

## **Ben S Bernanke: Asset-price “bubbles” and monetary policy**

Speech by Mr Ben S Bernanke, Member of the Board of Governors of the US Federal Reserve System, before the New York Chapter of the National Association for Business Economics, New York, 15 October 2002.

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I am very pleased to have this opportunity to address the National Association for Business Economics. Thank you for inviting me.

My talk today will address a contentious issue, summarized by the following pair of questions: Can the Federal Reserve (or any central bank) reliably identify “bubbles” in the prices of some classes of assets, such as equities and real estate? And, if it can, what if anything should it do about them?

By way of background, I note that monetary policy in the United States has achieved quite a good record over the past two decades. Since the Fed’s conquest of inflation in the 1980s, the American economy has moved steadily toward price stability and - except for two recessions that appear to have been relatively mild by historical standards - has enjoyed solid economic growth and high employment as well. Quarter-to-quarter volatility in both output growth and inflation has dropped markedly in the past twenty years, in comparison with the turbulent 1960s and 1970s.

New eras bring new challenges, however, and with inflation quiescent for the moment, public attention has shifted to a different source of potential instability in the economy: specifically, large swings in the prices of assets, both financial and real. As everyone here knows, the second half of the 1990s saw a major bull market in equities in the United States, followed by a bear market that began in the spring of 2000. The decline in stock values since March 2000 has not only vaporized trillions of dollars in wealth, but also likely played a role in worsening the recession that, according to the National Bureau of Economic Research, began in the United States in March 2001. This experience has led a number of observers - including academics, journalists, and businesspeople - to assert that the Federal Reserve should have acted earlier to contain the sharp run-up in stock prices. If the Fed had had the foresight to “prick the bubble” at an early stage, the argument goes, the economy might have been spared needless trauma. My goal today is to look more closely at this argument and its implications.

### **Dealing with Asset-Market Instability: Use the Right Tool for the Job**

As a preliminary to assessing the critics’ argument, and to get my own views on the table right away, let me briefly sketch a policy framework that I believe is useful for thinking about these issues. Before I do so, I will state the usual proviso, that the opinions expressed here are mine alone and not necessarily those of my colleagues at the Federal Reserve. In particular, I emphasize that my comments today should not be interpreted in any way as representing an official policy position of the Board of Governors or the Federal Open Market Committee.

My suggested framework for Fed policy regarding asset-market instability can be summarized by the adage, *Use the right tool for the job*.

As you know, the Fed has two broad sets of responsibilities. First, the Fed has a mandate from the Congress to promote a healthy economy - specifically, maximum sustainable employment, stable prices, and moderate long-term interest rates. Second, since its founding the Fed has been entrusted with the responsibility of helping to ensure the stability of the financial system. The Fed likewise has two broad sets of policy tools: It makes monetary policy, which today we think of primarily in terms of the setting of the overnight interest rate, the federal funds rate. And, second, the Fed has a range of powers with respect to financial institutions, including rule-making powers, supervisory oversight, and a lender-of-last resort function made operational by the Fed’s ability to lend through its discount window. By using the right tool for the job, I mean that, as a general rule, the Fed will do best by focusing its monetary policy instruments on achieving its macro goals - price stability and maximum sustainable employment - while using its regulatory, supervisory, and lender-of-last resort powers to help ensure financial stability.

Let me discuss the two parts of this recommendation in a bit more detail. The first part of the prescription implies that the Fed should use monetary policy to target the economy, not the asset markets. As I will argue today, I think for the Fed to be an “arbiter of security speculation or values” is

neither desirable nor feasible.<sup>1</sup> Of course, to do its job the Fed must monitor financial markets intensively and continuously. The financial markets are vital components of the economic machinery. Moreover, asset prices contain an enormous amount of useful and timely information about developments in the broader economy, information that should certainly be taken into account in the setting of monetary policy. For example, to the extent that a stock-market boom causes, or simply forecasts, sharply higher spending on consumer goods and new capital, it may indicate incipient inflationary pressures. Policy tightening might therefore be called for - but to contain the incipient inflation not to arrest the stock-market boom per se.<sup>2</sup>

The second part of my prescription is for the Fed to use its regulatory, supervisory, and lender-of-last-resort powers to protect and defend the financial system. In particular, alone and in concert with other agencies, the Fed should ensure that financial institutions and markets are well prepared for the contingency of a large shock to asset prices. The Fed and other regulators should insist that banks be well capitalized and well diversified and that they stress-test their portfolios against a wide range of scenarios. The Fed can also contribute to reducing the probability of boom-and-bust cycles occurring in the first place, by supporting such objectives as more-transparent accounting and disclosure practices and working to improve the financial literacy and competence of investors.<sup>3</sup> Finally, if a sudden correction in asset prices does occur, the Fed's first responsibility is to do its part to ensure the integrity of the financial infrastructure - in particular, the payments system and the systems for settling trades of securities and other financial instruments. If necessary, the Fed should provide ample liquidity until the immediate crisis has passed. The Fed's response to the 1987 stock market break is a good example of what I have in mind.<sup>4</sup>

I have expressed these two principles in rather simple terms; they could be elaborated much further. Taken together, they provide a strategy for policy that has a number of advantages: It keeps monetary policy focused on the appropriate goal variables, economic activity and inflation. It is transparent and easy to communicate to the public. It does not require that central bankers be systematically better than the market at valuing financial assets nor substitute policymakers' judgments of company prospects for those of investors. Finally, and crucially, it is a *robust* strategy, in that - although it certainly does not eliminate all economic and financial instability - it protects the economy against truly disastrous outcomes, which history has shown are possible when monetary policy goes severely off the track.<sup>5</sup>

### **The Opposing View: Preemptive Strikes against Bubbles**

As I noted at the beginning, however, the framework just articulated is not universally accepted, particularly the aspect that precludes attempts to guide the course of asset prices. Instead, a number of critics have argued that monetary policy should be more proactive in trying to correct incipient "imbalances" in asset markets. What can be said about these assertions?

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<sup>1</sup> The phrase is due to Friedman and Schwartz (1963, p. 290).

<sup>2</sup> See Bernanke and Gertler (1999, 2001) and Gramlich (2001) for further discussion. Because equity valuations may pose asymmetric risks to the economic forecast, the implied optimal responses of policy to changes in asset prices may be nonlinear. In this respect I agree with Bordo and Jeanne (2002).

<sup>3</sup> In this regard, some have suggested greater use of the Fed's ability to set margin requirements. Most evidence suggests that changes in margins have little direct effect on asset prices. Possibly, it has been argued, changing margin requirements would have a "psychological" effect on the market. I don't think that an attempt to manage the psychology of investors or consumers is a particularly useful or even appropriate policy strategy for the central bank, however. A better strategy is for the Fed to be transparent and direct in stating its assessment of the economy and of policy options.

<sup>4</sup> Mishkin and White (2002) emphasize the importance of focusing on financial stability following a stock market crash. To clarify this point, support of the financial system in a crisis does not by any means imply a generalized bailout of threatened, firms. Any support that is given should be done under conditions that minimize potential moral hazards.

<sup>5</sup> Bernanke and Gertler (1999, 2001) present simulations that suggest that simple policy rules focused on stabilizing macroeconomic goal variables deliver good economic performance in the face of large moves in asset prices. The 1987 stock market crash is a real-world example of how monetary policy aimed at macro stability coupled with other types of policy emphasizing financial stability can minimize the economic fallout of a sharp decline in asset prices. Later in the talk I discuss the 1929 episode as an example of what can happen when the Federal Reserve strays from this framework.

This debate is clarified considerably, in my view, by recognition that, in practice, the advocates of a more vigorous monetary policy response to asset prices fall into two broad camps, differing primarily in how aggressive they think the Fed ought to be in attacking putative bubbles. The first group, who favor what I will call the *lean-against-the-bubble* strategy, agree that the Fed should take account of and respond to the implications of asset-price changes for its macro goal variables. But also, according to this view, the Fed should try to gently steer asset prices away from a presumed bubble path. For example, seeing a rapid appreciation of stock prices, not only should the Fed tighten enough to offset the likely effects of the boom on inflation and output, but also it should add another 25 to 50 basis points for good measure, in the hope of discouraging increases in stock prices it judges to be excessive.

My sense is that this more moderate camp comprises the great majority of serious researchers who have advocated a monetary-policy response to bubbles.<sup>6</sup> And, in my opinion, the theoretical arguments that have been made for the lean-against-the-bubble strategy are not entirely without merit. At the risk of oversimplifying a large body of literature, I think one can usefully boil down many of these arguments to the idea that it may be worthwhile for the Fed to take out a little “insurance,” so to speak, against the formation of an asset-price bubble and its potentially adverse effects. Like all forms of insurance, bubble insurance carries a premium, which includes (among other costs) the losses incurred if the Fed misjudges the state of the asset market or the cost of a possible reduction in the transparency of Fed policies. But, as a matter of theory, it is rarely the case in economics that the optimal amount of insurance in any situation is zero. On that principle, proponents of leaning against the bubble have argued that completely ignoring incipient potential bubbles, if in fact they can be identified, can’t possibly be the best policy. I will discuss below why I believe that, nevertheless, “leaning against the bubble” is unlikely to be productive in practice.

The second group of critics is those preferring a more activist approach, which I will call here *aggressive bubble popping*. Aggressive bubble-poppers would like to see the Fed raise interest rates vigorously and proactively to eliminate potential bubbles in asset prices. To be frank, this recommendation concerns me greatly, and I hope to persuade you that it is antithetical to time-tested principles and sound practices of central banking.

## **Problems with the Proactive Approach to Bubbles**

If we could accurately and painlessly rid asset markets of bubbles, of course we would want to do so. But as a practical matter, this is easier said than done, particularly if we intend to use monetary policy as the instrument, for two main reasons. First, the Fed cannot reliably identify bubbles in asset prices. Second, even if it could identify bubbles, monetary policy is far too blunt a tool for effective use against them.

### **The Identification Problem**

Let’s first discuss the identification problem. Aspiring bubble poppers cannot get around the fact that their strategy requires identifying bubbles as they occur, preferably quite early on. Identifying a bubble in progress is intrinsically difficult. Though the price of (say) a share of stock is readily observable, the corresponding fundamentals - such as the dividends that investors expect to receive and the risk premium that they require to hold the stock - are generally not observable, even after the fact.

Of course, one can always try to estimate a fundamental value for stocks and other assets - I will discuss some possible indicators of fundamental value and overvaluation in a moment. But there is the additional difficulty that the prices of equities and other assets are set in competitive financial markets, which for all their undeniable foibles are generally highly sophisticated and efficient. Thus, to declare that a bubble exists, the Fed must not only be able to accurately estimate the unobservable fundamentals underlying equity valuations, it must have confidence that it can do so better than the

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<sup>6</sup> A sampling of recent work advocating more-proactive responses to bubbles includes Bordo and Jeanne (2002); Borio and Lowe (2002); Cecchetti, Genberg, Lipsky, and Wadhvani (2000); Cecchetti, Genberg, and Wadhvani (2002); Dupor (2002); and International Monetary Fund (2000). Though these papers are in the same camp, they differ considerably in their specific arguments and approaches.

financial professionals whose collective information is reflected in asset-market prices.<sup>7</sup> I do not think this expectation is realistic, even for the Federal Reserve. Moreover, I worry about the effects on the long-run stability and efficiency of our financial system if the Fed attempts to substitute its judgments for those of the market. Such a regime would only increase the unhealthy tendency of investors to pay more attention to rumors about policymakers' attitudes than to the economic fundamentals that by rights should determine the allocation of capital.

If we nevertheless persist in trying to measure bubbles, what indicators might be useful? Several have been suggested, including the rate of appreciation of asset prices, various ratios that attempt to measure the return on stocks, and growth in bank credit. None of these provides a reliable indicator of a developing bubble.

First, many people appear to consider sustained increases in the prices of assets as *prima facie* evidence of a bubble, on the principle that what goes up must come down. This view is simplistic at best. In fact, although no bull market goes on forever, historically it has by no means been the case that strong bull markets are inevitably followed by raging bears.<sup>8</sup> Further, the fact that a particular rise in asset prices happens to be followed by a price decline does not prove that the initial increase was irrational or unjustified - sometimes strategies that are perfectly reasonable *ex ante* just don't pan out, as every bridge player knows. Because risk-taking is essential for economic dynamism, we do not want an economy in which investors and businesspeople are not free to take bets that might turn out badly.

Various price-return ratios, such as price-earnings or dividend-price ratios, may seem to have more potential as indicators of bubbles than do simple rates of price appreciation. But even these are far from reliable - for a host of reasons, including changes in institutions, tax and accounting procedures, inflation, and underlying growth rates. The most difficult problem in using such ratios to assess fundamental values is that one cannot avoid taking a stand on the appropriate value of the equity premium, the extra return that investors require to hold equities rather than bonds. Economists have an extraordinarily poor understanding of the determinants of the equity premium, yet relatively small changes in this variable can have major effects on assessments of fundamental values.

I will give one illustration of the potential pitfalls of relying too heavily on ratio indicators, even in the hands of the most sophisticated practitioners. In December 1996, before my time at the Board, John Campbell of Harvard and Robert Shiller of Yale made a presentation at the Fed, in which they used dividend-price ratios and related measures to argue that the stock market was overvalued. (A version of their presentation was later published in the *Journal of Portfolio Management*, which is the source for all my comments here.) Campbell and Shiller, whom I know well and respect greatly as preeminent financial economists, rightly deserve credit for calling the possibility of a bubble to people's attention, at a time when (lest we forget) there was significant diversity of opinion about which way the market would go. Shiller, of course, has gone on to write a best-selling book about stock market manias.

Though Campbell and Shiller were among those warning of a bubble in stock prices, and deserve credit for doing so, we should not lose sight of a simple quantitative point: According to their published article, their analysis of dividend-price ratios implied that, as of the beginning of 1997, the broad stock market was priced at *three times* its fundamental value (Campbell and Shiller, 1998, p. 13). At that time the Standard & Poor's 500 index was about 750, compared with a close of 842 on October 1 of

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<sup>7</sup> Some may believe that stock prices are set largely by uninformed and unsophisticated traders and thus have little connection to fundamentals. I find that belief hard to reconcile with the general level of American prosperity, in which I believe the efficient allocation of capital by financial markets has played a central role. Moreover, even if bubbles arise from the behavior of uninformed traders, they should have no substantial effect on capital allocation unless those who make capital expenditures believe the market's valuations.

<sup>8</sup> For example, in an interesting recent paper, Bordo and Jeanne (2002) used mechanical rules to identify booms in stock and residential property prices since 1970 in 15 industrial countries. They defined a "boom" to be a situation in which asset-price growth over a three-year period lies significantly above its long-run average and a "bust" to be a situation in which the three-year asset-price growth is correspondingly lower than normal. Out of 24 boom episodes that they identified for stock prices, only 3 were followed by busts.

Bordo and Jeanne found more evidence for boom-bust cycles in residential property: Busts followed ten of nineteen property booms. However, none of these instances was in the United States. Bordo and Jeanne note that property boom-bust cycles tend to be local phenomena associated perhaps with only one city. This tendency may explain why they found most boom-bust cycles in property in small countries, in which a significant portion of the real estate value (or the data collection) is associated with one or two major cities.

this year. I do not know, of course, where the stock market will go tomorrow, much less in the longer run (that's really my whole point). But I suspect that Campbell and Shiller's implicit estimate of the long-run value of the market was too pessimistic and that, in any case, an attempt to use this assessment to make monetary policy in early 1997 (presumably, a severe tightening would have been called for) might have done much more harm than good.<sup>9</sup>

Part of the reason that the standard ratios were too pessimistic in 1997 was that at least some of the run-up in stock prices in the latter 1990s was apparently justified by fundamentals, as evidenced by the remarkable growth in output and productivity in recent years, the recent recession notwithstanding. Pure bubbles - increases in asset prices that are 100 percent air - are, I suspect, rare. So the problem of a bubble-popping Fed is much tougher than just deciding whether or not a bubble exists; to follow this strategy, the Fed must also assess the *portion* of the increase in asset prices that is justified by fundamentals and the part that is not. In my view, somehow preventing the boom in stock prices between 1995 and 2000, if it could have been done, would have throttled a great deal of technological progress and sustainable growth in productivity and output.

Another possible indicator of bubbles cited by some authors is the rapid growth of credit, particularly bank credit (Borio and Lowe, 2002). Some of the observed correlation may reflect simply the tendency of both credit and asset prices to rise during economic booms. However, to the extent that credit expansion is indicative of bubbles, I think that empirical linkage points to a better policy approach than attempts at bubble-popping by the central bank. During recent decades, unsustainable increases in asset prices have been associated on a number of occasions with botched financial liberalization, in both emerging-market and industrialized countries. The typical pattern is that lending institutions are given substantially expanded powers that are not matched by a commensurate increase in regulatory supervision (think of the savings and loans in the United States in the 1980s). A situation develops in which institutions can directly or indirectly take speculative positions using funds protected by the deposit insurance safety net - the classic "heads I win, tails you lose" situation.

When this moral hazard is present, credit flows rapidly into inelastically supplied assets, such as real estate. Rapid appreciation is the result, until the inevitable albeit belated regulatory crackdown stops the flow of credit and leads to an asset-price crash. Bubbles of this type may be identifiable to some extent after they have begun, but the right policy is to do the financial deregulation correctly - that is, in a way that does not allow speculative misuse of the safety net - in the first place. Or failing that, to intervene and fix the problem when it is recognized.<sup>10</sup>

### **The Difficulty of "Safe Popping"**

As a matter of logic, the fact that bubbles are difficult to identify with precision does not necessarily justify ignoring potential ones (although it does suggest that the optimal response to them should be highly attenuated). For example, an advocate of the lean-against-the-bubble philosophy could appeal to the "insurance" argument I noted earlier: Even if we can measure bubbles only imprecisely, is the optimal response of monetary policy to a perceived bubble literally zero? Shouldn't there be at least a bit of response, for "insurance" purposes?

To evaluate this argument, we must keep in mind an underlying premise of the lean-against-the-bubble strategists, which is that the response of incipient bubbles to monetary policy is more or less proportional to the policy action. In other words, for the insurance argument to apply, a small increase in the federal funds rate must lead to some correspondingly modest decline in the likelihood or size of a bubble. But such a smooth response is not well supported by either theoretical or empirical research on asset price dynamics.<sup>11</sup> If a bubble - a speculative mania, in the more colorful language of the past - is actually in progress, then investors are presumably expecting outsized returns: 10, 15, 20 percent or more annually. Is it plausible that an increase of ½ percentage point in short-term interest rates, unaccompanied by any significant slowdown in the broader economy, will induce speculators to think

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<sup>9</sup> Various ratio measures continue to give divergent readings on stock fundamentals even today. See, for example, Jesse Eisinger's article on the divergent predictions of two leading analysts, *Wall Street Journal* (September 30, 2002), p. C1.

<sup>10</sup> Supervisors of financial institutions can help here by insisting on tough underwriting standards.

<sup>11</sup> Alan Blinder has likened bubble-popping strategies to sticking a needle in a balloon; one cannot count on letting out the air slowly or in a finely calibrated amount.

twice about their equity investments? All we can conclude with much confidence is that the rate hike will tend to weaken the macroeconomic fundamentals through the usual channels, while the asset bubble, if there is one, may well proceed unchecked.

Although neither I nor anyone else knows for sure, my suspicion is that bubbles can normally be arrested only by an increase in interest rates sharp enough to materially slow the whole economy. In short, we cannot practice “safe popping,” at least not with the blunt tool of monetary policy. The situation is further complicated if, as is usually the case, the suspected bubble affects only a specific class of assets, such as high-tech stocks. Certainly there is no way to direct the effects of monetary policy at a single class of assets while leaving other financial markets and the broader economy untouched. One might as well try to perform brain surgery with a sledgehammer.

The problem of safe popping applies with double force to the aggressive bubble-popping strategy. A truly vigorous attempt by a central bank to rein in a supposed speculative bubble may well succeed but only at the risk of throttling a legitimate economic boom or, worse, throwing the whole economy into depression. Rather than discuss this point further in the abstract, let me give a concrete historical example: the role of Federal Reserve policy at the onset of the Great Depression in the United States.

### **An Historical Example: Federal Reserve Policy in the 1920s**

The U.S. experience of the 1920s illustrates many of the points I have been making. As you know, the “Roaring Twenties” was a prosperous decade, characterized by extensive innovation in technology and in business practices, rapid growth, American economic dominance, and general high spirits. Stock prices rose accordingly. As early as the mid-1920s, however, various policymakers and commentators expressed concern about the rapidly rising stock market and sought so-called corrective action by the Federal Reserve.<sup>12</sup>

The corrective action was not forthcoming, however. According to some authors, this was in large part because of the influence of Benjamin Strong, long-time Governor of the Federal Reserve Bank of New York and America’s pre-eminent central banker of that era. Strong resisted attempts to aim monetary policy at the stock market, arguing that raising interest rates sufficiently to slow the market would have highly adverse effects on the rest of the economy.<sup>13</sup> “Some of our critics damn us vigorously and constantly for not tackling stock speculations,” Strong wrote about the debate. “I am wondering what will be the consequences of such a policy if it is undertaken and who will assume responsibility for it.”

However, Strong died from tuberculosis early in 1928, and the Fed passed into the control of a coterie of aggressive bubble-poppers, of whom the most determined was probably Board Governor Adolph Miller. Miller was supported in his objective by another fervent enemy of “speculation” - and Miller’s neighbor and close friend - Herbert Hoover, soon to be President. Under Miller’s influence the debate within the Federal Reserve System shifted from whether to try to stop stock-market speculation to how best to do it. The Board in Washington favored “direct pressure,” which in practice meant threatening New York City banks that made loans to brokers with being cut off from the discount window. Strong’s successor at the New York Fed, George Harrison, argued correctly that the availability of alternative sources of credit made this approach ineffectual and pushed for higher interest rates instead. Ultimately, frustrated by the ineffectiveness of direct pressure, the Board in Washington came around to Harrison’s view.

Hence, in 1928, in a situation in which the inflation rate was actually slightly negative and the economy was only barely emerging from a mild recession, the Fed began to raise interest rates.<sup>14</sup> The New York

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<sup>12</sup> Much of the concern of contemporary observers in the twenties centered on the ability of world gold stocks to “support” the much higher postwar price levels. Readers of historical documents from this period should take care to understand that references to “inflation,” “excessive credit creation,” and “speculation” were often related to this issue rather than to the issues we associate those terms with today. The 1920s were in fact far from an inflationary decade in the modern sense; the Consumer Price Index in 1929 was essentially identical to its value in 1923, and prices fell from 1926 to 1929.

<sup>13</sup> Strong’s biographer quotes him as follows (Chandler, 1958, p. 427): “I think the conclusion is inescapable that any policy directed solely to forcing liquidation in the stock loan account and concurrently in the price of securities will be found to have a widespread and somewhat similar effect in other directions, mostly to the detriment of the healthy prosperity of this country.” The subsequent quote in the text is from the same source. Bierman (1991) reproduces this quote and gives additional useful discussion of Fed policies during the run-up to the crash.

<sup>14</sup> The National Bureau of Economic Research has designated November 1927 as a recession trough.

Fed's discount rate, at 3.5 percent in January 1928, reached 6 percent by August 1929, its highest value since 1921.<sup>15</sup> Rates on term stock-exchange loans peaked in that month at almost 9 percent, and the rate on call loans exceeded 10 percent in early August. For short periods the rates on these loans sometimes spiked above 20 percent.

As is well known, U.S. common stock prices peaked in September 1929 and fell sharply in panicky selling in October. The popular view is that the market crash was the harbinger of the Great Depression. In fact, the weight of historical research has shown that this interpretation gets the causality largely backward. The economy was already slowing by the fall of 1929 (the NBER peak, marking the beginning of the Depression cycle, was in August 1929), largely as a result of monetary tightness. Economic indicators, which had been uniformly strong, were becoming more mixed: The Federal Reserve's industrial production index began to decline in July, construction contracts fell sharply in August and September, and automobile sales dipped suddenly at the beginning of October. Conditions abroad were weakening, and both foreign and U.S. interest rates were rising. The famous warning by Roger Babson that led to the "Babson break" in stock prices in September 1929 was based on mounting evidence that an economic slowdown was already in progress, implying that continued strong earnings growth could not be counted on. Thus the stock market decline was more the result of developing economic weakness (and tight money) than the cause of the slowdown - though, obviously, falling stock prices did not help the broader economic situation in late 1929 and 1930.

Some additional evidence that the stock market was as much a victim as a cause of the Depression is that, to a degree not fully appreciated today, the stock market boom of the 1920s was surprisingly hard to kill. Indeed, stock prices did not collapse in 1929 but only began to plummet when the depth of the general economic decline became apparent. For example, stock prices in April 1930 were still about the same level as in January 1929; and someone who bought stock in early 1928 and sold in October 1930 would have almost broken even. Only as the bad economic news kept rolling in, in the fall of 1930, did stock prices finally fall below 1928 levels.

The correct interpretation of the 1920s, then, is not the popular one - that the stock market got overvalued, crashed, and caused a Great Depression. The true story is that monetary policy tried overzealously to stop the rise in stock prices. But the main effect of the tight monetary policy, as Benjamin Strong had predicted, was to slow the economy - both domestically and, through the workings of the gold standard, abroad. The slowing economy, together with rising interest rates, was in turn a major factor in precipitating the stock market crash. This interpretation of the events of the late 1920s is shared by the most knowledgeable students of the period, including Keynes, Friedman and Schwartz, and other leading scholars of both the Depression era and today.<sup>16</sup>

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<sup>15</sup> These and subsequent data are from Board of Governors (1943). Monetary tightening was also motivated by concerns about outflows of gold to France, which had recently stabilized its currency; see for example Hamilton (1987).

<sup>16</sup> John Maynard Keynes (1930, p. 196), writing at the time, was quite explicit: "Nevertheless the high market-rate of interest which, prior to the collapse, the Federal Reserve System, in their effort to control the enthusiasm of the speculative crowd, caused to be enforced in the United States - and, as a result of the sympathetic self-protective action, in the rest of the world - played an essential role in bringing about the rapid collapse. . . Thus I attribute the slump of 1930 primarily to the deterrent effects on investment of the long period of dear money which preceded the stock-market collapse, and only secondarily to the collapse itself." The early monetarist Lauchlin Currie (1934) expressed similar views.

More recently, Milton Friedman and Anna Schwartz, in their monumental study of monetary policy in the United States, (1963, p. 290) wrote: "Nonetheless, there is no doubt that the desire to curb the stock market boom was the major if not dominating factor in [Federal] Reserve actions during 1928 and 1929. . . In the event [the Fed] followed a policy which was too easy to break the speculative boom, yet too tight to promote healthy economic growth. In our view, the Board should not have made itself an arbiter of security speculation or values and should have paid no direct attention to the stock market boom, any more than it did to the earlier Florida land boom."

In his classic study of the stock market crash of 1929, economic historian Eugene White came to similar conclusions. He wrote (1990, p. 179), "Fearful of financial and economic dislocations, the Federal Reserve tried to restrain speculation first by direct pressure [that is, on the banks] and then by raising interest rates. These efforts had no discernible effect on the boom. It did however produce a general rise in interest rates that slowed the American economy and induced foreign central banks [who were constrained by gold standard rules to match American tightening] to raise their rates. Tighter credit then contributed to the beginning of a recession that was picked up in the mixed economic indicators of early August and September. These dispelled hopes that earnings would continue to grow at a rapid rate. As the economy faltered, wiser investors began leaving the market. When selling picked up speed, margin calls and delayed information from the ticker ensured a dramatic panic." White goes on to call the Fed's policies during this period "inappropriate." He wrote, "Instead of allowing the stock market bubble to run its course, the Federal Reserve's tighter monetary policy pushed the economy further into recession, rendering it more vulnerable to the shock that came when the bubble finally burst."

New York Fed Governor Harrison and other participants argued after the fact that the problem with their policy was not that they tried to burst the stock-market bubble but that their efforts were too little and too late. This attempt to defend the Fed's policies of the latter 1920s does not hold up. There is little credible evidence of a bubble in the U.S. stock market before March 1928 (Galbraith, 1954; White, 1990); yet, in part because of the workings of the gold standard, U.S. monetary policy had already turned exceptionally tight by late 1927 (Hamilton, 1987). Tighter policy earlier would have brought the Depression on all the more quickly and sharply (see Eichengreen, 1992, p. 214, for further discussion).

The Federal Reserve went on to make a number of serious additional mistakes that deepened and extended the Great Depression of the 1930s. Besides trying to pop the stock market bubble, the Fed made little or no effort to protect the banking system from depositor runs and panics. Most seriously, it permitted a severe deflation in the price level, which drove real interest rates sky-high and greatly increased the pressure on debtors. A small compensation for the enormous tragedy of the Great Depression is that we learned some valuable lessons about central banking. It would be a shame if those lessons were to be forgotten.

## Conclusion

Understandably, as a society, we would like to find ways to mitigate the potential instabilities associated with asset-price booms and busts. Monetary policy is not a useful tool for achieving this objective, however. Even putting aside the great difficulty of identifying bubbles in asset prices, monetary policy cannot be directed finely enough to guide asset prices without risking severe collateral damage to the economy.

A far better approach, I believe, is to use micro-level policies to reduce the incidence of bubbles and to protect the financial system against their effects. I have already mentioned a variety of possible measures, including supervisory action to ensure capital adequacy in the banking system, stress-testing of portfolios, increased transparency in accounting and disclosure practices, improved financial literacy, greater care in the process of financial liberalization, and a willingness to play the role of lender of last resort when needed. Although eliminating volatility from the economy and the financial markets will never be possible, we should be able to moderate it without sacrificing the enormous strengths of our free-market system.

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A final, recent quotation is from Cecchetti (1998, p. 178): "There are two important lessons to be taken away from this experience. First, I believe that if central bankers allow the fluctuations in asset market prices to affect their decisions, it may distract them from concentrating on some combination of output growth and inflation. The focus of the Federal Reserve on the level of equity prices in 1929 clearly led to a disastrously contractionary path for policy. [The second lesson is the importance of lender-of-last resort actions during a crisis.]"

More recent research has shown that attempted bubble popping by monetary policymakers played an even greater role in the onset of the Great Depression than we had thought. An insightful article by Hans-Joachim Voth (forthcoming) has shown how the German central bank, under the famous central banker Hjalmar Schacht, contributed mightily to the demise of the Weimar Republic by aggressively attempting to bring down stock prices in 1927. Schacht's policy was successful, in the sense that the stock market crashed. But investment plummeted as well, and the German economic boom of 1924-1928 degenerated into depression and played a role in the global slowdown. Ironically enough, Voth argues persuasively that in fact there was no bubble in German stock prices, so that Schacht's actions were purely destructive.