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## William C. Dudley

As I see it, a Federal Reserve consensus exists on how monetary policy should respond to asset bubbles. It consists of three major observations:

1. Asset bubbles are hard to identify.
2. Monetary policy is not well-suited to respond to bubbles.
3. The cost/benefit trade-off of “leaning against the wind” against asset bubbles is unfavorable.

From these propositions, two important policy implications directly follow:

1. The central bank should only take asset bubbles into consideration in the conduct of monetary policy to the extent that these asset bubbles affect the growth/inflation outlook.
2. The monetary authorities should be there to “clean up” after bubbles burst, both to prevent systemic problems and undesired downward pressure on economic activity or inflation.

Relative to this consensus, I would argue that:

1. Asset bubbles are not that hard to identify—especially large ones.
2. If one means by monetary policy the instrument of short-term interest rates, then I agree that monetary policy is not well-suited to deal with asset bubbles. But this suggests that central bankers should examine the efficacy of other instruments in their toolbox, rather than simply ignore the development of asset bubbles. Parenthetically, this may require development of additional policy tools if the current tools are deemed inadequate.
3. When the possibility of additional instruments is added to the mix, this may improve the cost/benefit trade-off from addressing asset bubbles early, prior to these bubbles bursting.

William C. Dudley was an advisory director at Goldman Sachs when these comments were presented. He is currently the executive vice president of the Markets Group at the Federal Reserve Bank of New York.

I thank John Y. Campbell and Martin Feldstein for inviting me to participate.

So let's examine in more detail where my views deviate from the Fed consensus.

Turning first to the issue of the difficulty of identifying asset bubbles, I don't think major asset bubbles are hard to identify. What is difficult to determine is how big a bubble will ultimately be and the causes and timing of its demise.

Over the past twenty-five years, for example, I can identify at least five bubbles that one could reasonably have identified in real time:

1. Dollar appreciation in 1984 to 1985
2. Stock market overvaluation in 1987
3. Credit market spread widening in 1998 associated with the failure of Long-Term Capital Management (LTCM)
4. Dotcom and NASDAQ bubble of 1999 to 2000
5. Regional U.S. housing bubbles that are currently in the process of unwinding

I say this with some confidence because I tried to speculate against three of the five bubbles listed in the preceding myself (with limited success I might add, indicating why I remain an economist rather than have transitioned to being a trader). And I probably would have tried to speculate against the other two had good market instruments been available to do so.

As I see it, the development of an asset bubble generally consists of three major stages. First, there is some sort of regime shift that generates an initial rise in valuation that is justified and sustainable. For the U.S. equity market of the later 1990s, this would include factors such as the reduced cyclical nature of the economy, benign inflation, or the secular rise in the productivity growth trend. The first two factors could have been expected to lead to a lower equity risk premium and higher equity prices. The latter factor could be expected to lead to a higher earnings growth rate.

For the U.S. housing market of the past five years, the initial impulse to the housing price rise was the fall in long-term interest rates. Only beginning in 2004 did the housing market become a bubble. In some regions, prices continued to rise much faster than income even though mortgage rates were no longer declining.

Second, the rise in valuation leads to a change in perception about the riskiness of investing in the asset class. Rather than the asset being perceived as more risky as the price rises, it is perceived to be less risky because it has not gone down in price. There is a corollary to this. Investors tend to raise their expectations of the prospects for future price appreciation after the asset has gone up in price, when, in fact, rapid price appreciation should lead investors to lower their expectations. If expectations are adaptive rather than fully rational, this can contribute to asset bubbles.

Third, the price appreciation causes the believers in the sustainability of the bubble to forget about the fact that the economy has important self-

equilibrating mechanisms. For example, consider what happens when stock prices rise, all else equal. This reduces the cost of capital, which, in turn, stimulates investment. The rise in investment puts downward pressure on profit margins and upward pressure on real interest rates. Both weigh on valuation and undermine the fundamental supports for the initial rise in stock prices.

Oftentimes, the trigger for the collapse of an asset bubble is some event that calls into question a widely held market belief. For example, one trigger for the LTCM debacle was the decision of Russia to default on its ruble debt. This was unexpected because market participants thought the worse-case scenario was that Russia would just print more rubles to service its debt. Another example is the role of portfolio insurance in the 1987 stock market crash. Portfolio insurance works to limit risk if market prices adjust continuously. In 1987, prices gapped lower, and portfolio insurance played an important role in making prices move discontinuously. After the fact, the flaws of portfolio insurance were self-evident. But when it occurred, it was unanticipated.

With respect to the assertion that monetary policy is ill-suited to respond to asset bubbles, I generally agree with this view if, by monetary policy, we are referring to the level of short-term interest rates. I doubt that an additional 50 to 100 basis points of monetary policy tightening in the 1999 to 2000 period would have had a significant impact on the dot-com bubble.

That said, I reach a very different conclusion than the Federal Reserve consensus. Rather than just giving up and saying that monetary policy doesn't work well with respect to asset bubbles, I would argue that the more appropriate conclusion is that this just underscores the need to develop other instruments to use to address such bubbles.

In reaching this conclusion, I would emphasize that the need for new tools has increased. As the role of depository institutions has diminished in the financial system relative to the capital markets, the tools of prudential supervision and regulation of depository institutions most likely has become less effective in preventing or limiting bubbles. This is especially true in cases in which credit standards are determined by the capital markets rather than depository institutions.

Consider, for example, the case for mortgages and credit derivative obligations. The prices for most of these types of obligations are not determined by banks but instead are determined in the capital markets. If bank examiners try to limit the type of mortgage loans that banks make, but the capital markets have a strong appetite for this type of risk, then tough bank supervision would not prevent this business from occurring. Instead, it would simply be forced out of the banking system into the capital markets.

So what tools are available? Unfortunately, not many and not very effective ones at that.

Two major tools come to mind. First, the monetary authorities have the

ability to use the “bully pulpit” to influence market participant’s views and expectations. For example, with respect to the stock market boom, Federal Reserve officials could have emphasized that higher productivity growth would generate an investment boom that would put pressure on profit margins or that higher productivity growth would lead to higher real interest rates that would put pressure on stock market valuation.

If you look at the evidence from the period, it is quite striking. Corporate profit margins peaked in 1997. But the earnings expectations of equity analysts kept increasing until the stock market bubble collapsed. For example, in the early 1990s, the median long-term earnings growth estimate of equity analysts was 12 percent per year. By 1997, it had climbed to slightly below 14 percent per year. It did not stop climbing until it reached a peak of 17 percent per year in 2000. Clearly, the behavior of profit margins and equity analyst expectations were inconsistent. Federal Reserve officials could have emphasized this disconnect in their speeches and testimony.

In fact, Chairman Greenspan reached a very different conclusion that had a much different implication. He cited the rise in equity analysts’ earning growth expectations as evidence that the increase in productivity growth was sustainable. Perhaps, this was not the proper emphasis!

Second, margin requirements could be used to discourage speculative activity. Federal Reserve officials rejected the use of equity margin requirements in response to the stock market bubble because they concluded that such margin rules could be easily circumvented. Although the requirements could be circumvented, an increase in stock market requirements might still have had an impact. The announcement effect alone might have had an impact. We just don’t know because Fed officials didn’t try to use this instrument. If the Fed had tried and failed, I would be more willing to conclude that margin rules will not work.

Moreover, Fed officials could have pushed for broader authority to make it more difficult for investors to circumvent the margin rules. The margin requirements could have been broadened. Or the margin requirements could have been altered in a way to better target their impact. For example, if the margin requirement had been tied to volatility, this would have implied higher margin requirements on NASDAQ-style equities, precisely the result intended.

Supervision and regulation of depository institutions, the “bully pulpit,” and margin requirements—together they do not make a very full or effective tool kit. This suggests that Fed officials and others should explore developing additional instruments to add to the Fed’s arsenal.

In addition to broader margin rules, this might include capital adequacy rules and or counterparty risk rules designed to limit leverage and risk. Increased disclosure requirements of portfolio positions by lightly regulated institutions such as hedge funds might also prove useful. Consider the LTCM debacle. Long-Term Capital Management was much more highly

leveraged than market participants, and its major counterparties appreciated. Also, many major market participants had market positions similar to LTCM's. Better disclosure might have limited the ability of LTCM to expand its risk positions, and it could also have discouraged market participants from taking similar types of positions.

The disclosure of portfolio positions would enable investors to find out when the "hot money" is all positioned the same way. Such a revelation would change investors' perceptions of risk and could help dampen speculation and incipient asset bubbles.

I clearly don't have the answer with respect to designing new tools for central bankers to use to address asset bubbles. But I think a more fruitful line of inquiry is to move in this direction. In my mind, the issue of whether short-term interest rates should be adjusted to lean against asset bubbles is mostly settled. It is time to move on and explore how central bankers can develop better tools to respond to asset bubbles.

### **Discussion Summary** Donald L. Kohn, Laurence H. Meyer, and William C. Dudley

*Martin Feldstein* asked *Donald L. Kohn* for his views on Japanese real estate values. When capitalization rates were at 2 percent at a time when Japanese government bonds were yielding at least as much, should the Bank of Japan have responded? Kohn replied that he had been in favor of improving the supervision and regulation of Japanese banks. It had been clear that there was a problem in the banking system. If the Japanese financial system had been reformed earlier, and the Bank of Japan had responded more quickly when the bubble burst, economic outcomes in Japan would have been better. Kohn agreed with Feldstein's suggestion that the government should not have allowed banks to support their balance sheets with equities whose valuations depended on high land values.

Feldstein said that Alan Greenspan's approach had been that the central bank should intervene swiftly following the bursting of a bubble. He suggested that in Japan, however, no amount of monetary easing could have rescued the banks. Kohn responded that a rapid response from the central bank would have helped considerably and that such a response would have ensured that less deflation occurred. Studies at the Fed suggested that although recession could not have been averted, it could have been shorter and less deep.

Feldstein asked *William C. Dudley* what he thought could be done to improve the already impressive resilience of the U.S. financial system. Dudley said that although the mortgage market worked well in stable economic

conditions, policymakers should worry about how the subprime market would fare if the economy weakened while house prices declined. Also, the Fed should think about how to expand its span of control. He suggested that further disclosure requirements were needed for creative mortgage products such as negative amortizers and teaser adjustable rate mortgages (ARMs).

Feldstein said that he was intrigued by Laurence H. Meyer's proposal that the Fed should issue quarterly reports on asset prices. But, on the other hand, Graham and Dodd's book recommended that the price-earnings ratio should be around 10. If Feldstein had believed that, he would never have invested in the market. There was a risk that the Fed would wrongly encourage people to sit out of the market. Meyer replied that the Fed should present the conventional wisdom—which may evolve over time. Furthermore, he said, the Fed has the advantage of being seen to have sober judgment. There are, in any case, benefits of airing different points of view. Dudley said that he agreed with this point. In 1999 to 2000, for example, bearish equity analysts were out of a job. It was important to have someone who was still in business at a time like that presenting a dissenting view.

*John Y. Campbell* pointed out that the Fed has a comparative advantage in helping people to understand the distinction between real and nominal quantities. Feldstein commented that Allan Meltzer's book revealed that even the Fed had only relatively recently understood the distinction. Campbell also mentioned a paper by Federal Reserve Board economists Brian Bucks and Karen Pence that demonstrates that the distribution of self-reported ARM mortgage risks is very different from the true distribution as reported by mortgage lenders. This implies that some mortgage borrowers do not understand their true risk exposures.

*Glenn D. Rudebusch* said that the Reserve Bank of Australia and the European Central Bank (ECB) had been vocal about house-price bubbles and appeared to have been successful in controlling them. Kohn replied that in the case of Australia, there had also been a change in the tax law so that the treasury and central bank had been working together. Dudley pointed out that there had also been a terms-of-trade shock in Australia's favor, which had strongly underpinned the Australian economy.

Rudebusch asked whether the view of the Fed as a street sweeper cleaning up problems—the so-called Greenspan put—had driven up equity prices as investors felt that they would be protected against price declines. Dudley responded that given that the NASDAQ index went from over 5,000 to less than 1,500, the put had clearly been well out of the money!

*Peter Westaway* asked Meyer whether he would suggest publishing an unconditional indicator such as a price-earnings ratio, or, on the other hand, something like a risk premium. He also suggested that the Fed's asset price report might be sufficiently complicated that it would require a

user guide. Meyer replied that it was important to keep things not too technical. The distinction between conditional and unconditional price indicators was not too important because in equilibrium, increases in the price-earnings ratio are associated with decreases in the risk premium. He said that he liked the simplicity of a measure such as the price-earnings ratio.

*Stephen G. Cecchetti* said he also agreed with Meyer's proposal. He compared such a report with the numbers produced by the Bureau of Economic Analysis (BEA) or Bureau of Labor Statistics (BLS). Given that industrial production indexes are based on all sorts of imputed statistics, why not do the same in this case? Kohn argued that if there were an academic consensus, the question would be easier. But in 1996, 50 percent of academics thought the market was too high, and 50 percent thought it was too low. Meyer said that that was true when the market price-earnings ratio was 18, but as it rose to 25 or 30, a consensus developed among academics that rationally expected returns on equity had declined.

*Brian Sack* said that he agreed with Kohn's points about the cost of acting against bubbles that turn out not to be bubbles. He suggested that this was dependent on the particular asset class in question. For example, in the case of equities, a bubble is associated with a low risk premium or high expected earnings growth. In either case, an interest rate increase is called for. But in the case of bonds, a bubble is associated with low risk premiums or low expected inflation. These two scenarios call for different interest rate responses. Kohn responded that he had in mind the cost of sacrificing some short-run output. He agreed that different assets would have different sacrifice ratios.