Index* (Department of Finance, Louisiana State University, February 1986); Standard & Poor's Corporation, *S&P 500:1989 Directory* (New York, 1989), 91-102.

S&P 500, Standard and Poor's announced an immediate reconstitution of the entire S&P 500 Index with significant changes in the weighting and composition of that benchmark portfolio. The result would likely be great uncertainty in the short-term trading market as participants scrambled to guess how index funds would attempt to rebalance their portfolios. This uncertainty would be compounded by a lack of information about the likely trading strategies of "closet indexers" and of other investors whose portfolio compositions are, one way or another, keyed to the composition of the S&P 500 Index.

In all probability, the price of short-term liquidity would rise in response both to the expected marketwide demand for immediate portfolio rebalancing and to the great uncertainty associated with the pace and potential magnitude of the rebalancing activity. The prices of some shares would increase as a result of an increased weighting in the index while the price of shares whose weighting was reduced would likely suffer a transitory decline. On balance, however, the increase in the price of liquidity caused by massive rebalancing would be reflected in a decline in average stock prices which would likely be reversed once all the rebalancing had been accomplished. In other words, after all is said and done, the prices of IBM and GM shares should not change much, if at all,¹⁴ as a result of the reconstitution of the S&P 500 Index, but there may well be an interim period during which prices could be higher or lower depending on whether the issue's weighting has increased or decreased. The result would be the purest of all crashettes: a transitory price decline wholly unrelated to any change in the fundamental valuation of any asset.

The critical point to note, however, is that a crashette need not occur even under these extreme circumstances if Standard and Poor's provides the market with sufficient advance warning of the changes that it intends to make in the composition of its benchmark portfolio. Such advance warning would provide market participants an opportunity to eliminate much of the uncertainty associated with anticipated liquidity demands and thereby reduce the risk premium demanded by liquidity providers. It would also allow portfolio managers to moderate the pace at which they rebalance their portfolios and thereby avoid generating peak load demands on the supply of immediately available liquidity.

Attracting More Liquidity: Why Doesn't It Happen Faster?

No doubt, when crashettes visit the market the rate of return to liquidity providers increases substantially. Why then does more money not quickly rush into the market and thereby rapidly restore a semblance of order? There appear to be at least two answers to this question.¹⁵

14. Whether prices change at all depends on whether there is a longer-term S&P effect. See, e.g., P. C. Jain, "The Effect on Stock Price of Inclusion in or Exclusion from the S&P 500," *Financial Analysis Journal* 43 (January–February 1987): 58–65.

15. A parallel question can, of course, be asked about the opposite side of the market: if the price of liquidity rises so substantially and quickly, why do sellers keep demanding liquidity? Information failure among sellers provides at least a partial answer to this question. Sellers who

First, although the absolute return to liquidity providers trading during crashettes might seem substantial when measured in hindsight, the risk-adjusted rate of return, given the uncertainty that exists at the time of the crashette, is not necessarily out of line with other prevailing risk-adjusted rates of return. Indeed, there is reason to believe that the uncertainty during a crashette can become so great that the price of short-term Treasury instruments experiences a transitory run-up as a consequence of a "flight to quality." This observable price change in what is probably the most liquid financial market in the world, combined with anecdotal indications that some large traders pull back from the market at least during the initial phases of volatility, suggests that the uncertainty causing a crashette can be of a sufficient calibre to force liquidity out of the market precisely at the time the market needs it the most.

Second, it is important to recognize that the process of providing liquidity to the market can involve a relatively high degree of specialization that is not quickly acquired. Experience in judging the informational content associated with certain patterns of order flows, as well as the ability quickly to gather reliable information from the cash and derivative products markets, can be extraordinarily valuable in managing funds during periods of market volatility. Simply put, many investment managers who pride themselves on their ability to pick "winners" and avoid "losers" (though in reality they may do neither) do not believe they have a comparative advantage in trading during periods of volatility. Moreover, these investment managers are either unwilling to provide capital to traders with that specialized expertise or are unaware of traders who have the necessary skills.

The observation that there are gains from specialization that result from experience in judging the informational content of order flow is hardly unique. The observation appears in analyses of specialist and market-maker behavior. It also appears in studies that hypothesize the existence of "informed" and "noise" traders.¹⁶ For present purposes, however, the essential

are concerned that there is a tremendous overhang of selling yet to come may be willing to pay a high current price for liquidity in order to avoid an anticipated price that is even higher. Sellers who have decided not to sell because of the high price of liquidity do not, however, have a practical means of signaling that they have no interest in adding to the demand for liquidity. In particular, the prospect of massive legal liability could well deter major traders from announcing a policy of abstinence during periods of volatility because, if market conditions changed and the trader decided that he wanted to sell, he would open himself to allegations of market manipulation and fraud. Thus, it is possible for sellers to be demanding liquidity in order to avoid a selling wave that will not come.

There is reason to believe that such behavior may have been at work during October 1987's market volatility. The volume of selling by portfolio insurers was substantially less than some traders had feared, but there were no practical means for insurers to signal that they would not be selling the anticipated volumes at prevailing market prices. Accordingly, many traders may have generated a demand for liquidity based on expectations that were incorrect but that could not be promptly adjusted.

16. For example, Gennotte and Leland (see n. 9 above), hypothesize the existence of three classes of investors: uninformed investors who observe only the prevailing equilibrium price; price-informed investors who also have access to unbiased predictors of future price; and supply-

observation is that not all investors are equally well-situated to trade during a crashette. Models that assume rapid and continuous entry by “fundamental” or “value-oriented” investors may therefore oversimplify some of the informational difficulties that arise during periods of unusual volatility.

Strategic Behavior and the Possibility of “Crazy Eddie” Pricing

There is also reason to believe that, during market crashettes, at least some traders engage in a form of strategic behavior that links stock prices much more closely to liquidity considerations than to any assessment of the market’s underlying value. These strategic considerations are perhaps best described by way of an example.

Suppose the Dow Jones average stands at 2600 immediately before the arrival of information that triggers a crashette. A trader estimates that, after the market absorbs the news, prices will reequilibrate at a Dow of 2500. To compensate for the risk that this estimate is incorrect, the trader decides not to buy until prices drop as low as 2550.

However, suppose the trader also perceives that the price of short-term liquidity is about to skyrocket as a result of both the peak-load nature of the demand for trading services and the uncertainty associated with the magnitude and composition of that demand. Under those circumstances, liquidity-related considerations could well cause prices to fall below the 2550 level at which the trader would be induced to buy on the basis of fundamentals alone. From the trader’s perspective, if he is happy buying at a price of 2550, he’s even happier buying at a price of 2450, or 2300, or 2200. As long as the trader believes that liquidity considerations are likely to force prices even lower, the trader has little incentive to buy even though he believes the market is oversold on the basis of “fundamentals.” (This example assumes, of course, that the trader does not change his estimate of post-shock pricing as a consequence of the information he subsequently observes in the market—surely an unrealistic assumption, but one that simplifies the example.)

When will such a trader enter the market and start buying? When he believes that, given the immediate supply and demand for liquidity, prices are so low that unless he starts buying now he may not find prices as good after the market recovers. Equivalent prices will be unavailable because the market is so thin that his orders are unlikely to be filled at better prices during the recovery. Put another way, the trader may estimate that the peak price of liquidity is about to be reached and that the discounts associated with the demand for

informed investors who observe order flow information. They find that the presence of an adequate number of supply-informed investors is critical to avoiding crashette-type behavior. The point I am suggesting is that, given usual trading patterns, there is an optimal amount of capital that is allocated to supply-informed traders. This amount of capital is not, however, so large that it is able to absorb the peak-load demand for trading that accompanies a crashette. Moreover, there are perfectly understandable institutional reasons why more capital does not quickly flow to these investors during times of market stress.

liquidity are about to decline. Under either circumstance, the trader's decision to buy stock or futures is determined by conditions in the market for immediate liquidity rather than assessments of postequilibrium stock market values.

This explanation of trading behavior may provide a rational basis for the observation that prices during crashettes no longer reflect assessments solely of the "fundamental" value of shares traded on an exchange. That does not, however, mean that the prices observed during crashettes are irrational because crashette prices may be sending more information about liquidity conditions than about fundamental values. Given the level of uncertainty and the peak-load nature of demand for liquidity that accompanies a crashette, short-term price declines may be perfectly understandable, if uncomfortable, consequences of rational market forces.

This behavior pattern can be described in a somewhat more colorful fashion that will be particularly familiar to New Yorkers. For many years, New York's airwaves were filled with advertisements starring a pitchman for "Crazy Eddie," an electronics and appliance retailer who claimed to have prices so low that they were "insane." The message was that Crazy Eddie's prices were so good that you could not afford not to shop at his store. That, in a sense, may describe the price signal sent during a crashette that triggers some traders' decision to reenter the market—prices are so low (because the price of liquidity is so high) that it makes sense to buy even if there is a chance that prices might drop lower still.

Information Problems and Information Solutions

If this analysis is generally correct, it suggests that recent incidents of short-term volatility have been caused, at least in part, by information problems in the market for immediate liquidity. Thus, it seems reasonable to suggest that we might want to look for information solutions to these information problems.

Interestingly, this is an area where regulators have actually experienced a modicum of success. During 1985 and 1986 the most significant complaints about market volatility were caused by "triple witching hours." These quarterly events were the result of the simultaneous expiration of futures and options contracts that created informationless peak-load demands for liquidity at precisely the market's closing price. Market participants knew beforehand exactly when there would be large liquidity demands but did not know the magnitude of those demands or the specific stocks in which the demands would be greatest.

To reduce the volatility associated with triple witching hours, regulators and self-regulatory organizations modified trading procedures in the futures, options, and equities markets. Contract expirations were moved from the close to the open, new requirements were introduced calling for earlier sub-

mission of trading orders, and new opening procedures were adopted that gave the market a better view of the volumes likely to be bought or sold at the open. As a result of these measures, traders had better estimates prior to the open of just how much demand for trading was likely to arise and of just where that demand would likely be centered. In other words, the regulatory environment was changed so as to generate more information about the demand for a very particular and immediate form of liquidity.

These relatively simple measures appear to have eliminated most of the volatility associated with triple witching hours. Moreover, triple-witch volatility appears to have been eliminated at very low cost and with no perceptible market inefficiency or dislocation.

There is a lesson to be learned here. Regulators have already successfully eliminated a particular form of liquidity-induced volatility by increasing the amount of information available to the market. Granted, this task is particularly easy when the peak-load demand on liquidity happens like clockwork because of the structure of contracts traded on futures and options markets. Reducing volatility through information solutions at other times will be more difficult, but it might not be impossible.

What is needed is more information about the magnitude and composition of the demand for liquidity, particularly when the market experiences substantial volatility. This information can be provided through a variety of channels. In no special order, and recognizing that other approaches may be preferable, I will describe two possible means of increasing liquidity-related information in the event of extreme volatility. Moreover, I should emphasize that I am not endorsing either of these proposals as measures that should be adopted. Instead, the primary purpose of articulating these information-related remedies is to stimulate consideration of approaches that have not been broadly explored or debated.

The first and perhaps simplest approach would be to require that, in the event of unusual volatility, traders announce their orders ahead of trading and perhaps also identify themselves if their orders are sufficiently large. Such a requirement would provide the market with information about the forthcoming demand for liquidity and not just about present and past demand. It would also provide the market with information about sellers' identities, from which the market could infer both the extent to which selling is informationless and the extent to which more selling might be forthcoming.¹⁷

This proposal could, of course, be modified in a variety of ways. The preannouncement period could either be quite short (e.g., requiring announcement immediately before the actual entry of an order) or it could be relatively long

17. A similar proposal is discussed by Gary Becker; see "Lassoing Herd Instinct for the Good of the Market," *Business Week* (20 November 1989), 20. ("If booms and busts in stock prices are caused by limited information, stock performance could be improved by more of it. For example, advance announcement of large institutional orders coming to market—sunshine trading—might give investors better information about the sources of price changes.")

(e.g., requiring announcement 15 minutes or more prior to execution of an order). Longer announcement periods would have to address the possibility that traders can legitimately decide to cancel preannounced orders, as well as the possibility that some traders might behave strategically and enter orders that they never intend to execute. The proposal would also be relatively cheap to implement and would not require that regulators have any *ex ante* view as to whether volatility is the result of a crash or of a crashette: in either event the proposal would call forth additional information.

No doubt, a major drawback of this approach to some traders will be the loss of anonymity currently available in the market. The basic policy issue, however, is whether the benefits resulting from increased information outweigh the costs associated with the loss of anonymity in situations of extraordinary volatility.¹⁸

The second approach would be to halt continuous trading once a specific volatility level is reached and require that trading then be conducted through a single-price auction. In a single-price auction buyers and sellers indicate the volumes of business they would be willing to do at various prices. This information is then conveyed to all market participants in a form analogous to supply and demand curves that illustrate the prices at which markets would clear. By requiring that all trading occur through the single-price auction mechanism, the market would be guaranteed that it knows the total demand for liquidity, at least until the next single-price auction is held or until continuous trading resumes.

The single-price auction has been actively promoted by Steve Wunsch of Kidder Peabody. Although it has several appealing information characteristics, a complete single-price auction for hundreds or thousands of financial instruments might be difficult to implement, particularly during periods of great volatility when a substantial amount of price-search activity is ongoing. Moreover, single-price auction systems would also have to address the possibility of strategic behavior by buyers and sellers who might enter indications of interest that they pull before trading commences. This approach could also expect to draw opposition from locals, specialists, market makers, and other intermediaries whose services would not be needed because the auction mechanism effectively allows buyers to do business directly with sellers. In addition, this approach would require the introduction of several new electronic systems. Accordingly, a single-price auction approach might be easier to justify on a cost basis if single-price auctions were used regularly, regardless of the degree of price volatility—a possibility that may deserve consideration for reasons wholly independent of volatility concerns.

18. Certain traders who want to preserve anonymity might seek to transact offshore in markets that are not subject to equivalent disclosure requirements. Liquidity for U.S. shares in foreign markets is, however, likely to be even worse than it is in the United States, and these traders will therefore be forced to pay a substantial price to retain their anonymity.

Conclusion

There is substantial reason for caution in any attempt to explain recent market volatility. Nonetheless, there is cause to believe that a material part of the volatility recently experienced in the equity market is attributable to information failure in the market for liquidity. In particular, instances of volatility appear to be correlated with peak-load demands for immediate trading and with great uncertainty about the magnitude and composition of these demands.

This observation is supported by evidence that large volumes of informationless trading can move the price of individual equities, as well as the price of the entire equity market. This observation also supports the policy recommendation that information failures should be addressed by information solutions. Measures designed to increase the flow of information about the size and composition of the market's demand for liquidity may be particularly worthy of further debate and consideration.

Summary of Discussion

Friedman began by pointing out that the discussants' remarks were focused on financial institutions and financial markets. He emphasized that the behavior of nonfinancial entities matters too, because their behavior affects the quality of the credits held by financial institutions. He posed the question whether regulation and supervision can control the quality of those credits. *Friedman* added that, despite the high visibility of the breakdown of the savings and loan system, that breakdown did not result in a financial crisis, although a banking system failure might produce such a crisis.

William S. Haraf felt that the problems of savings and loans were greatly understated by the discussants' comments. The true culprit in the S&L failure is deposit insurance, which long predates the 1980–82 deregulation. He then outlined two key problems for the future of the banking system. The first is determining the extent of coverage provided by deposit insurance. He noted that since the failure of Continental Illinois, when, on grounds of fairness, contingent creditors were protected as well as depositors, regulators have adopted "too small to fail" as well as "too big to fail." Consequently, there is little market discipline left in the current system. The second problem is understanding whether regulation can prevent institutional failure, and at what efficiency cost. *Haraf* pointed out that various changes in the deposit insurance system have been proposed that would restore some market discipline to the banking industry.

Lawrence B. Lindsey went on to say that the beginning of the unraveling of

the savings and loan industry was disintermediation and the government's reaction to the problem. Under Regulation Q, disintermediation created serious problems for the construction industry, but preserved the integrity of the savings and loan industry. Further, the process was self-correcting as the resulting recession in the construction industry cooled off loan demand, thus bringing interest rates back down to levels consistent with Regulation Q. The gradual deregulation of interest rates and the banking industry generally was an effort to limit the impact of monetary policy on construction and spread it more generally across the economy. The result was a shift in riskiness from the construction industry to savings and loans and the elimination of the self-correcting link between disintermediation and a recession in construction.

Sprague responded to Haraf that after the Penn Square failure, he had favored a "modified payoff" policy, in which insolvent banks were closed and depositors immediately received 100% of all deposits below \$100,000. Depositors also receive a percentage payment on the uninsured deposits based on the expected future sale value of their share of the bank's assets. This policy was employed eight times but was ignored in May 1984 when the consensus of regulators was that Continental Illinois had to be saved.

Paul A. Volcker also answered Haraf, saying that whether banks could be "too big to fail" depended on the meaning of the word "fail"; although Continental Illinois creditors were paid, the stockholders lost. He argued that financial regulators must act differently with the current "tenuous institutional background" than with a "robust institutional background." Alternative strategies were tried with Continental Illinois but failed. It is a misinterpretation of this episode to say that no bank would ever fail. Volcker noted that small banks are essentially protected by deposit insurance alone, since they have few deposits over \$100,000. He wondered how, in general, we can ensure protection from crisis without protecting inefficiencies in the banking system.

Feldstein asked Volcker whether we wanted to rely on supervision or to build in risk-sharing arrangements. Volcker responded that we need both and felt that lowering the \$100,000 insurance limit and introducing copayments for deposit insurance made economic sense but seemed politically impossible.

Michael Mussa explained that if the increase in corporate leverage was a response to greater macroeconomic stability and thus less economic risk, it should be viewed as a good thing. So the important question is whether we have encouraged too much leverage in some way. At the end of the Civil War, equity was 40% of banks' total assets but is only about 3%–4% today. One reason for the change is risk sharing by the federal insurance agencies. If only equity and not subordinated credit is at risk in a failing bank, then only equity should count toward the capital requirements. Further, capital requirements should be large enough that the average failing bank draws no public funds.

Robert J. Shiller addressed Grundfest's remarks by agreeing that psychology was important but disagreeing with Grundfest's specific theory. Financial panics are marked not by public insanity but by rapid shifts in public opinion.

The opinions held at any one time are not unreasonable; there are usually “experts” expositing them. The problem is that people change too sharply from one expert to another. People pay closer attention to the markets when they are unstable, so they are more likely to change their minds. Closing markets is unlikely to help this problem.

Edward J. Kane returned to the issue of regulation and supervision of the banking system. The recent reform of the regulating agencies gave the agencies new powers but also established grace periods before capital requirements can be enforced, left loopholes in the capital requirements, and resulted in a diversion of personnel to handle the failing institutions. The key error at the regulatory agencies has been measuring their success in the short run by failure rates rather than by the net capital reserves of the insurance funds. Savings and loans’ losses developed in the mid-1960s and throughout the 1970s and early 1980s, but, until the mid-1980s, the FSLIC covered up the problems. Kane emphasized the importance of insurers’ reporting *net*, not gross, capital reserves for themselves and regulated institutions based on mark-to-market asset values, with tough fraud laws to prevent deception. He proposed “escalating and predictable” penalties for a declining capital base, focusing on forcing shareholders to “buy back” the institution by investing more money or watch the institution close.

William Poole reminded the group that any proposal to make depositors bear some of the losses of a failing institution must take account of the fact that short-term assets are always subject to a run. This fundamental problem of instability cannot be overcome by programs aimed at depositors but must instead be addressed by increasing the amount of equity or long-term debt.

Sidney Jones asked the panelists to consider the sources of the regulatory failure of the savings and loans. He raised three possibilities. First, was the financial system inherently too complex to regulate? If regulators are working eight hours per day to enforce obsolete regulations and institutions are working 24 hours per day to beat the system, risk sharing arrangements will be necessary. Second, does the ability of financial institutions to move between different regulatory environments pressure regulators to soften their rules? Third, has the quality of the regulatory personnel been a problem? Jones said that, as a political appointee for 20 years, he can attest that they vary in quality. In particular, he was concerned about the turnover among appointees and their lack of previous experience. He summarized his views as a support for more supervision of institutions and less protection if they fail anyway.

Feldstein asked whether less protection for creditors is politically feasible and whether it would encourage more careful institutional behavior anyway. Individuals with less than \$100,000 in bank accounts are probably not sophisticated financial analysts. Would credit rating agencies develop to help such depositors assess the risks of different institutions? *Jones* repeated his belief in limitations on deposit insurance.

Sprague responded to Jones by stating that the main difference in operation

between the Federal Home Loan Bank Board (FHLBB) and the FDIC was the ability of the FDIC to ignore the special pleading of Congress and the president, an ability the FHLBB did not have.

Strunk agreed with Jones's suspicion that the FHLBB had a very inadequate examination staff in terms of size, ability, and experience. This was due to direct congressional control of the agency and low salaries. The FHLBB was also cautious in dealing with failing institutions due to a likely federal court review of their actions.

Paul A. Samuelson discussed the origin of the saving and loan problems in Congress's desire to help the real estate industry. By legislating a system with short-term deposits and long-term loans, they created the potential for honest institutions to go under water if interest rates were highly variable. This danger preceded the moral-hazard and agency problems stressed by Kane.

Richard F. Syron agreed with Jones and Samuelson that the Home Loan Bank Act of 1932 was inherently flawed, as the intent of Congress to promote home ownership became interpreted as an intent to promote the savings and loan industry. A system where the goal of the regulator was to promote the regulated industry (a majority of directors of the Home Loan Banks were from the institutions being regulated) could only work in a stressless world.

Samuelson discussed another approach to the insurance issue based on his personal money management, namely individual choice of mutual funds holding assets of varying risk.

Feldstein added that James Tobin had recently supported the so-called narrow bank concept in which individuals could have many types of mutual fund accounts but government insurance would apply only to deposits corresponding to government or AAA short-term bonds.

Grundfest went on to say that the Securities and Exchange Commission has given serious thought to popularizing the simple observation that limitless insurance is available at zero premium *if* one puts one's money into a money market mutual fund that invests in U.S. Treasury instruments. If one wants a return greater than the riskless rate, one needs to take some risk, but all of the legitimate reasons for deposit insurance can be fulfilled by money market funds that hold Treasury securities.

Richard D. Erb described other structural rigidities in the banking system that increase risks to individual institutions. The most important are limitations on asset choice, limitations based on geography because of restrictions on inter- and intrastate branch banking, limitations on the size of institutions, and the historical link between the mortgage market and the savings and loan industry. He proposed moving toward requiring a broadly defined portfolio distribution for all institutions covered by deposit insurance. Opening up the diversification possibilities for savings and loans was a good step but was too limited, as remaining geographic limitations led to concentrated high-risk investments, as in the Southwest.

Robert E. Hall raised the broader question of why default on debt is dan-

gerous for the economy. Although the public associates default with shutdown and layoffs, in fact the company usually continues in business with a new set of shareholders, as the old shareholders are wiped out and the debt holders become shareholders. Why is this conceptually distinct from a business that operated with zero leverage and faced hard times? Hall noted that there is an alternative view that default is more costly, as David Cutler and Lawrence Summers showed that the stock market capitalized the cost of Texaco and Pennzoil's reorganization in the billions of dollars. This loss greatly exceeds the direct costs, and the source of the extra loss is unknown, but there is no evidence that combined employment fell. Further, as defaults become more common, both their perceived and actual costs will fall.

Hall continued that the crucial question for banks is whether lending continues unabated after defaults. The answer appears to be yes for real estate loans, but is less clear for business loans, for which there is no secondary market; this means that funding and loan origination are done by the same institution. The idea that a financial crisis reduces business investment because it precludes business borrowing is much less true than it used to be.

Feldstein emphasized that the conference's concern is not with individual institutional failure but with the possibility of a systemic breakdown. Has the deposit insurance system acted as a brake on that breakdown process?

Friedman concluded by asking whether systemic failures differ from individual failures in a fundamental way. If they do, then Hall's approach of thinking about one institution in a world where other institutions are operating normally will not be a sufficient analysis.