

COMMENTARY

Why Central Banks Should Burst Bubbles*

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I. Introduction

Should monetary policy respond to asset prices and asset bubbles? This issue is highly controversial, both from an academic research point of view and, more importantly, from a policy perspective. There is broad evidence that asset bubbles do occur from time to time, and that such bubbles may lead to economic distortions as well as financial and real economic instability. Thus, many authors argue that optimal monetary policy requires monetary policy authorities to react to such bubbles over and above the effects that such bubbles have on current output growth, aggregate spending and expected inflation. Others are of the view that monetary policy should not react to asset prices or bubbles beyond the effect that such asset price movements directly have on inflation, aggregate spending and economic growth. In this paper, I will present the arguments in favour of the view that monetary policy should react to asset prices and asset bubbles. In the process, I will also discuss and refute the arguments against the use of monetary policy to address bubbles.

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This is not just an academic issue: twice in the past ten years the US Federal Reserve has had to decide how to respond to sharp rises in the price of key assets. Considering recent US economic history, it is obvious, in hindsight, that some of the surge in stock prices in the mid to late 1990s was excessive, and beyond what was warranted by economic fundamentals. Federal Reserve Chairman Alan Greenspan warned against ‘irrational exuberance’ in stock markets as early as the fall of 1996 but then, apart from a half-baked attempt to increase the Fed Funds rate by 25 basis points in the spring of 1997, the Fed did not further react to this asset bubble. While it was not certain in 1996 that such a stock market bubble was under way, by 1998–99 the evidence was quite clear and overwhelming but the Fed still chose not to react. Similarly, the Fed has explicitly resisted the idea of adjusting monetary policy in the face of regional housing bubbles that have developed in the last few years in a broad enough swath of the country to have a big impact on the overall economy. Recently, Greenspan and other Fed officials have expressed greater concern about such a housing bubble and its effects on the national savings rate and the US current account balance (Greenspan 2005a; Kohn 2005).¹ But the Chairman of the Fed has remained very sceptical as to whether the Fed should be reacting to such bubbles.²

Indeed, Greenspan (1999, 2002, 2004, 2005a, b) as well as other current and former Fed officials (Bernanke and Gertler 1999, 2001; Bernanke 2002, 2004; Kohn 2004, 2005; Ferguson 2005) have articulated, over the last few years, a series of arguments against targeting asset prices in the conduct of monetary policy. And they have used these arguments to explain or justify why the Fed did not react to the ‘irrational exuberance’ of the late 1990s in spite of the fact that the bubble eventually burst in 2000. As is well known,

¹‘Nearer term, the housing boom will inevitably simmer down. As part of that process, house turnover will decline from currently historic levels, while home price increases will slow and prices could even decrease. As a consequence, home equity extraction will ease and with it some of the strength in personal consumption expenditures. The estimates of how much differ widely. The surprisingly high correlation between increases in home equity extraction and the current account deficit suggests that an end to the housing boom could induce a significant rise in the personal saving rate, a decline in imports, and a corresponding improvement in the current account deficit’ (Greenspan 2005a).

²‘Debates on the relative merits of asset price targeting also will continue and possibly intensify in the years ahead. The configuration of asset prices is already an integral part of our evaluation of the large array of forces that influence financial stability and economic growth. But given our current state of knowledge, I find it difficult to envision central banks successfully targeting asset prices any time soon. However, I certainly do not rule out that future work could improve our understanding of asset price behavior, and with it, the conduct of monetary policy’ (Greenspan 2005b).

this bursting bubble and the ensuing investment bust was the major reason for the economic recession of 2001. They have instead argued that the Fed should ‘mop up after’; that is react to bursting bubbles to prevent them from causing economic and financial damage after the fact.³ This view implies an asymmetric response to bubbles: no reaction to them on the way up, but aggressive monetary easing when bubbles burst to contain the collateral damage.

In this paper, we will analyse and refute such arguments against asset price targeting by monetary policy. We will argue instead that the arguments in favour of such targeting are several, strong and robust. In general, we find that monetary policy should react to asset prices and should try to ‘prick’ or ‘burst’ asset bubbles. Bubbles that are growing excessively large lead to economic and investment distortions that are dangerous and likely to eventually trigger bubble bursts with severe real and financial consequences. Thus, optimal monetary policy should pre-emptively deal with asset bubbles rather than just mop up the mess that they cause after they burst.

II. Arguments in Favour of Using Monetary Policy to Target Asset Prices and Asset Bubbles

In presenting the arguments in favour of asset price and asset bubble targeting by monetary policy, we will also consider the arguments against such targeting in order to dissect the logic of those arguments and rebut them.⁴

Argument 1. Analytical models suggest that optimal monetary policy rules imply targeting of asset prices, on top of inflation and growth, in the monetary policy reaction function.

Before we discuss the complex policy and empirical details of monetary policy targeting of asset prices, a good starting point is to consider what the

³See Blinder and Reis (2005) for a discussion of monetary policy and bubbles that is supportive of the ‘mop up after’ approach taken by the Fed. See Rudebusch (2005) for a somewhat different view from the Fed on asset bubbles and monetary policy. See also the recent speech by New York Fed President Tim Geithner (Geithner 2006); he presents a view of the role of asset prices in monetary policy that appears to be meaningfully different in a number of dimensions from the views expressed by Greenspan and Bernanke. For a deconstruction of the Geithner views, see Roubini (2006).

⁴Other studies supporting an active role of monetary policy in targeting asset prices and/or bubbles include International Monetary Fund (2000), Bordo and Jeanne (2002), Borio and Lowe (2002), Cecchetti et al. (2000), Cecchetti et al. (2002), Dupor (2001), Filardo (2000, 2001, 2004, 2005).

analytical economic literature tells us about this matter. Should asset prices enter into the monetary policy reaction function of a monetary authority that cares about minimizing the deviations of output and inflation from their targets? As usual, the answer to this question depends in part on the model that one uses. However, interestingly, analytical models generally suggest that asset prices should enter directly into the reaction function of an optimizing monetary authority, above and beyond the direct effects that such asset prices have on expected inflation and current growth.

The first seminal study of monetary targeting of asset prices (Bernanke and Gertler 1999) considered the case of exogenous deterministic bubbles.⁵ Note that in this study the policy reaction function of the monetary authorities is not 'optimal'; that is, the size of the coefficient of interest rates on expected inflation and other variables – output and stock prices – is not chosen optimally, but rather in an ad hoc way. This study found that if the Taylor rule is aggressive enough (a coefficient of two on the reaction of interest rates to expected inflation), a monetary policy that targets only expected inflation dominates one that includes stock prices – again, in an ad hoc way – in its reaction function. More importantly, if the policy reaction is accommodative (that is, a coefficient that is barely above one in the reaction function on expected inflation), adding stock prices to the reaction function has destabilizing effects. That is, the variance of inflation and output is larger when asset prices are targeted.

Cecchetti et al. (2000) challenged this result by showing that, in the context of exogenous deterministic bubbles, looking at a wider range of monetary policy reaction functions – where the weights on inflation, growth and stock price bubbles are chosen with goals of picking the optimal interest rate policy reaction – leads to the opposite result: optimal monetary policy would target inflation and growth as well as asset bubbles. Bernanke and Gertler (2001) countered that the results of Cecchetti et al. were not robust if one considered 'stochastic' bubbles and cases where, in addition to a stochastic component of the bubble, there was also a real economic shock (that is, a productivity shock) that may have been driving the fundamental, as opposed to the non-fundamental, component of asset prices. The results of Bernanke and Gertler (2001) are obtained, again, in the context of non-optimizing monetary policy rules.

⁵The term 'exogenous bubbles' refers to bubbles where the bubble component of asset prices cannot be potentially affected – i.e. pricked – by monetary policy. Deterministic bubbles refers to cases where the bubble is modelled with no uncertainty, i.e. the time periods during which the bubble continues and the time at which the bubble bursts are known to all with a probability of one.

Cecchetti et al. (2002) correctly counter-argued – while not proving the argument formally – that the Bernanke and Gertler results depended on not using an optimal policy reaction in which the output gap, as well as asset prices, entered into the monetary policy reaction function of the authorities. If asset prices are used as alternatives rather than complements of the output gap in the monetary reaction function, welfare results of such a rule would be inferior to the case in which all the relevant variables enter in the monetary reaction function.

Filardo (2001, 2004) then formally showed that, in the context of stochastic exogenous bubbles, the optimal monetary policy rule implies that asset prices generally enter into the reaction function of the monetary authority. If there is a rising bubble, monetary policy would be tighter than under a simple Taylor rule, while when the bubble bursts optimal monetary policy is easier than the Taylor rule. That is, the optimal policy requires leaning against the bubble. The results of Filardo imply that the Bernanke and Gertler (2001) conclusions do not hold when one considers optimal policy rules. In general, the optimal interest rate rule reacts to inflation, output *and* the asset price. Thus, the general result from the analytical literature is that asset prices and asset bubbles will enter into the optimal monetary policy reaction function. Monetary policy should ‘lean against the wind’, being tighter than a standard Taylor rule would suggest when a bubble is rising and being looser than a Taylor rule would suggest when a bubble is bursting. So, at least conceptually and analytically, economic theory supports the idea of a monetary targeting of asset prices and asset bubbles.

Argument 2. Optimal monetary policy should react to asset prices even when there is uncertainty about the existence and extent of an asset bubble.

Economic theory also suggests that uncertainty about bubbles is not a reason to ignore them and not react to them. In general, optimal monetary policy will react to asset prices and bubbles even if there is uncertainty about the latter. This point is important, as a typical argument against monetary policy targeting of bubbles is that there is always uncertainty about the existence of a bubble in the first place, not to mention how big it is. That is, how should we respond to a bubble if we are not even sure that there is one? (See Bernanke 2002, 2004; Greenspan 2004; Kohn 2004; Ferguson 2005 for such an argument.) A variation of this argument is that the Fed may not be a better judge than markets about the existence of a bubble. Some (Garber 2000) even go as far as to challenge the whole concept of an asset bubble, arguing that swings in asset prices are driven strictly by economic fundamentals. Indeed, as the relationship between current and expected economic

fundamentals and asset prices is difficult to model and measure, it is often hard to assess whether a change in asset prices is justified by changing economic fundamentals or whether such an asset price movement has a bubble (that is, non-fundamental) component.

Formally, Bernanke and Gertler (2001) have argued that, in the presence of asset prices that may be partly because of fundamentals (supply shocks) and in part because of non-fundamentals (bubbles), a monetary policy that disregards asset prices is superior to one that targets asset prices. Again, this result is obtained in a model whereby the monetary policy rule is not set optimally. As shown by Filardo (2001, 2004), in a generalization of a standard economic argument that uncertainty does not qualitatively change the nature of optimal policy decisions, the introduction of uncertainty about the fundamental and non-fundamental components of the asset price does not change the result that optimal monetary policy should react to asset prices. Formally, if the fundamental and non-fundamental components of asset prices are known, optimal policy reacts to both components but with different coefficients. But even if monetary authorities cannot separate with certainty the two components of an asset price, the optimal policy response implies reacting to the overall asset price (as opposed to reacting separately to its two fundamental and non-fundamental components). Thus, optimal policy will react to asset prices even when there is uncertainty about whether there is also a bubble.

More generally, the uncertainty argument about the existence and size of a bubble – one of the two leading arguments presented by Bernanke (2002) to argue against monetary policy targeting of asset prices – is a very weak basis on which to oppose monetary policy targeting of asset prices. All economic policy decisions are based on some degree of uncertainty. There can be uncertainty about the data (observation uncertainty), uncertainty about the parameters of the right economic model (parameter uncertainty) and, even, uncertainty as to whether certain economic variables matter for economic activity (model/paradigm uncertainty). As far as data observation uncertainty goes, knowing about the existence and size of asset bubbles is not easy, but it is also not easy to estimate the output gap when there are radical changes in the economic structure (as in the productivity boom of the late 1990s in the United States) or to estimate expected inflation. The fact that it was hard to estimate the output gap or changes in the NAIRU and the inflation process in the mid to late 1990s did not prevent the Fed governors from doing their best to find the best forecast of these changing variables. The Fed did not drop inflation or output from the Taylor rule because it was hard to estimate output gaps and expected inflation in a rapidly changing economic structure. The argument that uncertainty about a bubble implies that one should not react to it is both conceptually flawed, as any standard

optimal stochastic model suggests, and empirically weak, for monetary policy is always implemented under conditions of data uncertainty.

It is of course correct that the greater the uncertainty about the realizations of a particular variable, as measured by its variance, the less the optimal policy will react to that variable. Indeed, as shown by Filardo (2004), the greater the uncertainty about the asset bubble the lower the coefficient will be on the asset price in the optimal monetary reaction function. But this coefficient will never be equal to zero even in the presence of uncertainty. Thus, the uncertainty argument for dismissing a monetary policy of targeting asset prices is flawed. While greater uncertainty over the size of asset bubbles would imply a more muted response, a 'no response' policy is neither optimal nor rational. And indeed, while when Alan Greenspan sounded a public alarm over 'irrational exuberance' there were already strong signs of a stock price bubble, it was certainly even more evident by 1999–2000 that such a bubble was out of hand. By that time the S&P 500 Index and the Nasdaq Composite Index were sharply above where they had been at the time of the 'irrational exuberance' warning. Thus, one could have comfortably assessed that a tech stock bubble existed.

Argument 3. Uncertainty as to whether bubbles affect the economy does not reverse the result that monetary policy should react to asset bubbles.

Although the precise magnitude of the effect may be uncertain, the fact that bubbles have an impact on the economy – on the way up and on the way down – means that monetary policy needs to take them into account.⁶ However, some have argued that bubbles do not have an economic impact on real or financial variables (growth, inflation/deflation) and do not cause any serious and lasting damage (Posen 2003, 2004). So, if bubbles have no damaging effects, monetary policy should not react to asset prices. A variant of this argument is that monetary policy is neither necessary nor sufficient to cause bubbles (Posen 2004).

The argument that bubbles do not have costs and are unrelated to monetary policy is based on a selective reading of the evidence of their source, impact and effects. First, note that Posen's observation that only one-third (17 out of 48) of cases of sustained monetary easing have lead to

⁶Even authors that argue against monetary policy targeting of asset prices – Bernanke, Gertler, Ferguson, Kohn, etc. – tend to acknowledge the analytical channels (wealth effects and credit constraints effects on consumption and investment) that link asset bubbles to real and financial variables. Most recently, Greenspan referred to the link between housing prices, private savings and the current account, a pretty clear evidence of the impact of the recent US housing boom on the real economy. And there is a general consensus among many that monetary policy should care about the broader goal of financial stability.

property or equity booms does not invalidate the point that monetary easing can be a cause of asset bubbles. The fact that some episodes of sharp monetary easing do not lead to a bubble is irrelevant. If monetary easing follows a sharp recession (as do most cases of easing), one would not expect that necessarily to lead to a bubble. Similarly, the fact that only one-third of asset price boom episodes were preceded or accompanied by a monetary easing is also irrelevant. The issue is not whether easy money causes a bubble, as sometimes bubbles can be triggered by financial rather than monetary factors. The relevant issue is whether, whatever bubbles are caused by, monetary policy should react to them.

The argument that bursting bubbles do not cause significant economic damage is also incorrect. If a bursting bubble systematically leads, as is possible, to a sharp monetary easing to prevent the systemic and real effects of the crash, then the observation that many crashes are not costly becomes irrelevant. In fact, without an aggressive policy response (that may have other costs to be considered below), the economic impact of a crash can be severe. Indeed most of the authors – including Posen, Greenspan and Bernanke – who believe that monetary policy should not react to rising bubbles also believe that monetary policy should react sharply to bursting bubbles, as otherwise such bubbles would be highly costly. So, arguing that bubbles do not seem costly in practice – after policy has reacted to them – does not imply that they are not very costly in principle. And arguing that bubbles are not costly, but that not reacting to bursting bubbles would be costly, is similarly illogical.

Moreover, the argument that bubbles that eventually burst are not costly does not seem to be supported by the evidence on advanced and emerging economies. A number of studies (IMF 2000, 2003; Bordo and Jeanne 2002; Borio and Lowe 2002; Bordo 2003; Helbling and Bayoumi 2003) suggest that credit booms and busts and asset price booms and busts can have severe financial and economic consequences. A decade of experience with financial crises in emerging market economies⁷ shows that many of these crises are preceded by asset bubbles, credit booms, investment booms, and large and growing external current account imbalances that eventually become unsustainable. In many episodes, such bubbles and imbalances lead to severe economic and financial crises that have sharp impacts on economic growth. And the argument that bubbles should be dealt with through good ex-ante supervision and regulation of the financial system is again too easy. While some crises are due to poor financial regulation, bubbles can occur regardless of the quality of financial market supervision and regulation, as

⁷See Kawai et al. (2001). See also the exhaustive study of emerging market crises by Roubini and Setser (2004).

in the case of the US tech bubble of the 1990s and the housing bubble of the last few years. Thus, as a bubble emerges, the open issue remains whether monetary policy should react to it or not.

Finally, economic theory also suggests that uncertainty about whether or not bubbles affect the economy does not imply that monetary policy should not react to asset bubbles. As intuition suggests (and Filardo 2005 formally shows), such uncertainty about whether asset bubbles affect the economy or not implies only that the optimal response of monetary policy to such bubbles will be more subdued than in a case where there is less uncertainty about such effects. The optimal response is dampened but it is not zero. Thus, again, this as well as other forms of uncertainty about bubbles and their effects are not good justification for a 'no policy response'.

Argument 4. Monetary authorities should attempt to carefully 'prick' a bubble.

The analytical issue of 'pricking' or 'bursting' a bubble is more complex than, and different from, the question of targeting bubbles. In one case, monetary policy tightening would be actively pursued to prick or burst a rising bubble while in the other case monetary policy would react to a bubble even if such action may not directly affect the bubble itself. While in practice there may be little difference between targeting and pricking a bubble (as in both cases monetary policy reacts to an asset bubble), from an analytical point of view there is a difference. Early models of bubbles considered exogenous bubbles in which the bubble component of asset prices could not be affected by monetary policy (that is pricked). That is, when a bubble is exogenous, the probability of its endurance and its size is not affected by monetary policy. In this case, policy reacts to the asset prices only as a way to minimize the cost that such an exogenous bubble may have on the economy. On the other hand, in the case of an endogenous bubble one considers the possibility that both the probability that the bubble will endure and its size depend on monetary policy. That is, the higher the interest rates, the greater the likelihood of the bubble bursting. With endogenous bubbles, the issue of pricking the bubble thus becomes a relevant policy issue. This case has been recently considered in the analytical literature (see Filardo 2001, 2005). The main result is quite general – as long as monetary policy can affect the bubble (that is the bubble is endogenous), the optimal monetary policy response is an interest rate policy that will attempt to affect the behaviour of the bubble. Therefore, it is optimal to attempt to prick the bubble. So, at least conceptually, there is no logical argument that monetary policy should not react to bubbles as a way to reduce the likelihood of their occurrence. The relevant empirical issue, which we consider next, is whether actual attempts to target or prick bubbles would require such a large movement

in interest rates that a severe and undesirable economic contraction might ensue.

Argument 5. A monetary policy that reacts to asset bubbles does not need to lead to severe economic contraction. It may instead appropriately control a bubble that could become damaging if left to grow without control.

Both analytical arguments and empirical evidence support the view that bubbles can be carefully affected or pricked without triggering a wide economic contraction or severe financial distress; asset bubbles can be pre-empted in the same way that monetary policy can pre-emptively deal with inflationary pressures. But both Greenspan (2004) and Bernanke (2002) have argued that, in order to prick a bubble, the monetary policy response would need to be too strong and draconian – a very sharp increase in interest rates. Such monetary tightening would surely lead to a recession and create greater damage than the potential harm the bubble was generating.

In this view, central banks are unable to gently prick a bubble. In the words of Greenspan (2004): ‘The notion that a well-timed incremental tightening could have been calibrated to prevent the late 1990s bubble while preserving economic stability is almost surely an illusion’. Or in the words of Bernanke (2004): ‘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 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’.

A variant of the same argument is that, as a bubble is rising, investors expect very high returns from the increase in asset prices, sometimes as high as 100%-plus per year. Therefore, a modest increase in short-term interest rates – say 100 to 200 basis points – would have a limited or negligible impact on irrationally exuberant investors.⁸

Finally, critics of bubble pricking, such as Bernanke, have presented the example of the 1929 stock market crash, where allegedly an attempt to prick the perceived asset bubble before the crash led to the collapse of the stock market in late 1929. They have also argued that several episodes of monetary

⁸Blinder and Reis (2005) wrote, ‘Put yourself in Greenspan’s shoes in, say, November 1998 . . . Was there any reason to believe that a modest increase in short-term interest rates (say, taking the 75 basis points back) would deter intrepid investors in high-flying tech stocks – many of whom were expecting 100% annual returns?’

tightening in the United States did not prevent asset bubbles from emerging after such tightening occurred.

The above arguments against bursting bubbles have, however, little logical and empirical basis. In any asset bubble, there are elements of a credit boom, reaching for yield, increasing leverage and increasing and excessive risk-taking by investors. All these economic and investment decisions do depend on interest rates and how tight monetary policy is. The Fed believes that the monetary policy impact on bubbles is severely discontinuous: no effect at all if interest rates are increased by several hundred basis points, and economic collapse after interest rates have been increased above a very high threshold. But there is little basis for this view. Indeed, policy-determined short-term interest rates affect both credit conditions and the economic decisions about consumption and investment that, in turn, affect asset prices. Thus, monetary policy can credibly affect the business cycle through its effects on interest rates, credit conditions, investment and consumption. This means that it can also have a meaningful and continuous, not discontinuous, effect on the asset prices that do depend on such monetary policy and interest rates. In simple terms, the Fed view that monetary policy cannot deal with asset bubbles because it would inevitably do either too little or too much is mistaken.

Indeed, a variety of pre-emptive monetary policy actions can help to prevent bubbles from getting out of control. In the case of the tech bubble of the late 1990s, Greenspan first warned against 'irrational exuberance', but then he became the leading 'cheerleader' of the New Economy. There were many good reasons to be optimistic about the increase in long-run productivity that the IT revolution of the 1990s induced. But the usually dour and cautious chairman of the Fed could have taken a more subdued public attitude towards the New Economy rather than becoming its most vocal official supporter. Moreover, the monetary easing following the LTCM crisis was probably excessive. It could have been reversed earlier and faster: by the end of 1998, when the liquidity seizure in US capital markets faded. And a more active use of margin requirements might have, at the margin, affected investors' willingness to borrow and be highly leveraged in their purchases of tech stocks. It is true that investors were expecting high returns from the tech bubble and were behaving in an irrationally exuberant fashion. But, a less 'irrationally exuberant' Greenspan, an earlier and more assertive Fed policy of tightening and the use of other instruments to control leverage could have had an effect on the 1990s bubble. Arguing to the contrary is simply inconsistent with the known effects of monetary policy on financial and real economic decisions.

In addition, the recent experiences in the United Kingdom, Australia and New Zealand suggest that it is possible to react to bubbles with a moderate

and gradual monetary policy tightening without causing a financial and economic crash.

In the United Kingdom, concerns that a housing bubble was getting out of hand led the Bank of England to increase short-term rates by 125 basis points between November 2003 and August 2004, pushing them up to 4.75%. This monetary tightening was successful in slowing the housing boom and led to a gradual fall in housing prices. UK economic growth did slow somewhat following this tightening, as was desired and expected by the monetary authorities. But it did not lead to a financial meltdown or a severe recession. Instead, after a few quarters of slower growth, the United Kingdom showed signs of a growth revival in the summer of 2005.

An even more successful example of pricking a housing bubble is that of Australia in 2003–05. There, the monetary authorities became seriously concerned about the risks of a housing bubble that had gotten out of control in 2002 (with Sydney house prices increasing as much as 50% in 2002). The monetary tightening started in 2003, and by the spring of 2005 short-term interest rates in Australia were at a four-year high. The monetary tightening succeeded in stopping the housing bubble without having severe effects on growth or asset markets. If anything, the reduced risk of a collapse of housing prices, because of the pre-emptive monetary tightening, benefited asset prices. Indeed, the local stock market was up 10% in the summer of 2005 compared with the start of the year. The soft landing of the economy was so successful that Australia has recently been referred to as a ‘nirvana’ or ‘goldilocks’ economy (see Pesek 2005). Indeed, the growth has slowed but has remained at a respectable rate after 14 years of continued expansion.

A similar story holds for New Zealand, which also used monetary policy to address its housing bubble. From January 2004 until the summer of 2005, short-term interest rates were increased seven times, up to 6.75%, in order to cool inflationary pressures and deflate the housing bubble. New Zealand’s economic growth may have slowed to 2.3% in 2005, from 4.8% in 2004, based on the latest forecasts, but this is hardly an economic or financial meltdown. If anything, markets expect that interest rates will be kept at these high levels as a way to prevent a renewed overheating of the housing market.

These three most recent episodes prove that monetary policy can, if used wisely and moderately, be very effective in pricking asset and housing bubbles without leading to significant economic or financial damage. The examples provided by the ‘prick-the-bubble-crash-the-economy’ pessimists such as Bernanke are all cases in which the asset bubble policy management was botched. In Japan in the 1980s, the Bank of Japan first waited too long to deal with the housing and equity bubble. Then, once the bubble burst, it waited too long to ease monetary policy to deal with the real and financial effects of the burst bubble. Similarly, the US case of 1929 is a classic example

of waiting too long to deal with a bubble and then waiting too long to deal with the economic and banking effects of the credit crunch that occurred once the bubble popped.

Thus, the Fed's attitude seems a bit disingenuous. In the latest episode of the US housing bubble, a series of Fed officials first altogether downplayed the evidence that there was a bubble. Then Chairman Greenspan spoke about some 'froth' in some housing markets. By August of 2005 he had started sounding serious alarms about the housing bubble ('nearer term, the housing boom will inevitably simmer down' and 'history has not dealt kindly with the aftermath of protracted periods of low risk premiums'). But he continued the refrain that 'I find it difficult to envision central banks successfully targeting asset prices any time soon' and thus did little in practice to address this asset bubble. He indeed forgot to mention that at least three central banks – those in the United Kingdom, Australia and New Zealand – had recently been willing to target asset prices, housing specifically, and had performed so quite successfully.

Argument 6. It is inconsistent and non-optimal to argue that monetary policy should react to bursting bubbles but not to rising bubbles.

There are many good reasons why, if monetary policy responds to bursting bubbles to control the collateral damage of crashing asset prices, it also needs to pre-emptively respond to rising bubbles. Greenspan and the Fed have argued that it is better to respond via monetary easing when a bubble has burst ('mopping up after'). Mopping up after the bubble has burst is necessary because of the risk of severe economic downturn or a systemic risk. In the words of Greenspan (2004), 'Instead of trying to contain a putative bubble by drastic actions with largely unpredictable consequences, we chose, as we noted in our mid-1999 congressional testimony, to focus on policies "to mitigate the fallout when it occurs and, hopefully, ease the transition to the next expansion"'.⁹ This Greenspan view implies that an asymmetric response to bubbles makes sense. The Fed should not try to prick a bubble when the bubble is rising, but should instead try to contain the economic damage of a sharply bursting bubble, as a rapid fall in asset prices is dangerous and damaging to the economy.

While responding to bursting bubbles makes sense for many reasons, the Greenspan/Federal Reserve view fails to recognize that a more symmetric response to rising and bursting bubbles is more appropriate than an asymmetric response. Indeed, the Fed argument is odd, as it suggests an asymmetric response of monetary policy to bubbles: monetary policy should

⁹See also Bernanke (2004), Posen (2004) and Kohn (2005) for similar arguments.

not react to rising bubbles, but should react to bursting bubbles. But this asymmetric response does not make sense.

First, theory suggests that the response should either be symmetric (Filardo 2003, 2004, 2005), or that there should be no response at all (Bernanke and Gertler 1999, 2001). Second, take the Fed argument that unless it is heavy handed in raising rates, monetary policy cannot prevent a bubble from expanding. If this is true, then why should monetary easing, unless it is also excessively aggressive in ways that may also be detrimental, be able to contain the damage of a bursting bubble? Why should the effects of monetary policy be asymmetric – ineffective in the case of rising bubbles, and very effective in the case of bursting bubbles? There is no economic or analytical logic to this asymmetry.

Greenspan tried, in a remark at the 1999 Jackson Hole conference, to justify the *asymmetric* response of the Fed to asset bubbles and asset crashes. His argument goes as follows. The Fed does not have an asymmetric response to bubbles. If asset prices are rising gradually in bubble-like fashion, the Fed should not intervene. Similarly, if a bubble is deflating gradually, with a slow fall in asset prices, the Fed should not and would not intervene. But the Fed does intervene when asset prices are falling very rapidly, as this *sharp* fall in asset prices risks being very damaging. So, in Greenspan's apology, it is not the Fed that is willingly asymmetric: markets are asymmetric, with bubbles building up slowly and bursting rapidly. So, Greenspan argued that the Fed looks as if it is asymmetric in its response only because markets are asymmetric and, thus, the Fed response ends up being asymmetric (see also Kohn 2005 for a similar argument).

Let us dissect Greenspan's apology for this asymmetric response to bubbles. One possible interpretation is that while it is hard to identify a rising asset price as a true bubble when prices are moving slowly upward, it is easier to identify asset prices suddenly collapsing as the result of a burst bubble. While it is correct that it is easier to spot a bursting bubble than a rising bubble, economic policy is about making sensible assessments of uncertain events. Greenspan, in late 1996, had already smelled a bubble when he spoke of 'irrational exuberance'. While it was not completely clear in 1996 that there was an asset bubble in the stock market, by 1998, 1999 or 2000 the existence of such a bubble was much more evident. By those later years, the Chairman must have been even more convinced that there was a bubble in tech stocks and also in the overall stock market. Similarly, the evolution of Greenspan's and other Fed officials' pronouncements on the housing market suggest that, over time, the Fed could have made a sensible probabilistic assessment that a housing bubble had indeed developed. Indeed, as housing prices kept on rising above levels justifiable by a range

of fundamentals, this assessment of the existence of a housing bubble would become easier. So, there is a reply to Greenspan's logic that an asymmetric response is justified because it is easier to spot a bursting bubble than a rising one. The reply is the famous comment by Justice Potter Stewart about 'obscenity' (I know it when I see it). A 'smell' test, as well as a range of statistical and analytical tools, can enable the identification of rising bubbles with some degree of certainty.

A second interpretation of Greenspan's argument is that a bursting bubble is much more damaging than a rising bubble because *sharply falling* asset prices are very dangerous – more so than a *slowly rising* bubble. If one takes this interpretation seriously, then logically the Fed should react to a rising bubble if the increase in the asset price were indeed very rapid. There have been episodes of that sort in recent US history. For example, the Nasdaq rose from a level of about 2,000 at the beginning of 1999 to above 5,000 by March 2000, a 150% increase in 15 months. This is a much more rapid percentage increase in asset prices than most falling asset price episodes. But, instead, Greenspan argued that the Fed could have not addressed such an asset bubble. The consequences of this tech bubble and its eventual burst were severe. The collapse of the Nasdaq in 2000 was the major factor behind the 2001 recession, a recession that was mild only because the Fed response to it was very rapid and aggressive. And the costs of this bubble were more severe than the mere GDP numbers suggest: the entire tech sector went into a complete meltdown, and access to venture capital and other forms of financing for the tech and Internet sectors dried up for years. Technological innovation in the tech sector was also hindered because the excesses of the 1990s led to overcapacity and an investment drought once the bubble burst.

A third interpretation of Greenspan's argument is that monetary policy needs to provide lender-of-last-resort support to financial markets when periods of liquidity seizure, following bursting bubbles, lead to the risk of a systemic crisis. Certainly, ensuring the orderly functioning of markets in episodes of liquidity stress is an important and valid role that a central bank should be playing. But, like any other form of insurance, such lender-of-last resort liquidity support may lead to moral hazard distortions. One does not want to exaggerate the risks of moral hazard, as there is always a meaningful trade-off between insurance and moral hazard. And the argument that dealing with the liquidity shortage of a bursting bubble may always lead to severe moral hazard (the so-called 'Greenspan put' argument) is exaggerated.

But an asymmetric response to bubbles – not fighting a rising one while easing the effects of a bursting one – is certainly more likely to lead to some moral hazard distortions than a more symmetric response. Suppose a central bank was to systematically allow asset bubbles to grow without doing

anything about them, while promising markets that liquidity would be eased every time a bubble burst (as the Fed has repeatedly done for the last two decades). The distortions to the incentives of investors may become serious. Therefore, exactly because liquidity insurance should be properly used in times when systemic risk is acute, it is necessary to avoid distorting investors' incentives in good times. This means being willing to 'pull the punch bowl away' when bubbles are making investors drunk and reckless. Those who are concerned about asset bubbles do not claim that monetary easing should not be used to address bursting bubbles because of moral hazard risk. They rather argue that a more symmetric response to rising and bursting bubbles is more likely to provide the appropriate incentives and balanced risk assessment by investors. These incentives to appropriately assessing two-sided financial risk may then prevent bubbles from developing in the first place and continuing over time.

In practice, the above arguments mean that the Fed has been right in providing liquidity in episodes where there has been a liquidity seizure. These instances include the stock market crash of 1987; after the Russia meltdown in 1988 led to the near collapse of LTCM; when the Y2K bug risked causing a liquidity squeeze in money markets in 2000; and in 2001 when the 9/11 tragedy put the financial and payments system at risk. But this willingness to provide lender-of-last-resort support – which has been made explicit Fed policy by repeated Greenspan pronouncements – has not been accompanied by a willingness to control the rise of bubbles when they do occur. In the case of the late 1990s tech bubble and most recent housing bubble, the Fed failed to try to control these rising bubbles. Instead, the Fed has been hiding behind the arguments that nothing can be done about rising bubbles and everything needs to be done to avoid the damage of bursting bubbles.

One additional risk of the Fed's asymmetric policy approach to bubbles is that it risks creating a new bubble after the previous one has burst. It is true that there is no clear evidence that not pricking a rising bubble and easing policy to deal with a bursting one will necessarily lead to the emergence of another bubble (see Posen 2004 for such an argument). However, the Fed has provided liquidity in cases of bursting bubbles and systemic risk episodes in 1987, 1998, 2000 and 2001. In contrast, it decided not to try to prick two major inflating asset bubbles in the 1990s and in the last few years (high-tech stocks and housing, respectively). This asymmetric behaviour may have created serious distortions in an excessively leveraged economy, one in which asset bubbles are now becoming more common. So there may indeed be circumstantial evidence that dealing asymmetrically with bubbles causes more bubbles to emerge.

Finally, Greenspan's statement that monetary policy would not respond to a gradually deflating bubble (one that does not suddenly burst) is not

credible. One can suspect that the actual response of the Fed would be different in such cases. First of all, while asset price *crashes* are likely to occur in the case of financial assets (stocks, bonds, currencies), they are highly unlikely to occur in the case of real-estate. Real-estate bubbles do not burst with a bang: real-estate prices are inertial and sluggish. The first sign of a real-estate bust is the increase in the inventories of unsold real estate, not falling prices; only over time does the price inertia turn into slowly falling prices.

But if the Fed argument that it would not respond to a slowly deflating asset bubble were true, the Fed would never respond to a protracted, slow but persistent and eventually damaging fall in housing prices. It would not respond even if such a fall were to lead housing prices below their fundamental values and cause widespread bankruptcies among households and firms in the real-estate sector. However, that 'no-response' policy would not be the appropriate policy reaction to a gradually falling housing bubble. The experience of Japan – where the Bank of Japan waited too long to deal with gradually falling real-estate prices – suggests that one may also want to respond to gradually falling asset prices. So, the Greenspan argument that the Fed should respond to sharply falling asset prices, but not to gradually falling asset prices, is not analytically correct. Also, in practice, it is neither obvious nor credible to argue that the Fed would not respond to a gradually deflating housing bubble in the United States. If such a bubble were likely to lead to a persistent but temporary fall in US growth below its potential rate, it is more likely that in practice the Fed would respond to such a falling housing bubble.

And indeed, the argument that the Fed would not respond to a gradually deflating asset bubble seems to be refuted by its response to the Nasdaq bubble in 2000–01. The bursting of that bubble did not take the form of a market crash *à la* 1987, when the stock market fell more than 20% in one day. The Nasdaq bubble bust took the form of a persistent and steady fall in tech stock prices from the spring of 2000 until the beginning of 2002. But the response of the Fed to this tech bust was one of an aggressive easing starting at the end of 2000. It is true that a part of the easing was driven by the economic recession that the tech bust was causing, but the recession was in part needed to deal with the excessive growth and the financial and investment excesses that the bubble had caused. Thus, not only was the Fed response asymmetric, but it was also asymmetric to a slowly falling bubble. Similarly, the concern about a 'Greenspan put' is that Greenspan – or, at this point, his successor – will respond to falling housing prices by inappropriately easing monetary policy. That is, the Fed may ease, rather than accept, the fact that the US economy will unfortunately need to grow below potential for a while in order to deal with the severe domestic and

external imbalances that the fiscal deficits and housing bubble of the last few years have created.

In conclusion, responding to inflating bubbles – not just bursting ones – could help avoid distorting economic and investment decisions. And it would work better than an asymmetric policy of responding to bursting bubbles (whether the bubble deflates slowly or bursts rapidly), but not responding to rising bubbles. An asymmetric response may be a source of investment distortions that may lead to cycles of repeated and intensified asset bubbles and asset crashes in the United States.

III. Concluding Remarks

In this paper, we have discussed the arguments in favour of and against monetary targeting of asset prices and asset bubbles. We have argued that there are many good arguments in favour of such targeting and that arguments against it are, in many dimensions, not robust. First, a wide range of analytical models suggests that optimal monetary policy should react to asset prices and exogenous asset bubbles (that is, bubbles whose evolution does not depend on monetary policy), above and beyond reacting to deviation of growth and inflation from target. Second, uncertainty about the existence of a bubble does not undermine the arguments in favour of asset price targeting: like many other types of data uncertainty, uncertainty about the existence and size of an asset bubble only reduces the degree of response of optimal monetary policy to asset bubbles. Third, uncertainty about whether bubbles can have damaging effects on the economy is not a good argument against targeting of such bubbles, as: (a) there is a wide body of evidence that such bubbles and their aftermath are costly; and (b) uncertainty as to the economic effects of bubbles again only reduces the degree of optimal interest rate response, but does not eliminate completely such a response. Fourth, analytical models also suggest that if a bubble is endogenous (that is, its probability and size can be affected by monetary policy), optimal monetary policy requires attempting to affect the bubble (that is, trying to ‘prick’ or ‘burst’ it). Fifth, the argument that trying to deflate or prick a bubble would require such a large interest rate response that a severe recession would be triggered is found to be incorrect both in theory and practice. Conceptually, a moderate interest rate response can have an impact on bubbles and reduce the economic distortions caused by them. And empirically, the recent experience of the United Kingdom, Australia and New Zealand shows that monetary authorities can successfully control bubbles with monetary tightening without causing severe recession or financial distress. Sixth, the Greenspan argument that the Fed should not react to rising bubbles but should be ready to ease in order to dampen the

real costs of bursting bubbles (that is, an asymmetric response to bubbles) is also found to be inefficient and, possibly, a source of moral hazard distortions. It is certainly warranted for a monetary authority to react to bursting bubbles that may cause severe liquidity seizures, systemic risk and risk of large economic contraction. But to prevent such a response from creating distorted incentives, monetary policy authorities should also be willing to respond to rising bubbles. That is, while a symmetric response to rising and bursting bubbles is appropriate, an asymmetric response is conceptually flawed, liable to create distorted incentives, and likely to induce cycles of rising and bursting bubbles that may have damaging economic and financial effects.

This paper does not suggest an aggressive monetary policy approach to asset bubbles. The uncertainties about bubbles and the other factors discussed above suggest that monetary policy should respond to asset bubbles in a cautious and moderate manner. Thus, some of the arguments presented by Fed officials to justify their resistance to fighting rising bubbles have logic and legitimacy. While caution is warranted, the Fed argument, presented and repeated by Greenspan and other Fed officials, that there is no case for responding to asset bubbles, is found to be incorrect. We also argued that the Fed practice over the last two decades of not reacting to rising asset bubbles (the tech stock bubble of the late 1990s and the housing bubble of the last few years), while aggressively countering bursting bubbles and episodes of systemic risk (in 1987, 1998, 2000 and 2001–03), has contributed to the asset bubbles and economic imbalances (low savings rate and large current account deficit) that make the US economy highly vulnerable to investor shifts in assessment of risk and to negative developments in global economic conditions. That is why a Fed reassessment of its approach to asset bubbles is seriously warranted.

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