Congressional Research Service

Report RL33666

Asset Bubbles: Economic Effects and Policy Options for the Federal Reserve

Marc Labonte, Government and Finance Division

September 25, 2007

Abstract. After several years of steady growth, equity (stock) market prices began to rise rapidly in 1995. From the beginning of 1995 to its peak in August 2000, the value of the Standard and Poor's index of the 500 largest firms had more than tripled in nominal terms (see Figure 1). The sharpest increases in equity prices were concentrated in high-tech stocks. Prices on the NASDAQ, an exchange known for listing smaller high-tech firms, were six times higher at the peak than in 1995. During this period, extravagant claims were made about a "new economy" that defied the old economic laws, and about the easy, sure-fire way to make money through equity investments. At the same time, many economists cautioned that the stock market was in the grips of a speculative bubble, an increase in prices unrelated to fundamental determinants of value, that would eventually burst and impoverish many of the same investors that it had hitherto made rich. Alan Greenspan, then-Chairman of the Federal Reserve, cautioned against "irrational exuberance" in the equity market in 1996, and Yale economist Robert Shiller released a widely read book of the same title in 2000.

Order Code RL33666

CRS Report for Congress

Asset Bubbles: Economic Effects and Policy Options for the Federal Reserve

Updated September 25, 2007

Marc Labonte
Specialist in Macroeconomics
Government and Finance Division

Congressional Research Service

Prepared for Members and Committees of Congress

Asset Bubbles: Economic Effects and Policy Options for the Federal Reserve

Summary

After several years of steady growth, stock market prices began to rise rapidly in 1995, more than tripling over the next five years. In 2000, stock prices began a prolonged decline. Shortly thereafter, in March 2001, the longest expansion in history ended, and the economy entered a recession. By September 2002, the Standard and Poor's 500 Index had fallen by nearly half from its peak. In hindsight, it is clear that some of the appreciation in stock prices in the 1990s was caused by a "bubble," a rise in price that cannot be attributed to underlying economic fundamentals, but is instead caused by "irrational exuberance."

Around the same time that the stock market boom was coming to an end, the housing boom began. House prices have doubled since 1997 and increased more than 50% from 2003 to 2006. Since 2006, prices have stagnated, while sales and housing construction have declined precipitously. In August 2007, problems with subprime mortgages led to widespread financial turmoil. This has led some analysts to conclude that a similar asset bubble has infected the housing market.

These experiences have led some critics to question the Federal Reserve's (Fed's) policy of non-intervention toward bubbles. If bubbles reflect harmful economic imbalances, they argue, then the proper policy response is to raise interest rates to neutralize them. This proposal faces two main drawbacks. First, bubbles cannot be accurately identified and their magnitude cannot be estimated until after the fact. Theory suggests that the Fed would be able to accurately identify bubbles only if it knew more than the thousands of professionals participating in those markets who believed high prices to be justified. Second, aggressively raising interest rates to counteract a bubble risks instigating the very recession that critics ostensibly wish to avoid. The relative shallowness and brevity of the 2001 recession is seen as evidence in favor of a hands-off policy response to a bubble.

Fed Chairman Ben Bernanke has argued that the Fed should respond to a bubble only insofar as it causes inflation or growth to rise above sustainable levels, but need not be concerned about eliminating a bubble for its own sake. Bubbles lead to higher investment in the affected industry and consumption spending (by making households feel wealthier). According to Bernanke's philosophy, the Fed could raise interest rates in response to a bubble if this spending increase were inflationary.

Assuming Bernanke's philosophy were correct, the issue of whether the Fed has responded to bubbles aggressively enough in practice to prevent them from igniting inflationary pressures remains. The Fed waited until 1999 to raise interest rates during the stock market boom, and cut rates in 2007 in response to financial turmoil. Both of these episodes have been marked by rising inflation, and if increases in house prices were recorded in the owner-occupied shelter portion of the consumer price index, recorded inflation would be even higher today. Critics also argue that the Fed's passive approach to a growing bubble is inconsistent with its aggressive rate reductions following a bubble's deflation, and this inconsistency sends a message to investors to take on excessive risk. This report will be updated as events warrant.

Contents

List of Figures

Asset Bubbles: Economic Effects and Policy Options for the Federal Reserve

Introduction

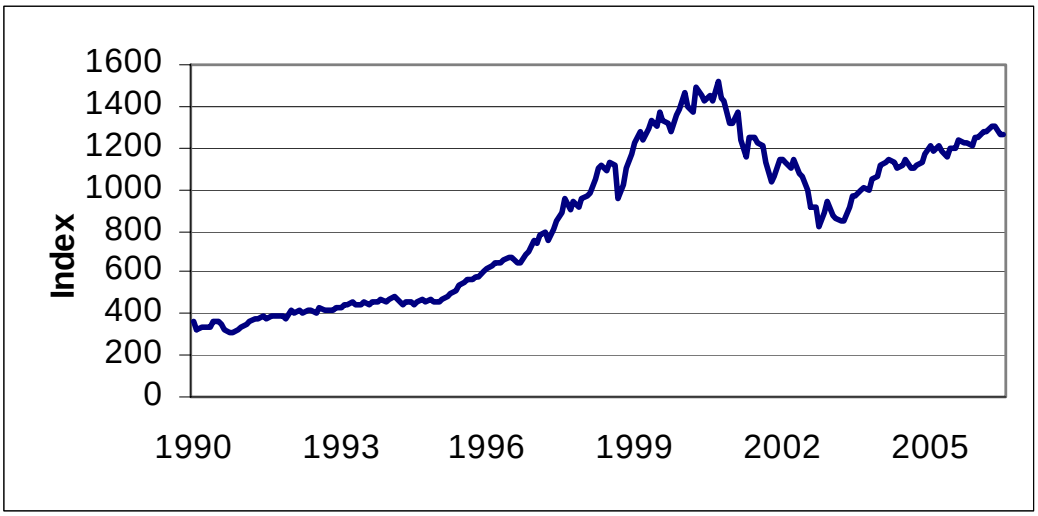
After several years of steady growth, equity (stock) market prices began to rise rapidly in 1995. From the beginning of 1995 to its peak in August 2000, the value of the Standard and Poor's index of the 500 largest firms had more than tripled in nominal terms (see **Figure 1**). The sharpest increases in equity prices were concentrated in high-tech stocks. Prices on the NASDAQ, an exchange known for listing smaller high-tech firms, were six times higher at the peak than in 1995. During this period, extravagant claims were made about a "new economy" that defied the old economic laws, and about the easy, sure-fire way to make money through equity investments.[1] At the same time, many economists cautioned that the stock market was in the grips of a speculative bubble, an increase in prices unrelated to fundamental determinants of value, that would eventually burst and impoverish many of the same investors that it had hitherto made rich. Alan Greenspan, then-Chairman of the Federal Reserve, cautioned against "irrational exuberance" in the equity market in 1996,[2] and Yale economist Robert Shiller released a widely read book of the same title in 2000.[3]

[1] See, for example, Stephen B. Shepard, "The New Economy: What it Really Means," *Business Week*, November 17, 1997, p. 38.

[2] Typically, Greenspan's actual words were more ambiguous than the interpretation they were universally given: "Clearly, sustained low inflation implies less uncertainty about the future, and lower risk premiums imply higher prices of stocks and other earning assets. We can see that in the inverse relationship exhibited by price/earnings ratios and the rate of inflation in the past. But how do we know when irrational exuberance has unduly escalated asset values, which then become subject to unexpected and prolonged contractions as they have in Japan over the past decade?" Remarks by Chairman Alan Greenspan, "The Challenge of Central Banking in a Democratic Society," at The American Enterprise Institute, Washington, D.C., December 5, 1996.

[3] Robert Shiller, *Irrational Exuberance* (Princeton: Princeton University Press, 2000).

Figure 1. S&P 500, 1990-2006



Source: Yahoo! [http://finance.yahoo.com/]

In 2000, the trend abruptly reversed, and stock prices began a prolonged decline. Shortly thereafter, in March 2001, the longest expansion in history ended, and the economy entered a recession. By September 2002, prices on the S&P 500 had fallen by nearly half from their previous peak, and prices on the NASDAQ were one-quarter of their former peak. In hindsight, it seems clear that some portion (though not all) of the 1990s stock market rise and subsequent decline was indeed caused by a bubble, or an increase in price that is caused by psychological factors, speculation, or error rather than economic fundamentals. The pattern was reminiscent of the stock market crash that preceded the Great Depression in 1929 or the decade of economic stagnation in Japan in the 1990s,[4] although this time the effects were far more benign.

Before the stock market crashed, seemingly similar events were starting to occur in housing markets, as shown in **Figure 2**. After several years of solid growth, house price appreciation suddenly began accelerating in mid-1997, with further escalation since 2003. According to the house price index (HPI), prices have doubled since 1997 and increased more than 50% since 2003. To date, the HPI has not shown any national decline in housing prices, although the market is slowing down.[5] In contrast, more recent data from another source suggest that house prices may have already begun to decline.[6] Housing sales and residential investment (house building) have already declined at double digit rates. Mortgage deliquency rates have risen, and as

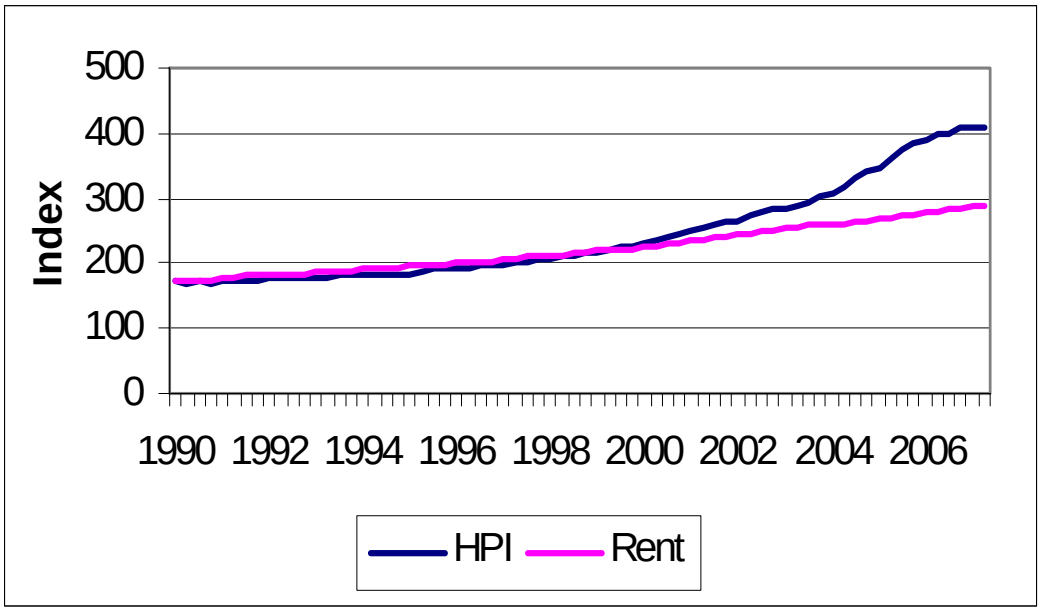
[4] For more information, see CRS Report RL30176, *Japan's "Economic Miracle": What Happened?*, by William Cooper.

[5] Office of Federal Housing Enterprise Oversight, "House Price Index," press release, September 5, 2007.

[6] U.S. Census Bureau, "New Residential Sales in August 2007," news release, September 27, 2007.

a result, there was widespread financial turmoil in August 2007 that originated with subprime mortgage-backed securities.[7]

Figure 2. House Price Index vs. Rental Index, 1990:1-2007:2



Source: Office of Federal Housing Enterprise Oversight, Bureau of Labor Statistics
Note: House Price Index is a repeat sales index of owner-occupied homes; rent index is rent of primary residence from the consumer price index.

Some economists have argued that the housing market is also suffering from a bubble, whereas some commentators argue that owner-occupied housing will always be a bargain investment.[8] While the efficacy of using monetary policy in response to the 1990s stock market bubble may seem obvious now, it is useful to remember that opinions on the existence of an equity bubble were equally divided at the time.

The rise and fall of the stock market led to widespread debate among economists and policymakers that the end of the housing boom has only intensified. Should the Federal Reserve have responded to the stock market bubble (and now the housing boom) when it first emerged by raising interest rates to promptly extinguish it before it took off? If it had done so, could a recession have been avoided? Is the targeting of asset bubbles consistent with the Fed's dual mandate of maximum employment and low inflation? How can bubbles emerge when standard economic theory strongly predicts they cannot? And given theoretical predictions, how would

[7] See CRS Report RL34182, *Financial Crisis? The Liquidity Crunch of August 2007,* Darryl E. Getter, Mark Jickling, Marc Labonte, Edward Vincent Murphy.

[8] For a complete analysis of the issue, see CRS Report RL31918, *U.S. Housing Prices: Is There a Bubble?*, by Marc Labonte.

the Fed be able to accurately identify a bubble? This debate is important to Congress in order to effectively exercise its oversight duties for the Federal Reserve.[9]

What is a Bubble?

Economic theory suggests that in a competitive market, price is determined by supply and demand, and equals the marginal cost of producing the good. A market is said to be competitive when there are many buyers and sellers who are perfectly informed and rational, prices can be easily altered, and there are no barriers to entry. A bubble is said to occur when price does not equal marginal cost. Standard economic theory (called "efficient markets" theory) strongly concludes that bubbles cannot occur in competitive markets because any time price exceeds marginal cost, producers will increase their supply, thereby pushing price back down to marginal cost. At first glance, few markets seem to better fit the "perfect competition" criteria than the markets for equities and homes — there are millions of buyers and sellers, an enormous number of transactions take place, information abounds, professional analysts closely evaluate market trends, prices adjust rapidly, and so on. Few goods markets meet these criteria.

Equity prices are based on the present discounted value of future dividends and price appreciation. Obviously, it is extremely difficult to accurately forecast these values into the distant future, and this would seem to suggest that bubbles could form. Still, standard theory rules out bubbles developing based solely on uncertainty for two reasons. First, theory predicts that systematic errors will not be made by market participants overall. In other words, optimistic and pessimistic prediction errors should on average nearly cancel out. Most participants should not systematically overestimate future prices, as a bubble implies. Second, standard theory does not necessarily require all market participants to be equally smart or sensible. But it predicts that less skilled participants will eventually be driven out of the market because they regularly lose money in transactions with more skilled participants. In other words, analysts who recognize the existence of a bubble should be able to profit from it by selling stocks short, and in the process of short selling, the bubble should be deflated.[10] This possibility seems to rule out a large and protracted bubble similar to the one that developed in the 1990s.[11]

---

[9] This report analyzes only the Fed's monetary policy responsibilities. In the case of a housing bubble, the Fed also has relevant banking regulatory oversight duties. An analysis of regulatory options is beyond the scope of this report.

[10] An investor would sell the market short by borrowing the asset from one party and selling it to a third party. When the loan came due, the price of the asset would have fallen back to its fundamental value and the investor could pay back the loan at a profit. There are two shortcomings to this argument in reality. First, investors face credit constraints, and if bubbles remained for long periods of time, investors might not be able to borrow for long enough to profit. Second, under the "uptick rule" short selling of a security is prohibited when the price of that security is falling on the NYSE and AMEX (SEC Rule 10a-1.) This rule does not preclude short selling as the bubble is growing, however.

[11] For a recent defense of efficient markets theory, see Burton Malkiel, "The Efficient
(continued...)

So why would these markets suffer from bubbles? Economists who accept that bubbles do occur in reality argue that people are not always as rational as theory predicts. Psychological behavior such as herd mentality,[12] overconfidence, "animal spirits" (as coined by John Maynard Keynes), and biased self-attribution (taking credit for one's success and blaming others for one's failure) may trump logic at times.[13] People seem to have a tendency to project past results forward (into the future) with little regard for whether fundamentals would justify such an assumption. A one-time improvement in fundamentals should be matched with a one-time increase in prices; in which case, there is no reason to think that future appreciation rates will match recent rates. And yet, the longer that high returns persist, the more certain people become that those returns will persist in the future, and the larger the bubble becomes.

In his classic study, Kindleberger argued that a bubble often emerges after a legitimate shift in fundamentals that warrants some increase in asset prices.[14] In the case of equity prices in the 1990s, fundamental changes such as the acceleration in productivity growth, reduction in inflation, increased appetite for risk, strength and duration of that economic expansion, and so on merited some legitimate increase in stock prices. In hindsight, it is clear that these fundamental changes did not justify the full increase in stock prices that actually occurred. Yet, at the time, financial professionals justified the price rises by using optimistic assumptions about fundamentals within standard models.[15] (Most famously, in 1999 two economists released a book entitled *Dow 36,000*, which argued that stock prices had not yet risen nearly high enough based on fundamentals.[16]) These explanations may have been highly unlikely, but they were not impossible; therefore, finding the dividing line at the time between the legitimate price increase and the bubble was impossible.

---

[11] (...continued)
Market Hypothesis and Its Critics," *Journal of Economic Perspectives*, vol. 17, no. 1, Winter 2003.

[12] See Ivo Welch, "Herding Among Security Analysts," *Journal of Financial Economics*, vol. 58, 2000, p. 369.

[13] Psychologically based causes of the bubble are analyzed in detail in Robert Shiller, Irrational Exuberance (Princeton: Princeton University Press, 2000).

[14] Charles Kindleberger, *Manias, Panics, and Crashes*, Fourth Edition (New York: John Wiley and Sons, 2000), Ch. 2. In the book, Kindleberger chronicles historical bubbles.

[15] Economist Timothy Cogley demonstrates that small modifications to economic fundamentals lead to large changes in fundamental prices. For example, if economic growth increased from 2% to 3% annually, equity prices would rise 28.4%. If the spread between stocks and bonds fell from 8 percentage points (the average since 1926) to 5 percentage points (the average since 1966), equity prices would rise 110%. Timothy Cogley, "Should the Fed Take Deliberate Steps to Deflate Asset Price Bubbles?", Federal Reserve Bank of San Francisco, *Economic Review*, no. 1, 1999, p. 42.

[16] James Glassman and Kevin Hassett, *Dow 36,000*, Crown Business Publishing, 1999. Likewise, Nobel prize winner Edward Prescott and his co-author argued that stock market was not overvalued in 2000. Ellen McGrattan and Edward Prescott, "Is the Stock Market Overvalued?," National Bureau of Economic Research, working paper 8077, January 2001.

Similar fundamental explanations can be found for why house prices have risen in recent years — lower mortgage rates reduced borrowing costs dramatically, innovations in mortgage markets reduced liquidity constraints (e.g., down payments have fallen and access to credit has risen), following the stock market crash, individuals perceived homes as relatively more desirable investments, and lower inflation reduced the relative up-front costs of a mortgage. Still, there is a limit to how far price increases can be justified by these explanations. For example, the only change to have occurred from 2003 to 2006 is a greater prevalence of non-traditional mortgages (which some see as a symptom of a bubble), yet prices increased more than 50% in that time. And builders should respond to higher demand by increasing the housing stock, which would push prices back down (although this factor is limited in areas where land is limited). Just as today's stock prices should reflect future dividends and appreciation, today's home prices should reflect the future costs and benefits of ownership. Costs of ownership include maintenance and borrowing costs; benefits include forgone rent payments and tax deductions. Any increase in prices should reflect a change in these costs and benefits or else it is caused by a bubble. With extreme enough assumptions about, say, future rental savings or mortgage rates, nearly any increase in housing prices can be justified. So it is impossible to currently identify a housing bubble with any certainty.

The housing market differs from an ideal competitive market in one important way: supply responds to price changes with a lag, and in some areas is constrained by a lack of open land. This means that a rise and (even subsequent decline) in price in the housing market is more ambiguous than in the stock market — it could be fundamentals at work (greater demand causes prices to rise, which increases supply with a lag). The housing market may also be further from the competitive ideal than the stock market because there is no short selling, there are high transaction prices, the profit motive is not the only motivation for buying, and most buyers and sellers have little expertise. Expecting the average buyer to be able to make complex calculations about future parameters may be unrealistic. On the other hand, it is easier to project a home's future price than a company's future earnings, because the projection is based on a tangible asset. While people will not readily switch from ownership to rental housing, ultimately a comparison of ownership costs to rents will influence people's decisions at the margins, and should therefore not move too far apart.

Discussions of a housing bubble should be cognizant of the fact that there is no national housing market. Price patterns vary widely across different regions — while prices in some regions have risen much more rapidly than the national average, other regions have seen little real appreciation in the recent boom. Thus, if there is a housing bubble, it is a series of localized bubbles, not a nationwide bubble.

The failure of economic theory to accurately predict bubbles does not mean that bubbles do not exist or theory is useless. What it does suggest is that it would be very hard for policymakers to accurately predict a bubble until after the fact.[17] For

---

[17] For efforts to identify bubbles empirically, see Refet S. Gurkaynak, "Econometric Tests of Asset Price Bubbles: Taking Stock," Federal Reserve Board of Governors, *Finance and*

(continued...)

example, economist Randall Kroszner, now a Fed governor, points out that the bull equity markets of the 1950s and 1980s were about as strong as the 1920s and 1990s markets. Based on price appreciation alone, there is no way to tell until after the fact that the former two would keep rising in price while the latter two would turn out to be bubbles.[18]

What Effect Does a Bubble Have on the Economy?

Effects on Investment, Consumption, and GDP

Asset price bubbles do not have any direct effect on gross domestic product (GDP) because GDP measures the current production of goods and services, while a bubble represents a change in the price of an existing asset. Bubbles indirectly affect the economy because economic agents alter their behavior in response to the change in the price signal. For example, when a corporation's stock price rises, it may respond by increasing its physical capital investment spending higher than it otherwise would have.[19] Likewise, when housing prices rise, developers may respond by increasing the housing stock more than the market can profitably support in the long run.

As shown in **Figure 3**, the responsiveness of investment spending to price changes can clearly be seen in the data. When equity prices were rising, (non-residential) physical capital investment spending increased from $763 billion in 1995 to $1,232 billion in 2000. Following the stock market crash in 2000, investment spending declined to $1,072 billion in 2002. Both the rise in equity prices and investment spending were heavily concentrated in the high-tech sector of the economy during the boom, and equity prices and investment spending fell disproportionately in that sector after the crash. Investment spending on information processing (IP) equipment and software grew more than 15% each year from 1995 to 2000. Similarly, residential investment (housing construction) boomed in recent years in tandem with house prices, rising from $449 billion in 2001 to $597 billion in 2005. As the housing boom ended, it then fell to $570 billion in 2006. (All data are adjusted for inflation and expressed in 2000 dollars.)

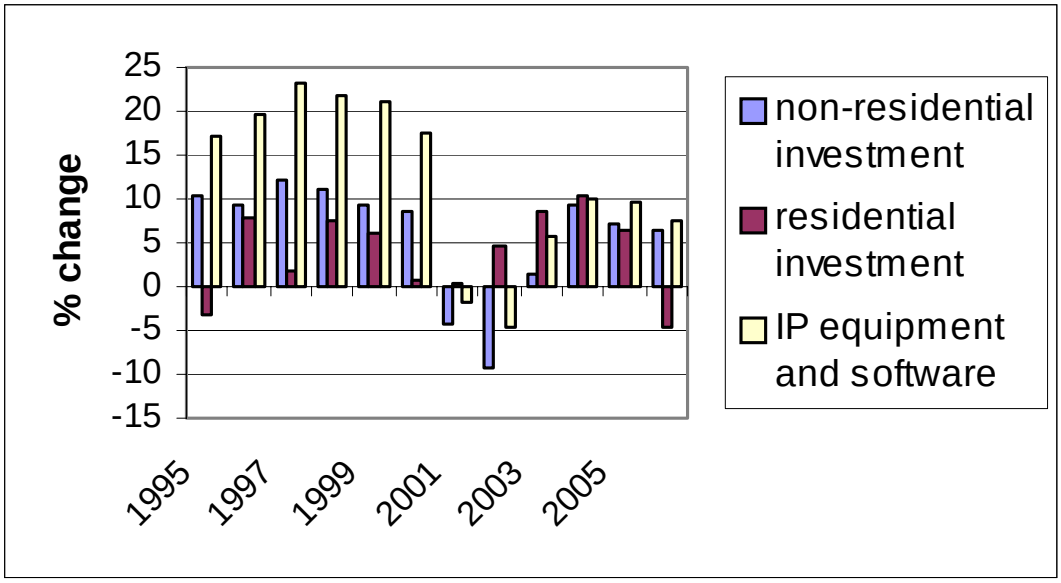
---

[17] (...continued)
Economics Discussion Series 2005-04, January 2005.

[18] Randall Kroszner, "Asset Price Bubbles, Information, and Public Policy," in William Hunter, et al., eds., Asset Price Bubbles, (Cambridge: MIT Press, 2003), p. 4.

[19] See also Simon Gilchrist, et al., "Do Stock Price Bubbles Influence Corporate Investment?", Federal Reserve Bank of New York, staff report no. 177, February 2004.

Figure 3. Growth Rate of Investment by Type, 1995-2006



Source: Bureau of Economic Analysis
Note: IP equipment and software is a sub-component of non-residential investment.

This suggests that bubbles may cause a misallocation of resources that leads to inefficiencies in the economy. For example, the "dot-com bubble" of the 1990s probably led to too much investment spending by high-tech companies relative to the rest of the economy. Some of these investments probably never generated output that justified their cost. Yet in the aggregate, this misallocation did not seem particularly costly to the economy since the dot-com sector was too small to singlehandedly have a large effect on the overall economy. However, Japan arguably provides an example where the misallocation problem was more costly for the overall economy, and contributed to persistent economic stagnation after the bubble burst.

More debatably, economists have also proposed that aggregate spending will be affected by a "wealth effect" when asset prices rise and fall.[20] According to this logic, when asset prices rise, asset holders would use some of their new-found wealth to boost their consumption spending. Evaluating the importance of the wealth effect is difficult because asset prices and consumption are not exogenous — for example, rapid GDP growth or lower interest rates would cause both to rise simultaneously. Some of what is popularly identified as a wealth effect (such as mortgage refinancing) should more properly be considered the standard results of monetary easing. Furthermore, attributing a wealth effect to housing is problematic because an increase in the price of existing housing makes the seller richer, while simultaneously making the buyer equally poorer (income that the buyer could have used on other goods must instead be devoted to financing the purchase of the

[20] See, for example, James Poterba, "Stock Market Wealth and Consumption," *Journal of Economic Perspectives*, vol. 14, n. 2, Spring 2000, p. 99; Karl Case, John Quigley, and Robert Shiller, "Comparing Wealth Effects: The Stock Market Versus the Housing Market," National Bureau of Economic Research, working paper 8606, November 2001.

house).[21] In any case, the size of the wealth effect relative to overall economic activity is likely to be modest because the life cycle theory predicts that spending from an increase in wealth would be spread equally across one's lifetime. For example, a Federal Reserve economist calculated that assuming a marginal propensity to consume from wealth of 0.04, an estimate within the standard range, the stock market decline from 2000 to 2002 would reduce GDP growth by 0.36 percentage points. As the author points out, this estimate is small enough to be indistinguishable from normal fluctuations in economic activity.[22] In fact, consumption grew far more rapidly than overall GDP during the recent stock market decline.[23]

From a policymaker's perspective, the fortunes of a particular industry may matter less than the overall economy's ability to generate full employment. The importance of bubbles, therefore, will depend largely on how damaging they are to the economy's overall health. If the economy can shrug off a bursting bubble and continue to smoothly expand, then preventing bubbles would probably not be a policy priority. Alternatively, if bubbles lead to recessions or financial crises when they burst, then policymakers have a strong incentive to stop bubbles before they start.

A bubble could lead to difficulties in the financial system if it caused a large firm or a number of firms holding the assets which are declining in value to experience insolvency or illiquidity.[24] Financial firms are interdependent, and if the troubled firm is unable to honor its obligations, trouble could spill over to other firms with which it had dealings. If the problem became serious and widespread enough, it could prevent the smooth functioning of financial intermediation, causing non-financial firms difficulty in financing their own operations, thereby feeding through to the general economy. Crisis in the banking sector is what made the Great Depression so long-lasting and deep. Since then, when financial unrest has threatened, the Fed has stepped in to prevent any financial problems from becoming more generalized.[25]

Falling house prices and rising mortgage rates have already resulted in financial problems for issuers of and investors in mortgage-backed securities, and in August 2007, these problems spread throughout the financial system and caused a liquidity

---

[21] There is not a similar issue when stocks rise in value because the buyer is purchasing the right to a larger stream of future profits. When an existing house rises in value, it does not generate more income — the buyer is paying more for the same future stream of shelter services.

[22] Paul Gomme, "Why Policymakers Might Care About Stock Market Bubbles," *Economic Commentary*, Federal Reserve Bank of Cleveland, May 15, 2005.

[23] Bureau of Economic Analysis, *National Income and Product Accounts*.

[24] For a model illustrating how the bursting of a real estate bubble could lead to a banking crisis, see Richard Herring and Susan Wachter, "Bubbles in Real Estate Markets," in William Hunter, et al., eds., *Asset Price Bubbles* (Cambridge: MIT Press, 2003), ch. 14.

[25] See CRS Report RS21986, *Federal Reserve: Lender of Last Resort*, by Marc Labonte.

crunch.[26] Although the Fed was able to restore overall liquidity relatively quickly, it is too early to tell at this date if the liquidity crunch will have any broader and lasting damage for the financial system or the economy.[27]

The most famous, and arguably misunderstood, bubble in U.S. history occurred in 1929, when the stock market crash coincided with the onset of the Great Depression. While the stock market crash may have helped instigate that economic contraction, the consensus among economists is that the bubble had little to do with the depth or duration of the Depression. Instead, most economists blame the contraction in the money supply, which in turn led to widespread bank failures, for the Depression's severity.[28] Likewise, Japan's economic stagnation in the 1990s may have started with the bursting of equity and property bubbles,[29] but most economists attribute its unusual persistence to tight monetary policy, problems in the banking sector, and structural rigidities in the overall economy. These experiences suggest that policymakers' reaction to a bubble is as important as the bubble itself in influencing economic activity.[30]

By contrast, two more recent experiences suggest that a bubble's effect on the overall economy need not be so severe. In October 1987, the stock market suffered its largest single day percentage decline, yet the economy expansion continued for two more years. And although the stock market decline eliminated $5.7 trillion in wealth from 2000 to 2002, the decline in output that followed was the mildest since World War II (although the decline in employment was deeper and longer lasting than the decline in output). Since the decline in stock prices beginning in 2000 was unusually large, it may provide a worst-case scenario for a bubble's effect on the economy, provided the Federal Reserve responded as it did then, by easing monetary policy rapidly. And it cannot be ruled out that other factors were equally or more to blame for causing the recession than the bursting of the bubble, including the preceding tightening of monetary policy, the disruption caused by the attacks of

---

[26] See CRS Report RL34182, *Financial Crisis? The Liquidity Crunch of August 2007*, Darryl E. Getter, Mark Jickling, Marc Labonte, Edward Vincent Murphy.

[27] As another example, Massachusetts saw a large increase in mortgage default rates and bank failures following its real estate bust in the early 1990s. See David Wheelcock, "What Happens to Banks When Housing Prices Fall?", Federal Reserve Bank of St. Louis, *Review*, September 2006, p. 413.

[28] Popular accounts of the 1929 crash often blame the Fed for allowing the bubble to inflate. Cogley argues that, on the contrary, the Fed aggressively tightened monetary policy in response to the bubble, and this contributed to the severity of the ensuing depression. For example, it raised the discount rate from 3% to 6% between 1928 and 1929 even though the price level was falling. Timothy Cogley, "Should the Fed Take Deliberate Steps to Deflate Asset Price Bubbles?", Federal Reserve Bank of San Francisco, *Economic Review*, no. 1, 1999, p. 42.

[29] More than 15 years after its peak, the Nikkei Index is still more than 50% below its peak value.

[30] For a review of all of the stock market crashes of the 20th century and their economic effects, see Frederic Mishkin and Eugene White, "U.S. Stock Market Crashes and Their Aftermath: Implications for Monetary Policy," in William Hunter, et al., eds., Asset Price Bubbles, (Cambridge: MIT Press, 2003), ch. 6.

September 11 (although those occurred near the end of the recession), the increase in oil prices, and the unusually lengthy duration of the expansion, which presumably could not last forever.

The nation has never experienced a housing bubble before in the post World War II period — nominal prices have never fallen significantly. (Prices fell in the early 1980s when adjusted for inflation, but not nominally. The decline was probably caused by the recession and sharp increase in mortgage rates, and not as a result of a bubble.) Therefore, it is difficult to judge how severe an effect on the economy a bursting housing bubble could have. (Since house prices are still rising according to the HPI, it is too soon to draw any conclusions about the current situation.) There are historical examples of sharp declines in local housing prices in California, New England, and Texas. All three of these episodes took place during serious economic contractions.[31] It is difficult to say, however, whether these price declines caused economic difficulties, or were merely the result of economic difficulties. For example, the Texas episode is attributed to the sharp decline in energy prices in the mid-1980s. There are historical examples of when housing prices have stalled, and in these cases residential investment spending has fallen sharply — by a cumulative 41% from 1980 to 1982 and 24% from 1988 to 1991. Presumably, the bursting of a housing bubble could result in even larger declines. Residential investment accounts for too small a share of GDP to cause a recession single-handedly, however. For example, it accounted for an average of 0.4 percentage points of GDP growth from 2003 to 2005, and reduced GDP growth by 0.3 percentage points in 2006. For a recession to occur, a decline in residential investment would need to be accompanied by broader financial distress — it remains to be seen if the turmoil of August 2007 will be long lasting — or a significant wealth effect on consumption.

Effects on Inflation

Just as bubbles have no direct effect on output, bubbles are also not measured in inflation because inflation is defined as the change in price of goods and services, not existing assets. In the late 1990s, some analysts argued that measures like the consumer price index (CPI) or the GDP deflator under-measured inflation because equity prices were not included in their definition of inflation. This argument is incorrect — these measures, by definition, are meant to capture changes in the prices of goods and services, not assets. A change in equity prices is a change in "paper wealth" with no direct effect on the price of goods and services; it may change a household's purchasing power, but this will register in measured inflation as soon as the household increases its consumption in response. If individuals change their consumption slowly in response to rising asset prices, then changes in asset prices may be a good predictor of future inflation in the goods market,[32] but in practice it

---

[31] For more information, see CRS Report RL31918, *U.S. Housing Prices: Is There a Bubble?*, by Marc Labonte.

[32] This argument is made in Charles Goodhart, "Time, Inflation, and Asset Prices," unpublished working paper, September 1999 and Armen Alchian and Benjamin Klein, "On a Correct Measure of Inflation," *Journal of Money, Credit, and Banking*, February1973. For a rebuttal, see Andrew Filardo, "Monetary Policy and Asset Prices," Federal Reserve Bank (continued...)

would be impossible to distinguish between a rise in asset prices due to real factors (which would not affect inflation) versus expected inflation. And it is unclear why expected future inflation would be manifested in asset prices, but not more traditional measures such as surveys or inflation-indexed Treasury bonds. Thus, the consensus among economists is that asset price increases may be one (of many) useful predictor of future inflation, but should not be included in measurements of actual inflation.[33]

Although the argument to include asset prices in inflation is theoretically weak for equity prices, it is on much stronger ground when applied to housing prices. Conceptually, a house is not seen as a consumption good, but rather as a physical asset that generates a stream of consumption services called "shelter." In fact, shelter is one of the biggest expenditures in the basket of goods and services measured by the CPI (owner-occupied shelter accounts for 23% of the CPI basket[34]). Thus, it would stand to reason that an increase in house prices would therefore be registered in the CPI as a rise in the cost of shelter. *But, as measured in the CPI, the rise in house prices has had no effect on the cost of shelter.*[35] That is because the CPI records the "cost" of owner-occupied shelter as the rent that the owner could get for his house if he rented it out. Since this cannot be measured directly, it is imputed in the CPI from similar rental properties. (For that reason, it is referred to as the "rental equivalence method" of measuring shelter inflation.) In the absence of a bubble, the cost of owner-occupied shelter and rental properties should be equal, since a house's fundamental price is equal to the present discounted value of the future opportunity cost of renting. But if a bubble were present, then, by definition, the cost of owner-occupied shelter has diverged from the cost of rental properties. This suggests that when a bubble is present, a more direct measure of housing costs would yield a more accurate measure of inflation.[36]

There is an alternative approach to measuring the cost of owner-occupied shelter called the "user-cost method," which measures the direct costs of providing the shelter instead of the cost of foregone rent associated with the house. (From 1950 to 1983, shelter was measured in the CPI using a similar method.) If a bubble were

---

[32] (...continued)
of Kansas City, *Economic Review*, Third Quarter 2000, p. 11.

[33] See James Stock and Mark Watson, "Forecasting Output and Prices: the Role of Asset Prices," National Bureau of Economic Research, working paper 8180, March 2001.

[34] Robert Poole et al., "Treatment of Owner-Occupied Housing in the CPI," presentation to the Federal Economic Statistics Advisory Committee, December 2005.

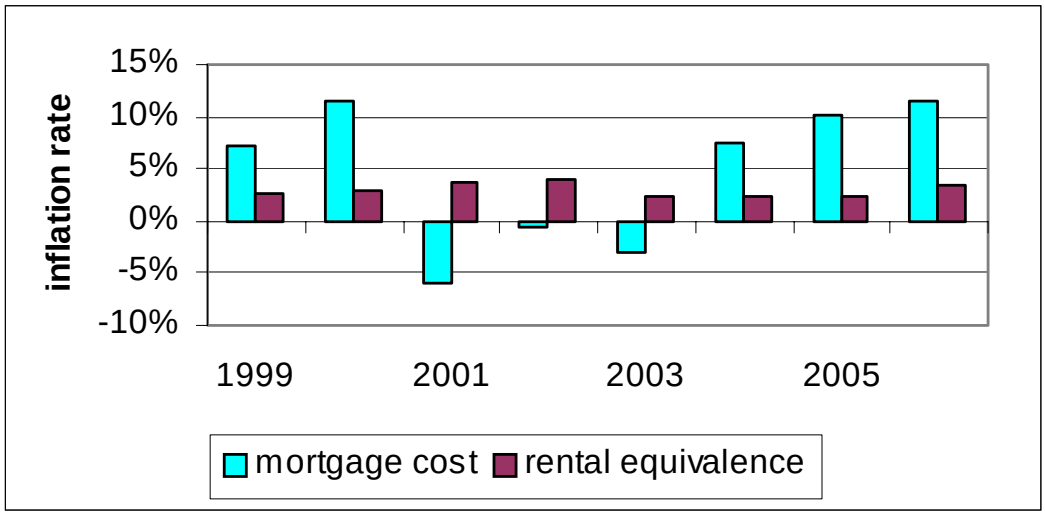
[35] Unlike the CPI, the GDP deflator measures the change in price of current production, which includes the construction of new homes but excludes existing homes. The inflation rate for residential investment in the GDP deflator has been fairly rapid in recent years, averaging 4.9% from 2001-2005, but it makes up a relatively small fraction of the overall deflator.

[36] In defense of the current measurement, David Johnson argues that the increase in house prices should be thought to affect the cost of the investment component of housing, not the consumption component, and it is therefore correct to omit it from the CPI. See David Johnson, "The Rationale for How BLS Measures Shelter Services in the CPI," *Business Economics*, January 2006, p. 62.

present, inflation would rise under the user-cost method and not the rental equivalent method. For most homeowners, the primary cost of housing is mortgage costs. Of course, lower mortgage rates in recent years have reduced borrowing costs at the same time that higher house prices have raised borrowing costs. Any alternative measure of owner-occupied shelter inflation would need to take both into account.

While not a true user-cost measure of inflation, **Figure 4** compares the BLS rental equivalence measurement of inflation to a measure of inflation based on the mortgage cost (which is the single largest determinant of user costs) for a constant quality house.[37] When measured by mortgage costs, shelter inflation rose faster than 5% per year in 1999, 2000, and 2004 to 2006 — all years when house prices and mortgage rates both rose.[38] Perhaps surprisingly, shelter costs experienced deflation from 2001 to 2003, despite rapidly rising housing prices, because of falling mortgage rates. By contrast, the measure of shelter costs used in the CPI has shown little fluctuation in recent years, never exceeding 4.1%. In fact, even as inflation surged by the mortgage cost measure, shelter inflation declined to 2.4% in 2004 and 2005.

Figure 4. Shelter Inflation Using Mortgage Costs Compared to the Rental Equivalence Measure, 1999-2006



Source: BLS, CRS calculations based on data from Census Bureau.
Note: "Mortgage cost" is the rate of increase in borrowing costs based on prevailing mortgage rates and the price of Census' constant quality house. Mortgage rates are the composite mortgage rate used by the National Assoication of Realtors to calculate the housing affordability index.

[37] Increases in house prices due to quality improvements should not be included in a measure of inflation. Therefore, the calculations in Figure 4 are based on Census' constant quality house price index.

[38] Of course, many homeowners have fixed-interest mortgages that would not change when mortgage rates change. This would reduce the overall inflationary effects of a change in mortgage rates using a user cost method.

As can be seen in the figure, the major drawback to a user-cost method is the extreme volatility in price changes that it generates. This volatility occurs because small changes in interest rates lead to large changes in mortgage payments. The Bureau of Labor Statistics prefers using the rental equivalence measure in the CPI because it is less volatile, and therefore sends smoother signals of inflationary pressures. Nevertheless, it should be recognized that the smoothness of inflation using the rental equivalence method comes at a price — **Figure 4** suggests that the economy may currently be experiencing inflationary pressures that are not being recorded in the CPI.

What Should the Federal Reserve Do About Bubbles?

Policy Response As a Bubble Inflates

Congress has mandated that the Federal Reserve maintain full employment and low and stable price inflation.[39] The Fed has discretion to develop whatever strategy it sees fit to accomplish these goals. One important reason for not giving the Fed a longer or more detailed list of goals to accomplish is that the Fed has only one tool available to fulfill its mandate: its ability to alter short-term interest rates. It can therefore pursue only one goal at a time, so giving it more goals would dilute its ability to accomplish any particular goal. For that reason, a shift toward using monetary policy to eliminate asset bubbles would be justified only if it was a goal whose importance was on par with the existing mandated goals, or if it could help better accomplish the existing mandate.

As stock prices rose more and more rapidly in the late 1990s, amidst the general climate of exuberance, there was a growing chorus of critics calling for the Fed to step in and raise interest rates high enough to prick the bubble before it got any bigger.[40] (Higher interest rates increase a firm's borrowing costs and reduce its profitability, which should, all else equal, reduce the firm's market value.) They argued that the larger the bubble was allowed to get, the more damaging it would be to the economy when it eventually burst. The Fed's response was far more cautious: wait and see what effect the potential bubble has on the economy, and then respond

---

[39] For more information, see CRS Report RL30354, *Monetary Policy: Current Policy and Conditions*, by Marc Labonte and Gail Makinen.

[40] See, for example, "Bubble and Squeak," *The Economist*, vol. 347, issue 8067, May 9, 1998, p. 17; Dean Baker, "Double Bubble: The Implications of the Overvaluation of the Stock Market and Dollar," Center for Economic Policy and Research, June 2000.

to any changes in economic activity.[41] Then-Chairman Alan Greenspan testified in 1999 that

> monetary policy is best primarily focused on stability of the general level of prices of goods and services as the most credible means to achieve sustainable economic growth. Should volatile asset prices cause problems, policy is probably best positioned to address the consequences when the economy is working from a base of stable product prices.[42]

Critics argued that this strategy was dangerous. In their eyes, the bubble was a clear indication of where the economy was headed — toward a cycle of overheating, followed by contraction — and the Fed should have responded pre-emptively to prevent it. They argued that Fed policy amounted to waiting to act until it was already too late. After the stock market began declining in 2000, they questioned the discrepancy between the Fed's eagerness to cut interest rates sharply at that point compared to its passivity when stocks were rising, fearing this asymmetry in response encourages investors' recklessness.[43] Yet, perhaps the weakest point in the critics' argument is that any attempt to prick the bubble risks instigating the very recession that the critics argue the bubble will cause. In Greenspan's words

> ...it was far from obvious that bubbles, even if identified early, could be preempted short of the central bank inducing a substantial contraction in economic activity — the very outcome we would be seeking to avoid.[44]

The current Fed Chairman Ben Bernanke's philosophy on bubbles has closely followed Greenspan's. In a 2002 speech, he argued

> 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,

---

[41] It is demonstrated statistically that the Fed did not respond to asset price movements (outside of any effect they had on inflation or output) in Ben Bernanke and Mark Gertler, "Monetary Policy and Asset Price Volatility," Federal Reserve Bank of Kansas City, *Economic Review*, 1999, Fourth Quarter, p. 17. See also Jagjit Chadha et al., "Monetary Policy Rules, Asset Prices, and Exchange Rates," International Monetary Fund, *Staff Papers*, vol. 51, no. 3, 2004. That paper finds that including asset prices as an explanatory variable improves predictions of monetary policy modestly, although this may be only because asset prices are a good proxy for inflation or output forecasts. See also Roberto Rigobon and Brian Sack, "Measuring the Reaction of Monetary Policy to the Stock Market," *Quarterly Journal of Economics*, vol. 118, p. 639. Based on empirical data, the authors estimate that a 5% increase in stock prices led to a 0.14 percentage point increase in the federal funds rate. They argue that this is consistent with a policy of the Fed responding to stock price increases only to the extent that they influence aggregate spending.

[42] Testimony of Chairman Greenspan before the Joint Economic Committee, US Congress, June 17, 1999.

[43] One justification for the discrepancy might be that the inflating of the bubble was gradual but the deflating was sudden. Sudden changes in equity prices are more likely to affect overall economic activity than gradual changes.

[44] Alan Greenspan, "Economic Volatility," speech at a symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August 30, 2002.

> 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.[45]

These views are fleshed out in a 1999 paper by Bernanke, then an academic economist, and economist Mark Gertler that demonstrated an asset bubble's effect on a theoretical model of the economy that validated the Fed's strategy at the time.[46] The authors show that in the presence of a bubble, inflation and employment stay closer to their desired levels in the model when the Fed targeted inflation (which, they argue, was close to actual Fed policy) than when it targeted the bubble. They do not argue that monetary policy should remain unchanged in the presence of an asset bubble. Rather, they argue, *interest rates should respond to the bubble only insofar as the bubble affects inflationary pressures*.[47] Once its inflationary effects were negated, the Fed should allow the bubble to remain.[48] This argument was important because it offered a rebuttal to critics of the Fed that claimed the Fed was carelessly ignoring the equity bubble's effects on the economy.

Whether this strategy worked as well in reality as it did in theory is an open question. But it helps clarify two distinct criticisms of Fed policy at the time, and perhaps today. One line of criticism would acknowledge that the Fed's use of policy to negate the bubble's effect on inflation and employment was the correct strategy, but underestimated the bubble's effect, and therefore did not respond vigorously enough in the 1990s — or today.[49] (For a discussion, see the text box.) In that light, if a bubble were a good predictor of future inflation, targeting it could be justified since monetary policy affects inflation with a lag. The other line of criticism would argue that bubbles are undesirable, and the economy cannot be thought to be operating on a sustainable path until they are eliminated. In this view, eliminating bubbles would be a legitimate policy goal in and of itself, since a bubble is incompatible with economic stability.

---

[45] Ben Bernanke, "Asset Price 'Bubbles' and Monetary Policy," Speech before the National Association of Business Economics, New York, NY, October 15, 2002.

[46] Ben Bernanke and Mark Gertler, "Monetary Policy and Asset Price Volatility," Federal Reserve Bank of Kansas City, *Economic Review,* 1999, Fourth Quarter, p. 17.

[47] This view, which is echoed in his 2002 speech, is at odds with Bernanke's statement that the Fed cannot identify bubbles with much certainty, since the Fed cannot respond to a bubble's inflationary effects unless it can identify the bubble.

[48] Perhaps the most unrealistic aspect of their model is the assumption that private individuals foresee that the Fed will stamp out the inflationary effects of the bubble, which allows the Fed to do so with very little actual increase in interest rates. This assumption leads to a much more benign outcome than if the Fed did raise rates sharply to cancel out the bubble's inflationary effects. It seems a leap of faith to assume that investors are forward looking enough to anticipate the Fed's reaction so precisely, but are not forward looking enough to prevent the bubble from emerging in the first place.

[49] Economist John Taylor goes further and uses econometric simulations to argue that if the Fed had responded more vigorously to inflationary pressures from 2002 to 2006, the housing bubble could have been avoided. John Taylor, "Housing and Monetary Policy," working paper, presented at Federal Reserve Bank of Kansas City symposium, September 2007.

How Has the Fed Responded to Potential Bubbles to Date?

As discussed above, the current Fed chairman and his predecessor take the position that the Fed will alter policy in response to a bubble only to the extent that the bubble affects inflationary pressures or employment. This raises the question of how aggressively the Fed believes it should act to achieve that policy, and whether it has been aggressive enough. Critics believe the Fed has responded too weakly when bubbles have arisen.

In the late 1990s, the Fed kept the federal funds rate flat until 1998, when it was reduced by 0.75 percentage points in response to concerns about financial stability resulting from the Russian debt default and insolvency of the hedge fund Long Term Capital Management. The Fed did not raise rates until 1999, at which point, rates were increased by 1.75 percentage points over the next year. At best, it could be argued that the Fed belatedly responded to the equity bubble beginning in 1999. However, inflation was rising in 1999 and exceeded 3% in 2000 (as measured by the consumer price index CPI), and the unemployment rate had fallen below 4% for the first time since the 1960s, so it is possible that these rate increases were carried out without any consideration of equity prices.

Fed governors and regional presidents expressed concern about a financial bubble many times in the transcripts from the Federal Open Market Committee (FOMC) meetings between 1996 and 1999. Fed officials were more candid in the transcripts about their certainty a bubble existed than they were in public statements (in fact, their internal forecast in November 1997 projected a 20% decline in stock prices in 1998). And yet, monetary policy was not tightened until 1999. For example, as early as December 19, 1995, Chairman Greenspan stated that "The real danger is that we are at the edge of a bond and stock bubble.... That is the reason why, if we are perceived to be easing policy, it is conceivable that we could foster further problems in that regard." In spite of those fears, the Fed decided to reduce interest rates by 0.25 percentage points at that meeting.

In the current decade, the federal funds rate steadily rose from 1% in 2004 to 5.25% in June 2006. Again, it is difficult to say to what extent these rate increases were motivated by concern about a potential housing bubble. In a June 2005 congressional testimony, Chairman Greenspan said, "Although a 'bubble' in home prices for the nation as a whole does not appear likely, there do appear to be, at a minimum, signs of froth in some local markets where home prices seem to have risen to unsustainable levels." Most of the rate increases were merely removing the stimulus previously put in place in response to the 2001 recession, moving current policy back to a more neutral level. Adjusted for inflation, the federal funds rate is still not particularly high at present based on standard measures of monetary policy. And inflation has shown a clear rising pattern since 2003, exceeding 3% since 2005 (as measured by the CPI), so tightening may be motivated by traditional concerns, without reference to house prices. In September 2007, the Fed reduced rates in response to the liquidity crunch spurred by subprime mortgage problems that began in the previous month. It remains to be seen whether the rate cut helps or hinders housing market adjustment. Transcripts of the FOMC meetings are released with a five year lag, so it will be some time before it is known how concerned the Fed was privately about a housing bubble.

Fed economist Glenn Rudebusch poses the latter view in terms of a tradeoff between better long-term outcomes (since the bubble would not be allowed to grow larger until it burst on its own) at the cost of worse short-term economic outcomes (since growth would temporarily be reduced by the effort to eliminate the bubble). He believes a legitimate case can be made for the tradeoff, but only if it meets three strong tests, which he argues are unlikely to be met in practice.[50]

First, Rudebusch says, policymakers must be able to accurately identify bubbles before they burst. While it may seem obvious after the fact that an equity bubble existed in the late 1990s, as Greenspan put it at the time,

> bubbles generally are perceptible only after the fact. To spot a bubble in advance requires a judgment that hundreds of thousands of informed investors have it all wrong. Betting against markets is usually precarious at best.[51]

If the Fed had acted on the assumption that there was a bubble, it would have been going against the expert opinion of many, if not most, financial market professionals at the time. This would have been problematic for the Fed both analytically and politically (since shareholders are unlikely to be happy that the Fed is pursuing a policy of reducing their wealth). The uncertainty in identifying a bubble makes a policy response potentially costly. If the Fed guesses correctly that there is a bubble and responds, then economic outcomes could improve. But if it guesses incorrectly, output and/or inflation would be more volatile than they otherwise would have been.

Second, the Fed must be unable to readily mitigate the damage done after the bubble bursts, according to Rudebusch. In other words, if lower interest rates can quickly bring the economy back to full employment after a bubble has burst (as was the case in 2001), then there is nothing to be gained by using monetary policy to eliminate the bubble before the fact. For example, Fed governor Mishkin uses the Fed's macroeconomic simulation model to show that a 20% decline in house prices can be offset by lowering interest rates by 0.75 percentage points so that GDP growth falls by only 0.5 percentage points at the peak year.[52] On the other hand, if the bursting of the bubble were to lead to a financial crisis or a credit crunch that caused

---

[50] Glenn Rudebusch, "Monetary Policy and Asset Price Bubbles," *Economic Letter 2005-18*, Federal Reserve Bank of San Francisco, August 2005. These views are echoed in a 2007 speech by Fed governor Frederic Mishkin. See Frederic Mishkin, "The Role of House Prices in Formulating Monetary Policy," remarks at the Forecasters Club of New York, January 17, 2007.

[51] Testimony of Chairman Greenspan before the Joint Economic Committee, US Congress, June 17, 1999. Fed economist Timothy Cogley takes Greenspan's point one step further and argues that the Fed knows less about financial markets than market professionals, and will thus be unable to ever determine whether perceived equity mispricing is caused by a bubble or by the Fed's errors in estimating fundamentals. Timothy Cogley, "Should the Fed Take Deliberate Steps to Deflate Asset Price Bubbles?", Federal Reserve Bank of San Francisco, *Economic Review*, no. 1, 1999, p. 42.

[52] Frederic Mishkin, "Housing and the Monetary Transmission Mechanism," working paper presented at Federal Reserve Bank of Kansas City symposium, August 2007, p. 35. This assumes that the Fed reacts as it has historically; Mishkin argues that the negative effect on growth would be even smaller if the Fed reacted more aggressively.

significant disruption the economy, pre-emptive action could be advantageous.[53] It could also be advantageous if the bubble causes resources to be misallocated across sectors of the economy, since monetary policy is too blunt to be aimed at specific sectors. The importance of avoiding a recession depends largely on how important one believes the misallocation problem to be. There are those who follow the maxim of Andrew Mellon, Treasury Secretary at the onset of the Depression, "Liquidate labor, liquidate stocks, liquidate the farmers, liquidate real estate. It will purge the rottenness out of the system."[54] In their eyes, misallocated resources are the problem, and recessions can be a useful cure; in this case, bubbles should be stamped out regardless of the costs. In contrast, mainstream macroeconomic policymaking sees recessions as the chief problem, and is relatively indifferent about the misallocation of resources.

Finally, Rudebusch says, a pre-emptive monetary tightening must be an effective means of deflating the bubble to be warranted. Greenspan doubted this would be the case:

> nothing short of a sharp increase in short-term (interest) rates that engenders a significant economic retrenchment is sufficient to check a nascent bubble. The notion that a well-timed incremental tightening could have been calibrated to prevent the late 1990s bubble is almost surely an illusion.[55]

In other words, the "irrational exuberance" driving the bubble was unlikely to be quelled by a small rise in interest rates. Only a large increase in rates, he claimed, would affect a bubble, and such an increase would be highly likely to cause a recession. Asset prices might also be unresponsive to short-term interest rate changes if they do not feed through to long-term interest rate changes (which the Fed does not control). For example, the Fed increased short-term rates from 1.1% to 3.2% between 2003 and 2005, but 10-year Treasury rates only rose from 4% to 4.3% and mortgage rates from 5.7% to 5.9% over that time. If a bubble were unresponsive to interest rate hikes or the reduction in GDP growth from such hikes was greater than would occur when the bubble burst, then there would be no advantage to a pre-emptive policy. Another drawback to using monetary policy to negate a potential housing bubble is the localized nature of the bubble. Monetary policy cannot be

---

[53] Using a cross-country sample, economists Borio and Lowe show that credit expansion is a better predictor of subsequent financial crisis than equity price increases, but the combination of both is the best predictor. They point out that crises in East Asia in the 1990s and Latin America in the 1970s were not preceded by large increases in equity prices. Claude Borio and Phillip Lowe, "Imbalances of 'Bubbles'? Implications for Monetary and Financial Stability," in William Hunter, et al., eds., *Asset Price Bubbles* (Cambridge: MIT Press, 2003), ch. 17.

[54] Quoted in Timothy Cogley, "Should the Fed Take Deliberate Steps to Deflate Asset Price Bubbles?", Federal Reserve Bank of San Francisco, *Economic Review*, no. 1, 1999, p. 42.

[55] Alan Greenspan, "Economic Volatility," remarks at a symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August 30, 2002. Chairman Bernanke agreed with this argument and offered empirical evidence that small increases in interest rates do not reduce stock prices enough to eliminate a bubble. Ben Bernanke, "Monetary Policy and the Stock Market: Some Empirical Results," Speech at Widener University, Pennsylvania, October 2, 2003.

targeted to specific regions, and regions without a bubble would share in the contractionary effects of higher interest rates.

Policy Response After a Bubble Has Burst

As discussed above, the Fed's belief that monetary policy can be effectively used to counteract the damage done by a deflating bubble is central to its position that it need not interfere with a growing bubble. Whenever financial markets have dropped sharply during Chairman Greenspan's or Bernanke's tenure (including episodes in 1987, 1998, 2001, 2007), the Fed has responded by reducing interest rates. In the eyes of many economists, the 2001 and 2007 declines were the result of bursting asset bubbles. In Chairman Bernanke's words,

> It is not the responsibility of the Federal Reserve — nor would it be appropriate — to protect lenders and investors from the consequences of their financial decisions. But developments in financial markets can have broad economic effects felt by many outside the markets, and the Federal Reserve must take those effects into account when determining policy.[56]

In other words, a sharp decline in financial markets may result in a decline in economic growth, and in order to maintain stable economic growth, the Fed must offset the financial decline by cutting interest rates or adding liquidity to financial markets.

Nevertheless, critics argue that there is an asymmetry between the Fed's *laissez-faire* approach to inflating asset bubbles and its interventionary approach to deflating bubbles. Further, they argue that the asymmetry has an important effect on investor behavior because it increases *moral hazard*, the economic term for the idea that people take greater risks when they are insured against adverse outcomes. In this case, in the words of the head of Britain's central bank,

> The provision of such liquidity support undermines the efficient pricing of risk by providing ex-post insurance for risky behavior. That encourages excessive risk-taking and sows the seeds of a future crisis.[57]

These critics argue that more efficient investment decisions would be made in the long run if the Fed allowed financial downturns to run their course and imprudent investors took losses.[58] The Fed's alacrity when prices fall could even make a future bubble larger than it otherwise would be since the Fed's actions reduce the payoff to

---

[56] Chairman Ben Bernanke, "Housing, Housing Finance, and Monetary Policy," Speech at the Federal Reserve Bank of Kansas City's Economic Symposium, August 31, 2007.

[57] Carter Dougherty, "British Central Bank Critical of Cash Infusions," New York Times, September 13, 2007. Soon after, the British central bank appeared to reverse its stance by providing financial markets with significant liquidity.

[58] The moral hazard argument should not be overstated. Investors will only be "bailed out" in instances when their losses correspond with responses by the Fed, and plenty of investors still experienced losses during financial turmoil despite the Fed's actions.

investors betting against a bubble, thereby interfering with the market's tendency for self-correction.

The drawback to the moral hazard critique is that allowing financial turmoil to run its course could run counter to the Fed's long-run goal of maintaining economic stability. If turmoil were to lead to recession, not only would overly risky investors take losses, but so would efficient firms that saw demand for their products drop solely because of the cyclical downturn. Some would argue that liquidity has characteristics of a *positive externality*, whose benefits to society exceed the benefits to private firms who provide it. If so, enough liquidity can be provided only through government intervention, in this case by the Fed.

Although the positive externality argument is generally consistent with mainstream economic thought, it and the moral hazard critique are not mutually exclusive. Traditionally, government programs that create moral hazard are complemented by government regulations to reduce risky behavior. For example, deposit insurance creates the incentive for banks to take on excessive risk, so bank regulations restrict the amount of risk that banks are allowed to take. If moral hazard really is being created by the Fed, there may not currently be corresponding regulations to offset the extra risk it generates.

Conclusion

Bubbles are difficult to identify with confidence until after the fact. This limits the ability of policymakers to respond to bubbles effectively. Nevertheless, their effect on the economy has been demonstrated to be significant enough that there is risk in ignoring them. Bubbles lead to volatility in investment spending, consumption, and, in the worst case scenario, financial instability. Because the rise in house prices is not captured in the CPI and other inflation measures, true inflationary pressures in the economy may have been greater than measured in recent years, possibly suggesting that the economy is overheating.

Critics have argued that the Fed should act more aggressively to counteract bubbles when they form. The Fed has responded that such a policy would detract from its mandated goals to keep inflation and economic growth stable. The greatest drawback of the critics' argument is that aggressively raising interest rates to counteract a bubble risks instigating the very recession that they ostensibly wish to avoid.

The Fed claims that it will respond to bubbles insofar as they affect economic growth or inflation, but a case can be made that the Fed has underestimated the effect of bubbles on the overall economy, and inflation and growth have been less stable than desired as a result. Looking at the historical record, there is strong evidence that the Fed has followed its stated policy that it would not purposely eliminate bubbles. At most, it has tightened policy slightly more than would be justified by inflation and output alone when possible bubbles have formed. But it certainly cannot be ruled out that the interest rate path the Fed has pursued would have been exactly the same in the absence of any potential bubble. Since the Fed is not explicit about how different

factors are weighted in its decision-making process, there is no way to settle this argument definitively.

The Fed did not raise interest rates in the face of unusually rapid increases in stock prices until 1999. The sharp fall in stock prices in 2000 would seem to vindicate the Fed's critics at first glance, but the Fed could also argue the experience proved its policy to be correct. The 2001 recession was one of the mildest and briefest declines in output since World War II (although it did not look nearly as mild from the perspective of the job market). Efforts to deflate the bubble earlier may very well have resulted in a recession of equal or greater magnitude. Besides a slow recovery in capital investment spending, the economy showed few lasting scars from the stock market crash. By 2003, capital investment spending had fully rebounded as well. And although a bubble seems to have formed at some point, it does not seem to have been as large in hindsight as critics had predicted. For example, at its trough, the S&P 500 was still 10% higher than it was when Greenspan made his "irrational exuberance" speech. Thus, although policy intervention may have been justified at some point, it was probably not nearly as early as critics had demanded. Had the critics' policy been pursued, some of the rapid output gains of the last few years of the 1990s expansion could have been lost. The burden of proof remains with critics that a policy of deflating bubbles would meet Rudebusch's three tests: accurate identification, improved macroeconomic stability, and effective deflation.

Part of the Fed's rationale for not interfering when bubbles are forming is its belief that expansionary monetary policy can be used to avoid any serious ramifications from a bursting bubble. Although this has been true in the past — it is still too soon to tell how well this strategy worked in August 2007 — critics argue that the asymmetry in its response creates a moral hazard problem. Since investors believe that the Fed will "bail out" markets when a bubble crash, they have the incentive to take larger risks, perhaps even resulting in larger bubbles than would otherwise have formed